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- Disaster Management Innovation (DMInnovation)
- Humanitarian OpenStreetMap Team (HOT)

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About Us

Disaster Management Innovation (Previously AIFDR)

Disaster Management Innovation is the latest investment of the Australian Government through Geoscience Australia in Indonesia. DMInnovation is founded to continue the success of Australia - Indonesia Facility for Disaster Reduction (AIFDR), a former initiative between the Australian - Indonesian Government. AIFDR was launched ceremoniously by the Australian - Indonesian Government on July 15, 2010 and was officially closed in August 2015. DMInnovation will continue to maintain scientific technical assistance which will be used in partnership programs between the scientific institution of Indonesia and Geoscience Australia.
Humanitarian OpenStreetMap Team (HOT)

Free and collaborative maps have its own unique value in humanitarian work, especially in places where basic maps are rare, containing old data, or frequently change. Developed in two years of informal collaboration, Humanitarian team of OpenStreetMap is a new initiative to apply the principles and activities of open source and open data sharing to achieve humanitarian response and economic development.

https://www.hotosm.org/

http://openstreetmap.id
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Chapter 1
Introduction

Learning Objectives

• To understand the definition of OpenStreetMap
• To understand the history of OpenStreetMap
• To understand the difference between and other map providers
• To understand OpenStreetMap sample products
• To understand how OpenStreetMap works
• To understand the concept of paper maps
• To understand the importance of digital maps
• To understand the components of digital maps

1.1 What is OpenStreetMap?
OpenStreetMap (OSM) is a tool to create and distribute information in a map. Anyone can contribute to OSM and thousands of people add new projects to OSM every day. Users make maps on their computer, instead of on a piece of paper, but as we are going to learn from this module, drawing maps on a computer is not too different from drawing it on a paper. We still use symbols, such as lines to draw roads and squares for buildings. However, what is important from OSM is that the maps you create will stored into the internet and anyone can access them anytime and anywhere for free.
1.2 OpenStreetMap History

The two main factors that bring about the initiation and growth of OSM is the limited usage and availability of map information in many parts of the world and the affordability of portable satellite navigation software.

Steve Coast began the project in 2004. He initially focused on mapping the United Kingdom. In the UK and other countries, government-funded projects, such as the Ordnance Survey, created a lot of datasets that cannot be freely and widely distributed. In April 2006, OpenStreetMap Foundation was established to encourage the growth, development, and the distribution of free geospatial data and to liberate such data to be used and shared by anyone. In December 2016, Yahoo! confirmed that OpenStreetMap was allowed to use its satellite imagery as its map creation background.

In April 2007, Automotive Navigation Data (AND) donated all its street datasets from the Netherlands and main roads datasets from India and China to this project. In July 2007, 9,000 users signed up to attend the first international conference State of the Map. This event was sponsored by Google, Yahoo, and Multimap. In September 2007, OpenStreetMap started a datasets import process of the TIGER for the United States. In December 2007, Oxford University became the first major organization to use OpenStreetMap data in its website.

The means to import and export data continued to develop. In 2008, the project launched a tool to export OpenStreetMap data into a portable GPS, that can replace copyrighted and obsolete maps in the inside. In February 2008, a series of OpenStreetMap workshops were organized in India.
In 2010, Microsoft let its satellite imagery to be used as a background satellite imagery for OpenStreetMap data entry. In 2012, Google Map is charging fees for its service triggered a number of reputable websites to convert from Google Maps into the OpenStreetMap and its other competitors. A few of these websites, including Foursquare, Craiglist who adopted OpenStreetMap, and Apple, Inc who terminated its contract with Google and launched its own independent mapping platform that uses TomTom and OpenStreetMap data (more information can be seen from: https://wiki.openstreetmap.org/).

1.3 Why Choosing OpenStreetMap?

The following are some reasons why you are better-off choosing OpenStreetMap:

1. OpenStreetMap is open and free. This means, OSM is not charging any fees to use its data.

2. Data OpenStreetMap is rich, accurate, and updated real-time. This is because each user can add, change and delete data. For example: if you
realize a building no longer exist but is still mapped on OpenStreetMap, you can easily delete that building from the map.

3. Using OpenStreetMap is easy. OpenStreetMap produces a lot of guidelines to first-time OSM mappers. Its layout and means to add data is made as easy as possible to enable users with diverse educational background can still participate in contributing data to OpenStreetMap.

4. OpenStreetMap can be customized. All datasets in OpenStreetMap can be used to your own needs, for instance, if you need to make tourism sites map in your place, you can take OpenStreetMap data and show only these tourism destinations without having to include other information.

Now that you understand the benefits of using OpenStreetMap, you may wonder, “how is OpenStreetMap better than other digital map providers?”. Below you can see a comparison between OpenStreetMap and other map providers using Map Compare by Geofabrik (http://tools.geofabrik.de/mc).

![Map Compare](image)

**Picture 1.3. Comparison between OpenStreetMap, Google Map, and Bing Map**

### 1.4 Samples of OpenStreetMap Usage

OpenStreetMap data is open, which means anyone can access and contribute to adding OpenStreetMap data. OSM data can be used for a variety of purposes, using Geographic Information System (GIS), such as disaster management, urban planning, et cetera.
1. Making of Village Map

The spatial data available to making village maps are often incomplete or not detailed. By using OpenStreetMap data, large scale maps, such as village maps can be created in detailed as contributors can do their own ground survey on the area in question.

![Picture 1.4. Example of Village Maps](image)

2. Making of Database for Disaster-prone Areas

In disaster management, maps play critical roles in preparedness, response, and rehabilitation phases. Some of the map examples related to disaster management, including map of disaster prone areas, map of affected buildings, map planning for evacuation shelters and routes.

![Picture 1.5. Example of Map of Disaster Prone Areas](image)
Picture 1.6. Example of Evacuation Route Map

Picture 1.7. Example of Map of Affected Buildings
1.5 Basic Concepts OpenStreetMap

1. The Concept of Paper Maps

Information is an important element. With better information and the right understanding, each individual and citizen can improve their livelihood and make informed decisions for their future. There are a lot of decisions made by communities and organizations that can affect people’s life. This means having richer information may enable organizations, governments, and community in making better decision that can improve people’s livelihood.

Maps can be a good way to convey information. Maps are visual symbols of our world. Maps can often deliver information and answer questions better than words, for example where are nearest schools and hospitals? Who has the easiest access to those facilities? Where do we find issues with poverty? These questions are better addressed using maps to find the right solution.

For an opening exercise, please prepare a pencil and a piece of paper, and then draw a map of the area you live in or are familiar with. What are the most important parts that need to be included in a map? What are the most critical parts of a map? Spend a few minutes on this exercise and once you are done, examine the maps and ask yourself questions, such as why is it important for this information to be included in a map and to whom will this information be useful?
If you draw an area that you know really well, you may find yourself drawing lines as roads and waterways. You may also include buildings, such as schools and offices, courts or even administrative boundaries, such as village and neighborhood boundaries. Whatever you decided to draw, you must use symbols to represent the objects you fill in, such as lines for roads, and squares for buildings, et cetera. In a sense, the map you drew is a representation of what exists on the surface of the earth.

The map you draw has to be informative. You may have to explain this map to someone who does not know the area you draw, to clarify what are the problems that exist in that
community, and to help someone who are trying to reach the location on that map. But of course, there are shortcomings in such maps, such as that you only draw one map, or that may be your drawing is not easy to comprehend by other people, or that because it is made on a paper, it is not easy to distribute it to other people. This what makes making maps on a computer or making it digitally is better solution to store and distribute maps that we make so it can easily be accessed by other people in need.

2. Why Shifting into Digital?

Digital maps are a representation of geographic phenomenon stored to be displayed and analyzed by a computer. In other words, digital maps are maps made by software with functions specific to making maps. Each object on a digital map is stored as one or a group coordinates. Data in digital maps, compared to paper maps, are easier to update and to store.

Making maps on a computer enable us to collect more meaningful data compared to making it on a paper. On a piece of paper, we may be able to draw a school, add its name and record a couple of other information about that school, but in a computer, we can attach data on the size of students, teachers, size of buildings, structure of buildings, et cetera. More importantly, when we add this school into a digital map, we are recording it to the right location (latitude and longitude) on the earth. In addition, there are a few components we need to consider in making digital maps.
3. Components in a Digital Map

Digital maps have several components, including:

1. **Projection System**
   Every digital map needs to have a projection system. Map projection is a system that translate relations between the nodes on earth compared to the ones on the map. This is because the earth surface is not flat and irregular, making it difficult to represent the result of measurements. Ellipsoid with certain scales is then chosen as a geometry that can represent the earth’s physical form.

2. **Spatial Data**
   Spatial data is data that has georeferenced in which a variety of attribute data is placed in spatial units.
   There are two types of spatial data, which are:

   1. **Vector Data (nodes, lines, polygons)**
      Vector data describes geographical data as points that have coordinates and can be linked to one another by lines and polygons. Each object in a vector dataset is called feature, and are linked with data that describe that feature.

   ![Types of Vector Data](image)

   2. **Raster Data (grid or pixel)**
      Raster data is similar to images. Although it may represent a variety of objects in real life, these objects are inseparable and are represented by a pixel with different colors.
3. **Non Spatial Data**

*Non Spatial data* is a tabular (attribute) data linked to or is integrated to the characteristics or description of spatial data. For example, the name of the facility, address, population size, et cetera.

Now that you understand the definition and history of OpenStreetMap, you have also learned the basic concept of the making of OpenStreetMap, one of which is by converting paper maps into digital maps. Having understood these concepts, you may be interested to find out more about OpenStreetMap and how to use it in daily life.
Chapter 2

Start Using OpenStreetMap

Learning Objectives

- To understand and to practice how to visit OpenStreetMap website
- To understand and to practice how to explore OpenStreetMap
- To understand and to practice how to change OpenStreetMap layers
- To understand and to practice how to look up object information on OpenStreetMap
- To understand and to practice how to save OpenStreetMap into images
- To understand and to practice how to share OpenStreetMap hyperlinks
- To understand and to practice how to create an OpenStreetMap account

Having known what is OpenStreetMap, in this chapter we are going to learn further how to visit OpenStreetMap website and the menu it has. We will also learn and practice how to change layer, to look up object information, to save maps as images, and to share OpenStreetMap links. By the end of the chapter, we will learn how to create an OpenStreetMap account before we can add and update data in it.

2.1 Visiting OpenStreetMap Website

In order to visit OpenStreetMap website, make sure your computer is connected to the internet. You also need to make sure it has a web browser, such as Google Chrome, Mozilla Firefox, Internet Explorer, Opera, Safari, and alike. If you have them both, please follow the instruction below:

1. Open the web browser in your computer, in the address bar above your browser, type www.openstreetmap.org and press enter;
2. When the website appears, you will see the following screen:
2.2 Navigating A Map

On the main interface of the OpenStreetMap website, you will see one big map on a display. You must be able to navigate this map so you can explore the place of your choice. To zoom the map in and out, you can use (+) and (-) buttons located on the right side of your monitor. If your mouse has a scroll wheel, you can use that to zoom in and out. Scroll the mouse’s scroll wheel upwards to zoom in and downwards to zoom out.

To drag the map display, you can use your mouse. Left click on your mouse, hold and drag it to the place you desire (see the Picture below for further information).
To search the location, you can use the search bar on the left side of your monitor. You can type in the location name on that search bar, and then press “Enter”. A “search result” panel will appear below the search bar. You can select one of the search results displayed to head over directly to the place you intended.
2.3 Showing a Map with Different Layouts

OpenStreetMap has geographic data from all over the world. Although stored in one database, those data can be shown in different layouts. To do that, you can click on the layer button on the right side of the map.
Click on each layer to see different layouts on your map. Each layer will show different layout. For example, transport map layer focuses more on transport routes, such as highways and bus lanes, while humanitarian layer will show public facilities, such as schools, hospitals, and office buildings. All these types of data can be included on the OSM.

2.4 Looking up for Object Information on OpenStreetMap

On the main page of OpenStreetMap, other than to look for a location and navigating the map, we can also see the objects’ information using query features. The following are the steps:
1. Click on the ‘Query Features’ on the right side of your monitor. A question mark will appear on the right side of your mouse cursor. This means the query features have been activated.

2. Select objects or locations you need to identify. In this example, we will choose Placa Indonesia in Jakarta.

3. A box will appear on the left side of the monitor to show Nearby Features and Enclosing Features. Nearby Features show the objects located closest to the object we select, while Enclosing Features show the objects located surround our selected object. Select the object information Plaza Indonesia.

4. After you select that, detailed information about Plaza Indonesia will be shown on the left panel.
2.5 Exporting Maps into Images

Other than changing layer on OpenStreetMap, you can also export that map as an image. Here is how to do that:

1. Click on the label ‘Share’ on the icon located at the right side of your map.
2. Determine which area on the map you would like to export as an image. Tick the ‘Set custom dimensions’ box and then set the size of the box as you want or by adjusting the scales.

3. Click ‘Download’.

![Picture 2.10. The Interface to Export OpenStreetMap](image)

### 2.6 Sharing OpenStreetMap Links

You can share a link pointing at a location on OpenStreetMap to others for many reasons, for example when you want to share a location you are at right now to your colleague. To share OpenStreetMap, here are the steps:

1. Click the icon ‘Share’ on the right panel of your monitor.
2. A ‘Share’ panel will be displayed on the right side of your monitor. Tick ‘Include marker’ to add a marking sign on the location. A marker will appear on your map. You can move this marker around to point the location you intend. Just click and drag the marker to the intended location.
3. When done moving it to the right spot, you can copy the link on the link box and share that link as you like.
2.7 Creating OpenStreetMap Account
You have seen the layout and main menus of the OpenStreetMap website, now you can learn how to make an account in the OpenStreetMap and make your first contribution. Here is how:

On the upper right corner of the OpenStreetMap website, click ‘Sign up’

1. You will see the following page:

2. There are five columns you need to fill in to create an OSM account.
3. Insert your **email address** on the first two columns. You have to fill in the exact same addresses on the two boxes. This is where the confirmation email will be sent to.

4. On the third box, fill in **username** that you want to use. If you wish to use your name as the username but somebody else has used it before, please note that you cannot use that same username anymore, so please find another username still available.

5. Fill in the **password** that you want to use in the fourth and fifth boxes. You have to fill in the same password in both boxes and these passwords do not have to be the same with the one you use for your email account.

6. Once done filling out these columns, click ‘**Sign Up**’ in the bottom part of the website.

In this stage, you have registered yourself an account for the OpenStreetMap, but you have not activated this account. To activate, these are the steps:

1. Open a new tab on your browser and open up your email.
2. Type in your email address and your password.
3. When succeeded, you will see an email from OpenStreetMap in your inbox.
4. Open that email. Click the link in the email body, as shown in the picture below.

**Picture 2.13. Notification about OSM Account Registration Sent to Email**
5. A new tab will automatically appear on your browser. If it runs as described, congratulations, now you have an OSM account!

**Notes:**
If a trouble occurs, a message will appear. Make sure the email addresses and passwords you typed in were the same. If the username column turns red, that means somebody else has taken that username and you need to use a different username.

6. On the OpenStreetMap main page, click ‘**Log in**’ on the upper right corner. Insert your username and password and then press enter. You will be logged in and you can see your username on the upper right corner of the OpenStreetMap website.

Congratulations! If you completed all the parts explained in this chapter, you would already have an OpenStreetMap account and know how to navigate the OpenStreetMap website.
Chapter 3

Adding OpenStreetMap Data with \( iD \)

**Learning Objectives**

- To understand the concept of \( iD \)
- To know how to use \( iD \)
- To know \( iD \)'s interface
- To understand and to practice how to change the map background
- To understand and to practice how to operate \( iD \)
- To understand and to practice how to modify objects using \( iD \)
- To understand and to practice how to save new edits with \( iD \)
- To understand the additional attributes available on \( iD \)
- To save and to upload edits

If you have succeeded making an OpenStreetMap account, you have the access to add new data to OpenStreetMap. Now we will learn how to add data on the OpenStreetMap website, using a tool, called \( iD \).

\( iD \) is an OpenStreetMap web-based editor that can be used to add and to change data on OpenStreetMap. \( iD \) has basic functions that enable users to update OpenStreetMap data easily and quickly using spatial data sources, such as satellite imagery, GPS, and Field Papers. Because \( iD \) is an OpenStreetMap web-based editor, using \( iD \) to add data, you need to connect to a stable internet connection.

### 3.1 Starting the \( iD \)

Before starting, your computer needs to connect to the internet. Open your internet browser, and type in OpenStreetMap website (http://www.openstreetmap.org). Login
to your OpenStreetMap account and zoom in to the area you would like to edit until the Edit tab becomes active. Click on the arrow sign next to Edit and then click Edit using iD (editor in the internet browser).

**Picture 3.1. Activating iD on the OpenStreetMap**

### 3.2 iD’s Interface

**Picture 3.2 iD’s Interface**
1. **Features Panel:** This panel can display attributes of an object and show that object on the map. You can edit attributes of an object from this panel.

2. **Tools panel:** This panel shows several basic functions to edit a map, including:

<table>
<thead>
<tr>
<th>Icon</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Titik</td>
<td>To add a point</td>
</tr>
<tr>
<td>Garis</td>
<td>To add a line</td>
</tr>
<tr>
<td>Area</td>
<td>To draw a polygon</td>
</tr>
<tr>
<td></td>
<td>To undo</td>
</tr>
<tr>
<td></td>
<td>To redo</td>
</tr>
<tr>
<td>Simpan</td>
<td>To save changes</td>
</tr>
</tbody>
</table>

3. **Map panel:** this panel shows several function to customize map display, including:

<table>
<thead>
<tr>
<th>Icon</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Zoom in</td>
</tr>
<tr>
<td></td>
<td>Zoom out</td>
</tr>
<tr>
<td></td>
<td>To go to the current location</td>
</tr>
<tr>
<td></td>
<td>To set the map's background layer</td>
</tr>
<tr>
<td></td>
<td>To open help menu</td>
</tr>
</tbody>
</table>
4. **Information panel:** this panel shows who have contributed editing the area.

![Picture 3.3. A History of Contributors Who Have Edited an Area](image)

**3.3 Setting up Map Background**

Before starting to edit, you can of course change the map’s background. Please try clicking this icon ![Icon](image) to open up the following panel:

![Feature 3.4. Background and Brightness Setting in iD](image)

There are several things you can do to change the background on iD, including these:

- You can **set the brightness level of the satellite imagery** by clicking one of these boxes: ![Brightness Levels](image) there are 3 brightness level 100%, 50%, and 0%. Try all of them to see the differences.
- You can also set the type of satellite imagery by choosing from available providers (Bing Aerial Imagery is the default setting). You can also select OpenStreetMap as the background.
• If you would like to show uploaded Field Papers as background, please click on Custom and fill in the Field Paper url (for example: http://fieldpapers.org/snapshot.php?id=fdsbgzns#17/-6.20049/106.82533) on the pop-up window, as shown in the Picture below:

![Picture 3.5. Inserting Field Paper to the ID](image)

• You can also add GPS tracks and waypoints from your computer (GPX format). You only need to click left on your GPX file, hold, and drag it into the editor page.

• If there is a satellite imagery offset, you can correct it by clicking on Adjust Imagery Offset so the following box can appear:

![Picture 3.6. Adjust Imagery Offset Setting](image)

You can adjust the correction by clicking the navigation buttons (↑, ↓,←, →). Click on (←) to revert to its previous position.
3.4 Basic Editing with iD

Before we start practicing with iD, so you could feel more at ease adding new data to the OpenStreetMap, please drag to an area that you are familiar with. You can change what is on display by click and hold on the left side of your mouse while dragging it to the location you desire.

1. Adding Nodes

Click on this button , now you see that your cursor changes into this sign (+). Now, click on a place you know. For example, on the map you see a building that you know is a hospital. Click on that position.

You will see that you get a new node. At the same time, features panel will show options of attributes you can use to add to your first node, in accordance to what it is in real life. Click on Hospital Grounds, to add that the location is a hospital.
Your node symbol will change automatically, and your features panel change into a form to add more information about the objects you are referring to. You can add the name of the hospital, its complete address, and other additional information.

**Note:** each feature has different forms to fill, depending on the type of features in use.

If you made a mistake, you can drag the node you made by holding the left side of your mouse and drag it to the new location. If you want to delete that node, click once on the node you want to delete, until this sign appears to delete an object.

### 2. Adding Lines

Click this icon 

, and then you will see your cursor changes into this (+). If you want to draw a highway, click on one of the point of the road, and then move your mouse so it forms a line, click left on the mouse again to make a node (for a turn point, for example). Click twice to end the line. Take a look again at the panel to your left.
Just like when you adding a node, after you draw a line, a feature panel will show selectable attributes that you can use to identify the line you drew. You can drag a node on the line by click and hold on a left side of your mouse and then drag it. You can also drag the line by a left click and hold and then drag the line. When you click a line, you will find additional functions, as follows:
<table>
<thead>
<tr>
<th>Icon</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="trash_can.png" alt="Trash Can" /></td>
<td>To delete a line</td>
</tr>
<tr>
<td><img src="circle.png" alt="Circle" /></td>
<td>To change a line into a circle</td>
</tr>
<tr>
<td><img src="move.png" alt="Move" /></td>
<td>To move a line's position</td>
</tr>
<tr>
<td><img src="reverse.png" alt="Reverse" /></td>
<td>To reverse the line’s direction</td>
</tr>
<tr>
<td><img src="straighten.png" alt="Straighten" /></td>
<td>To straighten a line</td>
</tr>
</tbody>
</table>

### 3. Adding Polygons

To add an area on a map, click on this icon ![Area](area.png). You will see your cursor changes into a plus sign (+). You can then draw a line following its shape on the map. For example, if you want to add a building on the map, you can draw that area following its shape on the map. What makes a line and an area different, you can see a color on the inside of an area, depending on its attribute.
<table>
<thead>
<tr>
<th>Action</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Trash Can" /></td>
<td>To delete a line</td>
</tr>
<tr>
<td><img src="image" alt="Circle" /></td>
<td>To turn an area into a circle</td>
</tr>
<tr>
<td><img src="image" alt="Position" /></td>
<td>To move an area's position</td>
</tr>
<tr>
<td><img src="image" alt="Square" /></td>
<td>To make an area’s corners in square</td>
</tr>
<tr>
<td><img src="image" alt="Rotation" /></td>
<td>To rotate an area</td>
</tr>
</tbody>
</table>
Similar to nodes and lines, when you click on a node in that area, you will additional functions. This also applies when you click on a line in that shape.

3.5 Saving Your Edits

Click the button to save your edits. You will see the panel on your left will change into something similar to the following:

![Picture 3.11. Saving Edits on iD](image)

Fill out the change set comment with what kind of edits you have made on the objects so other users can find out. When done, click ‘Upload’.

3.6 Additional Attributes

When you determine an attribute, you can also add additional information by clicking the following options:
<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Elevation</strong></td>
<td>To add information on its elevation</td>
</tr>
<tr>
<td><strong>Fix Me</strong></td>
<td>To explain that this building needs fixing</td>
</tr>
<tr>
<td><strong>Level</strong></td>
<td>To add the number of stores/level on that building</td>
</tr>
<tr>
<td><strong>Note</strong></td>
<td>To add notes</td>
</tr>
<tr>
<td><strong>Telephone</strong></td>
<td>To add contact/telephone number</td>
</tr>
<tr>
<td><strong>Sources</strong></td>
<td>To add sources</td>
</tr>
<tr>
<td><strong>Website</strong></td>
<td>To add website information</td>
</tr>
<tr>
<td><strong>Wheelchair access</strong></td>
<td>To add information on the building’s accessibility to a wheelchair users</td>
</tr>
<tr>
<td><strong>Wikipedia</strong></td>
<td>To add a link to a Wiki article</td>
</tr>
</tbody>
</table>

*Source: Picture 3.12. Additional Attributes on the Features Panel*
Besides, you can add your own attributes by clicking ‘All tags’. Click on the + sign to add key and value that you would like to add. A complete list of key and value can be seen in this list: [http://wiki.openstreetmap.org/wiki/id:Map_Features](http://wiki.openstreetmap.org/wiki/id:Map_Features)

![Image](Picture 3.13. Filling in one of the tags on iD)

**SUMMARY**

Now that you can add data on OpenStreetMap using an editor, called iD. You have also known different objects on OpenStreetMap, including nodes, lines, and polygon. iD helps you add new information on the OpenStreetMap without you having to install additional software. Using iD, however, you have to keep being connected to the internet, which means when your connection gets unstable, you will encounter some difficulties. Another alternative is by using another tool to add data on OpenStreetMap, which is JOSM.
Chapter 4

Adding Data to OSM Using JOSM

Learning Objectives:
• To understand the definition and the concept of JOSM
• To understand how to download JOSM installation files
• To practice how to install JOSM
• To operate the basic settings on JOSM
• To understand JOSM interface

We will now learn about steps to download and to install JOSM. JOSM stands for Java OpenStreetMap, which is a desktop base OSM editor. We need to always be connected to the internet when using the iD, but with JOSM we can do edits even when the computer is offline or is disconnected from the internet. This will help people working with limited internet connection. Users only require internet connection when downloading or uploading data from and to OpenStreetMap.

In this chapter, we will modify several settings in the JOSM so we can use the tool well. Besides, we will also learn about the features available on JOSM’s interface. By understanding each part of JOSM, by the end of this chapter we will be able to understand JOSM in its entirety alongside with some of its basic settings.

4.1 Download JOSM

If you have a copy of JOSM installation software in a CD or flash drive, you can go directly to the subchapter, JOSM Installation. But if you do not have JOSM installation package or that you wish to update the version, you can open your web browser — such as Firefox, Chrome, Opera or Internet Explorer. On the address bar at the upper side of the browser, type: josm.openstreetmap.de and then press enter. You
can also find this website by searching ‘JOSM’ at a search engine. JOSM website will look like this:

![JOSM Interface](image)

**Picture 4.1. JOSM Interface**

Please select an installation file that matches your computer’s operation system. If you use a computer with Windows operation system, click “Windows JOSM Installer” to download JOSM. If you have a different operating system, click on the link that matches your computer’s operation system. You can then download the file. In this tutorial, we will explain from Windows OS, but the steps are similar to other operating systems.

### 4.2 JOSM Installation

When you are done downloading JOSM installer, you can install JOSM into your computer or laptop. The following is how to install JOSM:

1. Find the JOSM installation file in your computer. Click twice on that file to start setting.
2. Click ‘OK’, ‘Next’, ‘I Agree’, and ‘Install’. When it is done, click ‘Finish’ to open JOSM for the first time. In the next turn, you can open JOSM again by
clicking the start menu on the bottom left corner of your monitor, and then find and open JOSM by clicking on its shortcut on the menu.

3. When JOSM is open, here is how it will look like:

![Picture 4.2 JOSM Opening Interface]

**Notes:**

1. You may encounter problem installing JOSM if you do not have Java installed on your computer. If so, you can download and install java from here: [http://www.java.com/en/download/](http://www.java.com/en/download/)

2. You may also see a pop-up window when opening JOSM for the first time, asking you update the software. You do not need to do this as you have just recently downloaded the software. Click ‘Cancel’. Tick the box at the bottom part of it before clicking Cancel if you do not wish to see that notification again.

3. The JOSM used in this tutorial is version 11427. The layout displayed in this tutorial may change if you use the older version of JOSM.

### 4.3 JOSM Settings

#### 4.3.1 Language Setting

There are a lot of settings you can do with JOSM. One of them is language setting. JOSM has been translated into many languages, and you can select the language you want to use.

1. To access the preferences window, click **Edit -> Preference**.
2. On the left side, click on the icon with a **paint can** and **brush**.
3. Above the window, click the tab ‘**Look and Feel**’.
4. Select the language of your preference on the drop down list ‘**Language**’.
   Click OK and restart JOSM to change it into Bahasa Indonesia.

   ![Picture 4.4. Changing Language in JOSM](image)

**4.3.2 Account Setting and Network Proxy**

After changing the language you use in JOSM, you need to insert your username and password. This is so the server could recognize the edits and data addition that you make belong to you. If you do not put in your username, you will not be able to upload your data into OSM. Here is how you can do it:

1. Open preferences tab, and then click on the icon with the **Globe** symbol located on the left side of preferences box

   ![Globe Icon](image)

2. Select “**Use Basic Authentication**”
3. Fill in your OSM username and its password.
4. If your internet connection uses a proxy, you can also fill in the proxy in the proxy setting tab to adjust to your internet proxy.

4.3.3 Adding Presets

Now that you have typed in your username, you can set the presets in JOSM. What are presets? Presets are files that give information related to objects being mapped to the OpenStreetMap. Do not worry if this definition is yet to make sense to you as we will learn further about them as we go deeper in this guide book. You can try add these presets with the following steps:

1. Click the icon with the following picture:

2. Click on the tab “Tagging Presets”.

3. On the “Available Presets”, search and select the preset “Buildings Indonesia.” And then click on the blue arrow on the right side of the box.
4.6. Adding presets files into JOSM

Or if you already have your own preset files on your computer, you can add them directly by:

- Click on the ‘+’ located on the right side of the active presets box
- And then click on the icon as shown below to look for your preset files:

- Once found, click ‘Open’ and then ‘Ok’

4.3.4 Adding Plugin

Now we will try adding plugins on JOSM. Plugins are extension tools to JOSM that can make edits easier. This is how we can add plugins into JOSM:

- Click on the icon for **plugin** as shown below:

- Click on ‘Download list’ to download all plugins available for JOSM
- In the search bar, click on the plugins you want, such as **buildings_tools**
- Tick on the box preceding the text:
4.3.5 Activating Remote Control

Remote Control settings in JOSM is needed so we can fetch OSM that we would like to edit from the internet, such as from openstreetmap.org, into JOSM. Here is how to activate:

- Click on the following icon:

- Tick on the box ‘allowing remote control use’

- Tick on the boxes listed underneath as you need.
4.3.6 Inserting Satellite Imagery

We would need to insert satellite imagery as a background when we do edits, so that we will need to insert them from this setting window:

1. Click the icon with WMS TMS on it, just as shown below:

2. Click on “Bing aerial imagery”. And then click “Activate”.

3. Click “OK” on the bottom part of the preferences window.
4.3.7 Setting the Objects Layout

In the initial setting of JOSM, each object on OpenStreetMap do not show nodes, labels, and icons.

In order to make them visible, you will need to change the map styling on your JOSM:

1. Click on the menu File - New Layer to show JOSM interface
2. On the right panel of JOSM window, look at the Map Paint Styles

3. Click right on JOSM default (Map CSS) and select Style Settings

4. Adjust it as shown in the picture below:

![Map Paint Styles Setting on JOSM](image1.png)

If you have altered all settings as shown above, your JOSM display will show nodes, labels, and icons for each OpenStreetMap objects.

### 4.4 JOSM Interface

Now that you have done a few settings on JOSM, to make your edits easier you will need to get acquainted with some of the most important parts in JOSM interface. To see JOSM interface, click on menu File - New Layer. The following shows some of the parts of JOSM interface.

![Parts of JOSM Interface](image2.png)
On the main window that you are already familiar with—this is the map window and it is where most of the activities will take place. This window is where you will see, edit, and add data to OpenStreetMap.

On the right side of the window, you will several panels, each has its own function. Usually, when you first install JOSM, you will see panels for standard setting, such as layers, tags/memberships, options, and makers. Layers panel will show what layers are added into JOSM, such as satellite imagery, et cetera. When you select a node, line, or polygon, it will be shown on the option panel. Information about objects are shown on tags / memberships panel, and the ones making the objects will be shown on makers panel.

These panels can be made open and close by clicking several buttons on the bottom left side of JOSM. These are tools window with several buttons to edit, such as Object Selection Tool and Object Drawing Tool. Below are tools to make it easier to zoom in, delete an object, drawing a polygon, or to make a line in a parallel position to other lines.

![Picture 4.13. The Button to Set Panel Window on JOSM](image)

**SUMMARY**

If you are able to follow and to practice all steps in this chapter, you have been able to install JOSM into your laptop or your computer. Besides, you have also been able to learn and to practice how to do initial setting in JOSM to make your work easier. Later, you will learn about how to add data into JOSM, from beginner and advanced level.
Chapter 5

Drawing Exercise with JOSM

Learning Objectives

● To practice how to draw with JOSM
● To practice and to change paper maps into digital maps with JOSM
● To practice how to draw with more advanced skills with JOSM
● To understand editing tips on JOSM
● To practice how to draw special objects

5.1 Basic Drawing Exercise with JOSM

Now please open the OSM sample file that we can use to learn how to draw maps with basic skills in JOSM. Please note that this data is only a sample file that does not correspond to any place in reality, so we should not be uploading them into OpenStreetMap.

1. Download the file here: bit.ly/osmsample

2. Open OSM map sample file in JOSM. Click “Open” on the upper left side.

3. Find sample.osm file in your computer and then open it. Your computer will show something like this:
5.1.1 Basic Operations

To move the map to right or to the left, up or down, click left on your mouse and hold and drag it. There are several ways to zoom a map in and out. If you use a mouse, you can scroll the wheel to for zooming it in and out. If you use a laptop without a mouse, you can use the scale located at the left of your map. Hold and drag it left and right.

Look at the sample data. There are several different objects there. There are river, forest, some buildings, roads and a pair of shopping venues. To select an object, click on those objects.

5.1.2 Changing Map Paint Styles on JOSM

To make it easier to interpret and to draw objects in JOSM, you must first set the paint style on each object shown in JOSM. Here is how:

1. Click Window from the menu, and select “Map Paint Styles”
2. On the right panel, you will find Map Paint Style Panel, right click on “JOSM Default (MapCSS)”, and select “Style Settings”
3. Untick all boxes other than “Areas are drawn with fill only around their inner edges”.
5.1.3 Nodes, Lines, and Polygons

There are three objects on OpenStreetMap. These three objects are nodes, lines and polygons.

1. Nodes are locations shown by symbols. In the sample data you use, there are two nodes, which are a clothing shop and a market. A clothing shop is symbolized by a shirt and a market is symbolized by a shopping cart.

2. There are several lines on the sample file. Lines represent a simple road network. If you look closely, a line consists of several nodes. These nodes do not have symbols or other information but these nodes form the line.

3. Lastly, there are polygons/area in the exercise file that represent different places, such as forest, river, and buildings. A polygon in general represent an area or a building. Polygons are similar to lines but polygons have consist of several lines where the last node meets the first node of that line.

Notes:
It is very easy to think of maps consisting of three basic objects—points, lines, and polygons. In OpenStreetMap, there are other terms to use as you advance. In OSM, points refer to nodes, lines are referred as ways. Polygons are called closed way because essentially it is a line with the same nodes in its beginning and end.
5.1.4 Choosing Objects

On the left side of JOSM, there are multiple buttons. To select an object in JOSM, you can select Button to Choose Object. Try choosing one of the area/polygon on your sample file. All objects that you choose will turn red, and on the right side, a panel will appear, showing “Properties”. In this properties window, it will show data attributes of object, referred to as tags. Tags are information on objects, including nodes, lines, and polygons that explain the identity of the selected object. From here you can figure out the information of a given object, whether it is forest, river, or buildings, et cetera.

![Image of Object Information on Properties Window on JOSM](image)

5.1.5 How to Change Objects

- Choose the forest on the left side of your map. Make sure you click on the line, instead of the nodes. Now click and drag the object. You can move the forest into a new location on the map.
- Click one of a node around the forest. You can move that node. By doing so, you change the shape of the object.
5.1.6 Drawing Objects

There are a lot of symbols on the left side of JOSM that provides information about the map. The most important button is located at the upper part of the column. These buttons change what you can do with your mouse.

<table>
<thead>
<tr>
<th>Button</th>
<th>Name of the Button</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>![Select icon]</td>
<td>Select, move, scale and rotate objects</td>
<td>This button can be used to select objects. By choosing an object, you can drag, change shapes, rotate, and even delete an object.</td>
</tr>
<tr>
<td>![Draw node icon]</td>
<td>Draw nodes</td>
<td>This button is used to draw objects:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>● <strong>To create nodes</strong>, click twice on the map.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>● <strong>To draw lines</strong>, click once with your mouse, move it to the point you intend to and then click once again. You can do it again to draw longer lines and then click twice to end it.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>● <strong>To draw a polygon/area</strong>, you can do it using the same method of drawing a line, except that to end the process, you need to click twice on your first node where you started your drawing.</td>
</tr>
</tbody>
</table>

5.1.7 How to Add Presets

At this section, we have already learned how to draw nodes, lines, and polygons, but we have not covered how to add information on these objects. We would need to know whether the area we draw is a school, a shop, et cetera, or whether it is a building at all or something else. To add information on an object we drew, we need to add presets on that object. Here is how:

- Click **Select**, on the button at the left panel.
- Choose one of the objects that you will make with Draw button. On the upper menu, click “Presets”. Hover your mouse to the submenu you would like to add.
- Go to Preset menu. Click on the item with “Building”, that has now been added to the bottom part of the menu.

![Picture 5.5. Building Presets at JOSM](image)

- When you click on the preset, some columns will appear and ask you about more information on the object. **You do not have to fill in all columns**, such as the name of the object you created.
- When you have finished inputting information, click on “Add Preset”. If everything goes well, the nodes, ways, and polygons that you created will change color and will have certain symbol. This depends on the information you added into those objects.

### 5.2 Advanced Drawing Exercises with JOSM

In the previous session, you have installed JOSM and learned about some basic operations, such as how to draw nodes, ways, and polygons. You have also learned how to add presets into the object you created by attaching information about those objects.

In this section, we will take a closer look at the JOSM interface and learn about several steps to take in order to edit OpenStreetMap in JOSM and how we can maximize tools available in JOSM that can help us making edits in easier manner.

#### 5.2.1 Advanced Drawing Tools on JOSM

In this section, we will inspect several basic tools available and some techniques to draw map features in JOSM, in the preceding chapter we will learn more about more advanced drawing technique. If you would like to follow and to practice some JOSM
editing tools, please download from bit.ly/edittools and then open JOSM and the file you downloaded. It will look like the following:

Picture 5.6. Exercise File to Edit Using JOSM

JOSM has several additional tools to make it easier to draw ways and polygons. These tools can be found in the “Tools” menu at the upper part of JOSM. When you click on this menu, you will see there are a lot of functions available to help you with drawing lines and polygons, and to edit objects on your map.

Picture 5.7. Options Available on JOSM Tools Menu
In order to apply a function from this menu, you would have to first choose a node, a way, or a polygon from your map window. The sample file you downloaded has a variety of elements with labels on different tools from the menu.

- Select one of the element in that file. Go to Tools menu and click on the functions indicated on the side of the feature you selected.
- For example, click on the irregularly shaped to choose it.

![Image of a circle with aligned nodes](image)

- Go to Tools —> **Align Nodes in Circle**
- That circle will change into being more symmetrical.

Try each of the feature available on the sample file. The following is the description of several tools available:

- **Split Way**: this allows you to **split one single way into two separate ways**. This is useful when you want to add attributes to a different section of a road, such as bridge. To use this function, click on a node from the way you want to split, and then click Split Way from the Tools menu; the way should have parted into two.

- **Combine Way**: this is the reversal of Split Way. In order to **combine two ways** into one, they have to share one node. To use this function, chose both ways you want to combine. You can do this by pressing SHIFT on your keyboard while clicking on the ways. When you have selected the two ways, click Combine Way from Tools menu.
If you combine two ways that have different directions, you will get this warning:

```
Ubah arah?
```

If you are sure about combining the two ways into one directional way, choose “Reverse and Combine”.

- **Reverse Way:** this will reverse the direction in the selected way. All ways in OSM have its directions, which is shown on OSM by arrows on the lines. These directions are usually not a problem, except for roads that have one direction or for rivers that flows in one particular direction. There are cases when you may need to reverse the direction of the ways so it reflects the object (such as the rivers) more accurately.

- **Simplify Way:** if your drawn way has too many nodes in it, you may want to simplify it, this will delete some nodes on the selected line.
● **Align Nodes in Circle**: when you try to draw a circle, you can try make the shape as close to the circle shape as possible and then select the object. This function will help align the nodes to form a circle.

● **Create Circle**: as an alternative, you can try this tool. Draw a line that will become a diameter of your circle which consist of two nodes, and then apply this tool.

● **Align Nodes in Line**: this function will align nodes into a straight line. Try this, preferably with a long line to see how the line is straightened out. Look out for the position of this line, however, as it usually drags the line off its intended position.

● **Orthogonalize Shape**: this function is very useful to draw clear-cut shapes, such as buildings. After you drew an area, this function will help shape the corners into squares.
○ **Unglue way:** this tool allows you to detach otherwise connected nodes. This is useful when two objects share nodes that shouldn’t be as such in real life. As an example, there are common mistakes in mapping where a road share node with a building’s body. Of course, such case cannot be true, whereas a building is attached to a road network. You can detach these objects from one another using this tool.

- **Rotate Objects:** you may wonder how to rotate a line or a polygon when they are already drawn.
  1. To rotate an object, you have to first **select the object**.
  2. Hold **SHIFT+CTRL** on your keyboard.
  3. Click and move your mouse to rotate the object.

**5.2.2 Shortcuts on Keyboard**

After doing some edits in OpenStreetMap, you may realize that you need considerable time clicking on menu and submenu. To overcome this, JOSM has shortcuts for many functions. This is to save time when performing a task, so users do not need to search
for the function from the menu and submenu; they can instead use their keyboards to perform the same task. The following are some of the most important shortcuts.

<table>
<thead>
<tr>
<th></th>
<th>To Activate Select Tool</th>
<th></th>
<th>To Delete Selected Object</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>S</td>
<td>4</td>
<td>Del</td>
</tr>
<tr>
<td>2</td>
<td>To Activate Draw Tool</td>
<td>5</td>
<td>To Zoom In</td>
</tr>
<tr>
<td>3</td>
<td>To Activate Zoom Tool</td>
<td>6</td>
<td>To Zoom Out</td>
</tr>
</tbody>
</table>

**Some Shortcuts on JOSM**

**5.2.3 Plugins on JOSM**

When you are used to making edits on your map, you may want to set additional JOSM features to enhance your mapping abilities. JOSM allows you to install add-ons, and inserting additional functions to the software. In this section, we will look at some of the very useful plugins already available for JOSM.

- **buildings_tools:** when you want to draw a lot of buildings, this function will make the process quicker and easier. Building Tools Plugin facilitates digitizing buildings as it allows you to draw a square shape with various length. When you draw buildings, this plugin shortens the amount of clicks and time needed. After you install the plugin, a new button—as shown below—will appear on the left side of JOSM:

![Building Tools Plugin](image)

How to use:

- Start JOSM with new, empty layer.
- Select Building Tool and click to draw a line on the map.
• Move your mouse and click once again to draw a square.
• This will not only make a square block by only three clicks, but it will also automatically add `building=yes` tag into the polygon.

![Drawing Buildings with Building Tools](image1)

Picture 5.15. Drawing Buildings with Building Tools

You can also draw more complex buildings by firstly draw overlapping buildings and then merge them into one.

1. Draw two overlapping buildings, so it has an L shape.
2. Select both buildings (press SHIFT to select more than one object).
3. Go to Tools -> Merge Overlapping Areas or press SHIFT+J on your keyboard.

![How to Draw L-shape Buildings?](image2)

Picture 5.16. How to Draw L-shape Buildings?

- **DirectUpload**: if you collect a lot of GPS tracks and you want to save it into OSM database, this plugin will make it easier for you.
- **Editgpx**: if you want to upload GPS tracks from a Garmin device, you may need to use this plugin. OSM will not accept GPS tracks already saved in Garmin’s external memory, but this plugin will correct the formatting so it can be uploaded.
- **Fieldpapers**: this plugin can load scanned Field Papers into JOSM.
- **imagery_offset_db**: this plugin works with imagery providers that detect Bing imagery offset. This problem will be discussed in a later part.
- **mirrored_download**: this plugin allows you **download larger OSM area** for edits.
- **Print**: this will add print function, if you need to print an area quickly with lower quality.
- **Utilsplugin2**: to add many additional tools and menu on JOSM.

If you have not installed this plugin, here is how to do it.

After you have installed this plugin and restarted JOSM, you will have new menu, under “**More tools**” menu.

Create a new layer and we will experiment with some of these new tools. We will learn how these tools are very useful.

1. **Add Nodes at Intersections**: this tool is very useful to add missing nodes at selected intersections. Please be mindful that two crossing intersections should have a node where they intersect.
2. **Copy Tags from Previous Selection:** this function enables easier copying for tagging. If you want to create objects with the same tagging, first draw an object and then add tagging to this object. Click on other objects and **press Shift + R** to copy the tags from the previous object. You can do the same steps for all objects that have the same tagging. Please remember that the tags are copied from a previously selected object, if you click on an object with no tags prior to performing the task, the tagging will not be copied.

![Picture 5.20. Copying Tags from Selected Buildings](image)

3. **Add Source Tag:** this tool simplifies adding source tag. It will remember your last source tag and add it to your object. You can add source tag just by one click.

Util plugin2 also adds more tools under “Selection”. You can try experiment with these tools.

![Picture 5.21. Menu from Selection](image)
One of the selection tools we will often use is **Unselect Nodes**: this tool cancels selection of all nodes. This is useful when you hover over an area to select multiple objects, but do not want to include all objects—nodes, ways or polygons—in that area.

5.3. **Editing Tips**

There are several common mistakes for beginners when contributing to OpenStreetMap. The following are among the most common ones, alongside with how to avoid and to resolve these mistakes.

5.3.1 **Objects that Should Not Intersect**

When you make polygons or ways that should not be connected to each other, make sure they do not share nodes. For example, buildings should not share a node with road network, because there is no road directly attached to a building. If you want to separate the two objects, select the intersecting node and then choose **Tools -> Disconnect Node from Way** or press **G**.
5.3.2 Objects that Should Intersect

Two ways that intersect should be connected with a node. Otherwise, the computer will not detect these two as intersecting to one another. When you see two intersecting ways do not share a node, you can correct this by adding a node, by going to Tools -> Merge Nodes or press M and try moving it around.

![Picture 5.24. Roads have to Connect to One Another](image)

5.3.3 Overlapping Objects

Another common mistake is overlapping objects for objects that should not overlap in real life. A building cannot overlap with other buildings. For example, a polygon for outdoor park should not intersect with a building, it should be drawn next to it instead.

![Picture 5.25. Sample of Buildings that Overlap between One Another](image)

There are some exceptions to this rule, such as school. Within the school court, you may want to identify the buildings with polygons, but you may want to add a polygon
that includes all school’s court area. In this case, polygons may overlap, but make sure that all buildings are all fitting in inside the land area.

Picture 5.26. Sample of Buildings that Correctly and Incorrectly Overlaps

5.3.4 Other Errors

The following are some of the other common mistakes often found committed by new OpenStreetMap users.

<table>
<thead>
<tr>
<th>Tag is given to a node, not to a building</th>
<th>One of the common mistakes is to add a tag on a node, which is only a part of a polygon’s way. This happens when someone draw a building and select a node on that object. When you are tagging, you have to select the whole object (select all), which include all ways and nodes. When you are adding a tag only to a node, it is not a correct tagging. To avoid doing this, click on the way before adding tags.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Samples of a building with false tagging (left) and correct tagging (right)</td>
<td></td>
</tr>
<tr>
<td><strong>A turn that meets in an intersection / a turn that has to be made separate</strong></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td></td>
</tr>
<tr>
<td><img src="image1.png" alt="Image" /></td>
<td></td>
</tr>
<tr>
<td><strong>A wrong way of drawing intersection (up) and the correct one (bottom)</strong></td>
<td></td>
</tr>
<tr>
<td><img src="image2.png" alt="Image" /></td>
<td></td>
</tr>
<tr>
<td><strong>When two ways intersect one another, you should not draw a bending way in that intersection. The intersection has to be in 90° degree, as how it will look like in reality.</strong></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>No tag on a node or line</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image3.png" alt="Image" /></td>
</tr>
<tr>
<td><strong>To correct this, select the object and insert presets that match the information for that object. You can also delete those objects if they are mistakenly drawn.</strong></td>
</tr>
</tbody>
</table>
To correct this, you can select a node from a way you want to connect and then choose “Draw Node” to add a node on the way in front of the selected node. You can also use “Merge Nodes” (if the ones in front of the way is a node), the way to do this is:

1. select both adjacent nodes on the two ways you want to connect
2. choose “Merge Nodes” from the Tools Menu.

If there is no node in front of the way you wish to connect, you can use “Join Node to Way”, by:

1. Choose the last node from the way that you have not merged and also select the way in front of it.
2. Select “Join Node to Way” from the Tools menu.
A way cannot bypass a building

A sample where a way bypass a building

To resolve this, you have to inspect the satellite imagery, which object is mistakenly drawn. When you are sure about it, you just need to move the object to the correct position.

5.4 Drawing Special Objects

Up to this point, you have learned how to draw objects on OSM using JOSM and some of the common subjects you need to pay attention to when drawing objects with JOSM. When you try drawing objects on top of a satellite imagery, you may find some buildings that need special drawing skills, such as bridges, office complex, or big roads with barriers to it.

5.4.1 Drawing Bridges

A bridge is commonly found on top of a waterway. On the OSM, however, you cannot just draw a road on top of a river. When you do that, technically, you can still upload it to OSM, but the system will recognize it as an error. So how do we draw bridges correctly?

Here is an area with a bridge object within:
Here is how we can digitize it:

1. First, draw the waterway
2. Draw the road network that passes (above) the waterway
3. Zoom the imagery in, you will be able to see the left and right side of the bridge.
4. On the road network, make nodes on top of the left and right side of the bridge

5. We will then split the ways for bridge and road network. To split ways, you can do the following:
   1. Click on the recently made nodes, which represent the left and right side of the bridge. To choose more than one node, press Ctrl. Select Tools —> Split Way.

   2. The way that is initially in one way is now divided into three, which are (i) the way to the left of the bridge, (ii) the bridge, (iii) the way to the right of the bridge.

6. After having the bridge drawn as a lone-standing object, the next step is to give tagging / information that the object is a bridge. Now click on the bridge object, and click on the menu “Preset” —> “Man Made” —> “Bridges” —> “Bridge”
A dialogue box for bridges will appear. You only need to fill it out with this information “Bridge” = ‘yes’ and “Layer” = ‘1’

7. Done.
5.4.2 Drawing School/Office/Building Complex

A school, hospital, or office buildings in general do not stand as a single building, but instead, consists of several separate buildings within the area. Look at the following example:

Some people draw it as a big complex with fences surrounding it (see picture a). The others draw each building within the complex separately, and then each building are tagged with the name / information of the school (picture b). Doing that, the system will count the school as more than one and that is not the correct way of drawing it.

So how do we draw a building complex correctly, with a lot of smaller buildings within? Relation is the answer! The following is the steps.
1. Firstly, draw the elements / parts of the schools, such as classrooms, parking lot, mosques, playing court, and parks. Give tagging according to the objects. Do not tag with school or hospital yet.

2. After each part is drawn, draw the fence or the outer part of the school, and then add the tag “amenity = school”.

3. It is time to make school relations! Here is how: select all of the school, to select more than one object, press and hold Ctrl on your keyboard. After all elements are selected, also select the outer part of the school.
And then choose “**Tools**” > “**Create Multipolygon**”. Your object will look like this.

If you click on / select the outer part of the polygon, which is the school fence, the area within the polygon will become purple, and an additional panel, which is the “**member of**” panel.
If you now click on the button “edit” from “member of” panel, the following dialogue box will appear. This dialogue box will show that polygon we selected is the outer part of a school complex. In relation terminology, such type of polygon located at the side most part is called outer; while all other polygons within (schools/classrooms, mosque, parks, courts, parking lot) are called inner.

If you click on one of the objects / buildings within, there would only be object information, without the school name; and there will be a “member of” panel that indicate that the object is an inner part within a relation SMA Negeri 1 Ngawen.
5.4.3 Drawing Road Network with Middle / Dividing Lines

A road network can be found in a simple form (1-3 meters width and without dividing lines in the middle) (picture a), but you can also find it in a more complex form, a very wide one (up to 10-20 meter) with middle lines (picture b).

To draw a simple road network is of course very easy, you can do it by just drawing one way. But to draw a road network with a dividing line in the middle, you need to draw the roads separated into two opposing directions.
The following is part of Thamrin Highway, Centre of Jakarta. This highway is about 40 meters wide, with a dividing line in the middle that separates the roads to the north and to the south.

To draw Thamrin Highway, we need to draw two ways, that represent the side roads for vehicles heading to the north and to the south.

Firstly, draw a line from the bottom to the top (north to south), and then give a tag from the Presets menu → Highways → Streets → Primary and then add relevant information, such as the name of the highway, Jalan Thamrin. And then activate the option “One Way” located on the presets for highway. Afterwards draw a line from the top to bottom (south to north) and then give the same tag “highway=primary”, “name=Jalan Thamrin” and “oneway = yes”. 
Make sure that the arrows on both ways are pointing to opposing directions. On the first way, it should point upwards, which means this area is for vehicle from the south direction, while the second way points downwards which means it is for vehicles from the north direction.

If a road has four different lanes (which means it has three middle lines), such as slow lane to the north, speed lane to the north, slow lane to the south, and speed lane to south; we need to draw it with four ways. Such condition can be found in Sudirman Highway.

A part of Sudirman Highway, Centre Jakarta, with four lanes (3 middle lines).
How the highway look like from the satellite imagery above.

These lanes, although belong to the same highway, which is Sudirman Highway, consist of four lanes on OSM, and should be drawn as four separate ways.

5.4.4 DRAWING MULTILEVEL BUILDING

A skyscraper, when photographed from the above by aerial imagery or satellite imagery, will generally look tilted. The following are pictures of one of the skyscrapers (Picture a), from a satellite imagery, the building look like it is leaning to the side (Picture b), due to the photography or satellite imagery’s angle when capturing the picture.

Some people may draw these object incorrectly. Picture (c) and (d) show some examples of incorrect drawings. On picture (c), the building is drawn based on tis roof’s
position, when it should have been drawn based on the building’s foundation. Meanwhile picture (d), the building is drawn in its entirety from its body to the roof. With such drawing, the building will have an irregular shape, when the real building has a square form.

So how do we draw skyscrapers or multilevel buildings correctly?

○ First draw the building’s roof (assuming that the foundation has the same shape with the roof).

○ Give tags according to the type and information of the objects
○ Drag building’s roof to where the foundation is.

○ Done!

SUMMARY
If you follow all instructions, you would have been able to do basic settings for JOSM in your computer. You have also recognized the tools to draw in JOSM. In the next chapter, you will also learn further how to do OSM edits with JOSM.
Chapter 6

Adding OpenStreetmap Data with JOSM

Learning Objectives

- To understand steps to add data to OSM
- To practice how to download OSM data
- To practice how to add satellite imagery to JOSM
- To practice how to add and to edit OSM data using JOSM
- To practice how to upload edits to OSM
- To understand how to save file in OSM
- To know how to see data change set in OSM

6.1 What Are the Steps to Add OSM Data from JOSM?

To add OpenStreetMap data with JOSM is similar to using iD Editor, but because JOSM is a desktop application, there are several differences. The following is the editing process and how to add to OpenStreetMap using JOSM, you only need to follow these steps:

- **Download** map data that you want to edit directly from the OSM
- Insert satellite imagery, GPS or Field Papers
- **Edit** using satellite imagery, GPS or Field Papers
- **Upload** changes into OpenStreetMap
6.1.1 Download Data OSM

The first step to add or to do edits is to download existing data from the area we want to add to change from. Remember that you can do it anything you would like to this maps will also be updated many times by other users.

- Click “File” on the upper left corner of JOSM and click “Download from OSM”. A download window will open, you can also access this window by clicking on the download button, as follows:

- When the download box pops open, you will see a map with a pink square in it.
The pink square is the mapping area you will download. Use your mouse to move or to zoom in the area you want to edit, such as your house or your neighborhood. **Right click and hold** to drag the map and **use the scroll wheel** to zoom the map in and out.

Draw the square in the area you wish to download. To **draw new square, click and hold** on the map and **move the mouse** to areas you want to cover. **Release** the mouse click to when done.

When your square covers the right size and position you want to edit, click “**Download**” in the bottom part of the window. JOSM will download OpenStreetMap data from this area and open it in a map window for you to edit.
6.1.2 Adding Satellite Imagery

If you still remember how to edit using iD editor, you can see that underneath the map data there is a satellite imagery to help you identify the objects from the earth’s surface. This imagery is from Microsoft Bing, which provides the satellite imagery for OpenStreetMap users for free as a reference to contribute to mapping. To add Bing satellite imagery into JOSM, click on “Imagery” on the upper side of JOSM and select “Bing aerial imagery”.

Picture 6.3. The Interface when Data is Downloaded from OSM Server
6.1.3 Editing with JOSM

We have done several mapping steps in JOSM which are by downloading OSM data and we have prepared JOSM with a satellite imagery as a reference. The next step is to edit the map and to add new objects.

You may get a lot of or a few spatial data in JOSM, depending on the size of the area you use. Remember this is the same type of data we use and learn about in the previous steps—nodes, ways, and polygons—that represent locations in real life. When we want to add certain new objects or to edit existing ones, the following are the steps:

1. Add data by using the satellite imagery that you have learned to add nodes to the map you are familiar with. If you notice a mistake on that map, try correcting it.
2. You do not need to rush when learning about a new area. If you are unsure about an object, it is advised not to map it.
3. If you want to move a node, way, or polygon, use the Object Selection Tool. Click on an object and move it to the right place. This is to correct the location of an object that is mistakenly mapped.
4. Use Drawing Tools to add new nodes, ways, and polygons. Describe these objects by selecting from Presets menu, which you have practiced doing in the previous chapter.
JOSM Layer

You might have already noticed that every time you add new data on JOSM, it will be added on the layer panel in the right side of JOSM. Depending on what you have opened, layer panel will look like this.

![Layer Panel in JOSM](image)

Each item on this list is different data source that you open on your mapping window. In this example, “**Data Layer 1**” is the OpenStreetMap data we edit. “**Bing aerial imagery**” is a satellite imagery that we inserted earlier.

Layers used as backgrounds to help digitizing, such as satellite imagery, GPS tracks, and field papers are often referred to as “**base layers**” while the data layer from OSM that we downloaded is the main layer that we use to do edits:

1. To move a layer, click on that layer on the layer panel and switch it upwards or downward to move it.

2. To temporarily remove a layer, click on the layer and click the **Show/Hide** button:

Notes:

Do not edit the maps outside the area you downloaded. You can see a square area you downloaded by the brighter color, while the area you did not download has a darker color with diagonal lines on top of it.
You will see that the layer you chose to hide will be removed from the map window. Click Show/Hide again, and the layer will appear again.

3. You can remove a layer by selecting it from the list and press delete:

4. Lastly, it is important to know that you can only do edits to layer considered active by JOSM. If you cannot edit the maps in your window, this is maybe because the layer is not active. Most layers, such as GPS nodes, Field Papers, satellite imagery, are not editable. The only layer that can be edited is the data from OpenStreetMap, which is usually named as “Data Layer 1”. To make an active layer, select from the layer panel, and click on Activate:

Tag
A tag is like a label that you can put on an object. For example, if we select a building in an area and apparently that building is a mosque, named “Masjid Al-Itisom”; the amenity is “place of worship” and it is a place of worship for the Muslims. You can add as many tags as you want to an object. A tag is stored as a pair of text, which are key and values. In OpenStreetMap, you can see all texts attached to an object from Tags/Memberships panel in the right side.

![Sample Tags from an Object in OSM](image)
Editing Tags
You can add, edit, and delete tags from Properties panel. But tags are manually written in English and are sometimes confusing, so it is often easier to use Preset menu. When you add or change tags, the object’s attributes change:

1. To edit an object’s tags, first select the object.
2. And then edit tag using one of the two options: (1) Using Preset Menu, or (2) Editing tags directly from the Tags/Memberships window on the right.

6.1.4 Saving Changes

The third and last step to finish and edit is to upload the changes we made into the OpenStreetMap database. To save changes, we need have an internet connection.

1. Click on “File” on the upper menu, and click on “Upload Data”. This will command an upload window to appear. You can also access this window more quickly by clicking on the upload button, shown below:

2. The window that appears will show the list of objects you added and the objects you edited. On the box below it, you are requested to type in comments about the changes you made and to also put in the data source of the objects you created, whether they are from a field survey, satellite imagery, or your personal knowledge.
3. Click “Upload Changes”

4. You need to wait for several seconds to upload your edits, and then done! You have already made edits to OpenStreetMap.

6.1.5 Saving OSM Files

When you do edits in JOSM, you are advised to download, to edit, and to upload the changes in a short period of time. Do not hesitate to upload your changes as often possible. This is to ensure that your changes are stored onto the OSM server and that you do not lose your work. But later, there may be a case when you have not finished your work and you want to save the OSM file into your computer. This can be done. Here is how:

1. To save an OSM file, make sure it is an active layer on the Layers panel. Click on “File” from the menu at the upper part of JOSM, and click “Save”. Select the
location where you want to save the file and name the file. You can also perform saving by clicking on this button:

2. You can close JOSM and the data will be saved. When you want to open that file again, open JOSM and go to “File”, and click “Open…”

**6.1.6 Seeing the Changes You Made on the Map**

2. Go to the area you have mapped.
3. You should have been able to see the changes on the map! If not, try pressing CTRL+R to refresh the website. The map usually has not been refreshed and need to reloaded.
4. How if you cannot see the changes you created? Do not worry – it will take a few minutes for the map changes to take effects. You can also check your JOSM again to see if the steps to edit you took were correct. The common guideline is that when your node has an icon on JOSM, it should be visible on the main map of OpenStreetMap.

**SUMMARY**

You have learned and practiced how to add OpenStreetMap data using JOSM. Now you can add data changes to your map into OpenStreetMap using JOSM as often as you want. Keep practicing adding data edits to enhance your mapping skills. You can start by mapping the area surrounding your place of living or the area you are familiar with. In the next chapter, you will learn the importance of quality assurance to the data you add to the OpenStreetMap.
Chapter 7

Data Quality Assurance on OpenStreetMap

Learning Objectives:

- To understand the definition of data quality assurance in OpenStreetMap
- To understand the importance of OpenStreetMap data quality assurance
- To understand several examples of data quality assurance tools
- To practice quality assurance tools in JOSM

7.1 What is Quality Assurance?

Quality assurance is an activity where mappers, in this case OpenStreetMap contributors, do data checking to ensure the data on OpenStreetMap meets certain standards for usage and is free from data vandalism. Quality assurance activities can be divided into three categories:

1. Geometry Quality Assurance

   This quality assurance category aims to ensure that the data on OpenStreetMap has similar forms to the ones on the field, for example: school buildings on the satellite imagery must have the same shapes with the ones in real life.

2. Attribute Quality Assurance

   This category of quality assurance aims to ensure that OpenStreetMap data has the same attributes/information with the ones on the field, for example: the information on buildings’ structures must be the same with the real building.

3. Positional Quality Assurance

   Kategori penjaminan kualitas ini bertujuan untuk memastikan data-data yang ada di OpenStreetMap memiliki posisi yang sama dengan yang ada di lapangan,
sebagai contoh: posisi bangunan di OpenStreetMap harusnya mempunyai posisi yang sama seperti dengan posisi sebenarnya di lapangan.

According to "Assuring the quality of volunteered geographic information", a book written by Goodchild dan Li, the quality assurance for participatory mapping can generally be done in three mechanism, which are:

1. **Participatory**

Added by Surowiecki in his book, entitled “The Wisdom of Crowds”. Participatory data quality assurance has the following characteristics and strength:

   1. Several users can make common agreement on the mistake found.
   2. The observations and experiences of an individual could strengthen the validity of observation and experience of other individual so as to reduce the possibility of misunderstanding to an object.
   3. Validation and quality checking on mistakes in a certain areas can be done collectively so it can save time, energy, and costs in data quality assurance.

2. **Social**

Social Quality Assurance prioritize the individuals who do the validation. The more frequent a person performs validations and data checking, the more they become reliable to lead a group in a quality assurance activity or a project.

One of the examples of social quality assurance done by the OpenStreetMap is through the working group with each group has different topical discussions. In the Data Working Group, the community discusses matters related to OpenStreetMap data, such as data license, vandalism, conflict, and assisting in making direction to OpenStreetMap data use policies.
3. Geography (Scientific)

The last mechanism to data quality assurance is through geography. This mechanism uses theoretical approaches in geography. Not all users can and are allowed to perform geographical quality assurance. Only the ones who have really understood the theories related to spatial data, such as Spatial neighbors and auto-correlation (Moran Statistics), Inferential Statistics and Analysis of Variance (ANOVA), et cetera. This mechanism, therefore, is not common for a participatory mapping activity, especially in OpenStreetMap.

7.2 The Importance of OpenStreetMap Data Quality Assurance

OpenStreetMap (OSM) is one the free, open source map of the world. OSM has a lot of data and information on a variety of objects on the earth’s surface. All of this information is collected and inputted by OSM users spread all across the world.

Since its launch in 2004 by Steve Coast, OSM has been an alternative or even the main option for citizens to complete the spatial data they want. OSM’s flexibility, completeness, and accessibility makes it possible for its data to be used for many purposes, including business, technology, and social, humanitarian and disaster related purposes.

This has given an upsurge to the data in OSM and will increase the data quality itself. As the map is open and free, OSM data quality assurance is very vital to ensure that its usage for public purposes in large scale can be done right and with good quality.

Quality assurance is also important to mitigate users who intentionally alter OSM data or add data that are not supposed to be on the OpenStreetMap.
7.3 Some Samples of Data Quality Assurance Tools in OpenStreetMap

Now that you know what is data quality assurance and how important it is to keep OpenStreetMap data quality in check. In this section, you will be introduced to some tools created by fellow OpenStreetMap users that can help monitor data and ensure data quality in OpenStreetMap. Some of the tools that can be used to ensure data quality in OpenStreetMap are as follows:

1. Notes in OpenStreetMap

Notes is one of the facilities made available by OpenStreetMap to allow users to give each other comments on specific objects on OpenStreetMap. Notes on objects are given to notify other users that there are loopholes in them, for example on a hospital, users can notify that the hospital is being demolished or is under reconstruction or that the hospital has a wrong name. What is interesting from this feature is that the contributor does not have to have a username to add information to OpenStreetMap and to use the notes feature. But when you want to correct / to edit the object directly you have to create / login to an OpenStreetMap account.
2. Who Did It
This is a website that can more specifically help us monitor OpenStreetMap data in an area. This website is developed Simon Legner. The main objective of this website is to know entries, edits, and deletions activities on an area in OpenStreetMap, by putting in the username, the time of activities, the object forms, and the area we want. To open it, please go to: http://simon04.dev.openstreetmap.org/whodidit/.

3. OSM Inspector
This tool is developed by Geofabrik and is often used to inspect errors in OpenStreetMap. To visit this website, you click on this: http://tools.geofabrik.de/osmi/. The following is the interface of OSM Inspector:
7.4 JOSM Quality Assurance Tools

JOSM is one of the most commonly used editors to contribute to the OpenStreetMap. One of the reasons why this is the case is because JOSM can be used offline and is its various features to edit a map, including to validate data. When you validate data, you may often find several errors and warnings.

1. *Error*

This type of mistakes need to be resolved and must not be ignored. You can not upload your edits if this mistakes have not been resolved. For this type of mistake, you can automatically resolve it by pressing **Fix** button. Some of the sample errors are:

1. *Duplicate nodes*: this happens when there are more than one node in the same position.
2. *Duplicate way nodes*: this happens when there are more than one way in the same position.
3. *Unconnected coastline*: this happens when the coastline is drawn not as a closed / connected ways.

2. *Warning*
Warnings are mistakes that may need to be resolved but in some cases can be compromised. To resolve this type of mistakes, you need to do it manually, because it can not be automatically fixed by JOSM. Here are some of the examples.

1. **House number without street**: this warning appears when there is a tag `addr:housenumber` but without a tag `addr:street`.
2. **Crossing ways**: this warning appears when there are ways or polygons that overlaps with other ways nearby. For example: building polygon that overlaps with the building polygon rumah next to it, or overlaps with the road.
3. **Overaping Highways**: this happens when there are two road objects with different types share more than one node.
4. **Similar named ways**: this happens when there are ways, commonly road network, that share the same name.
5. **Untagged ways**: this happens when there are objects (nodes, ways, polygons) that have not been given any attribute/presets information yet.
6. **Way end node near other highway**: this warning appears when a node from an object is positioned very close to other objects.
7. **Crossing building**: this warning is similar to the crossing ways warning.

3. **Using JOSM Validation Tool**

To use the validation tool in JOSM, you can click on the logo with checklist (validation) on the left toolbar. A validation panel will appear on the right side of JOSM.

![Validation Panel in JOSM](image)

Make sure **no objects are selected**. If you select an object, only that object will be validated, whilst what we aim is to validate the entire area we downloaded. Hover your mouse to the validation window and click **Validate**. JOSM will analyse all data you
added or changed in accordance to the validation test on the JOSM setting. From JOSM
default setting, all validation test will be done by JOSM. If you only want several
validation test by JOSM, you can go to Edit – Preference and then go to the validation
tab and untick validation tests you do not need.

For a while your data will be analyzed. On the Validation Results window, you will see
a list of warnings and errors, if any. Besides, on your layer panel there will be a new
layer highlighting Validation Errors.

As previously explained, you can make JOSM automatically correct errors, but nor with
warnings, where you need to correct them one by one. To correct warning, you can click
right on the warning and select Zoom to problem.
Not all warnings on JOSM need to be resolved, if you are unsure or not capable or resolving the issue, you can temporarily leave them as is.

7.5 Tag / Information Standard in Indonesia

When adding information to an object we mapped, we need to make sure the information is correct and is aligned with the OpenStreetMap’s rules. Therefore we need certain guiding standards on those objects. OpenStreetMap has provided a wiki for general guideline. The page is called wiki map features. You can visit them from http://wiki.openstreetmap.org/wiki/Map_Features.

The following is the main interface of that page:
On map feature you can see a variety of objects that can be mapped on OpenStreetMap with its description and pictures. We need to remember that the objects displayed on map feature has universal reference and it will also show objects in foreign countries, such as snow cart, childcare, drinkable tap water, et cetera. Some of these objects are not commonly found in Indonesia and sometimes cannot be understood in local context by Indonesians. If you would like to search for objects specific for Indonesian context, you can visit the Wikipedia page made by HOT Indonesia:

http://wiki.openstreetmap.org/wiki/Id:Referensi_Atribut_Objek_OSM_Indonesia
SUMMARY

In this chapter you have learned about how to maintain the quality of OSM data and the tools for OSM data Quality Assurance. With these tools, OSM data can be made up to standards and can avoid the possibility data vandalism.
Chapter 8

GPS Usage

Learning Objectives

• Understand notions and different types of GPS
• Able to Turn on GPS
• Perform GPS settings when first used
• Understand the various factors that affect GPS accuracy
• Understand definition of Track and Waypoint
• Collect data by GPS
• Copy GPS data (track and waypoint) to a computer
• Open waypoint and track in JOSM

Learning to edit is one of the most important parts of mapping - how to add information on the field to the map. We will study some methods for conducting field surveys in this guide.

In this section, we will see what is GPS and how GPS work. You will learn how to operate a GPS and how to use it to create maps.

Here we will explain how to operate Garmin GPSmpa 62s/64s. A GPS which commonly used for mapping. There are many other GPS models that can do the same, so if you work with a different GPS, do not worry because the principle remains the same.
8.1 Definition and GPS Parts

A GPS works like a mobile phone, but if a mobile phone receives a radio signal from cellular company, GPS receives signal from the satellite surrounding the earth. By receiving those signals from satellite, a GPS can calculate precisely your position on the surface of the earth. GPS records that location in a form of coordinates, where there are two long numbers. One number indicates how far your position is from East or West - commonly called longitude position. The second number shows how far your position is from North or South - usually called latitude. Every place on earth possesses unique geographic coordinates.

GPS that will be discussed this time is GPS Garmin GPSmap 62s and 64s which use the same way but have slightly different specifications. Here are the Garmin GPSmap 62s GPS parts:
8.2 Turning on GPS

Before turning on your GPS, you should go to an open space. Because, GPS can only locate your location by receiving signal from satellite. GPS is not well indoor.

Steps in turning on GPS are as follows:
1. Push and hold Power button which is located in the right side of GPS. Push power button once again to setting up screen brightness or to view battery status and signals. It will look like this:

![Picture 8.4. Description of One of the Garmin 62s GPS Layout](image)

2. GPS will turn on and display satellite page. If not on the satellite page, then push the Page button until it displays the satellite page

3. Satellite page will display as follows:

![Above pictures showing that your GPS is still looking for satellite signals. When it is connected to three or more satellites, the GPS will get your location. Not only satellite page, a home page which has been set up, are:](image)
• Compass to display the direction of our survey.

• A Map to display waypoint and track

• Main Menu to display some other menu options

### 8.3 Track and Waypoints

Your GPS will record two types of information which is useful to create a map or to save coordinates from a location. First, GPS could save your location at GPS Memory. If you save a location, the coordinate will be saved in a specific name. For example, the first point saved by you will be named 001, 002, and so on.
When you saved a point, you can write the number on a piece of paper, with a note of what point it is, with attributes or indicators you want to know. A saved location in your GPS are called waypoint.

Steps saving waypoint are as follows:

- Push **Mark** button and the display will appear as follows:

- Select **Done** to save Waypoint

To view previous saved waypoint list, you can go back to **Main Menu** and choose **Waypoint Manager**.

To delete a previously saved Waypoint, press **Enter** button to one of waypoint, then press **Menu** button and choose **Delete**.

Secondly, your GPS can save things called Track. If a waypoint only save a location, a track will save a location series wherever you moved. For example, a track will record your location every second, or every one meter, and the result will be a series of dots showing the path of the location where you have been there previously. Track will be very useful to mapping an object indicated by a line or shape, such as streets, buildings, or field. Here are the steps in activating track recording:
1. Go to **Main Menu**, and press **Setup**

![Setup icon]

2. Select **Tracks**

![Tracks icon]

3. At **Track log**, change to: **Record, Show on Map**

![Track log menu]

4. Make sure, track recording in your GPS is active before you start your survey.

   To non-activate track recording, choose **Do not Record**.

Tracks are saved after the field survey is completed. Generally, tracks are saved per day. The way to save the recorded tracks are as follows:

1. Go to **Main Menu**, choose **Track Manager**

![Track manager menu]
2. Choose Current Track, is a recording route you just made.

3. Choose Save Track, to save a Track

4. Insert track name, generally in form of date and survey time, then choose Done.
5. Clear the track record from previous recording, choose Yes.

6. Make sure the name of the track you saved will appear. This proves that your survey tracks have been successfully saved.

8.4 Copying Data to Computer

Next, data that has been collected will be copied to a computer to use as mapping references. Steps are as follows:

1. Make sure, you have installed USBDriver_231.exe to make GPS device readable on your computer.
2. Connect GPS to computer by using Data Transfer Cable.
3. Make sure GPS is turning on.
4. Go to Garmin GPSMAP directory, then choose folder Garmin → GPX

5. Select data with your field survey data (Track & Waypoint) and copy to your computer.

8.5 Opening GSM Data in JOSM

GPS Data, that has been collected could be used as a reference to digitize using JOSM. This GPS data will make it easier for you to know the location of the objects that you have surveyed. The following are steps to open GPS Data to JOSM:

1. Open your JOSM

2. Choose File → Open, then select GPS data you have copied to your computer (Track and Waypoint), then click Open.
3. There will be 2 layers that appear:

4. JOSM will display this:

5. Open satellite imagery to display location where you survey by clicking **Imagery → Bing Aerial Imagery**

   To change colors for Track and Waypoint, you may **Right Click** to track layer or waypoint then select “**Color Adjustment**” and choose color you want.

   For Track, in addition to **changing the color** you can also **change the thickness of the line**. Same way, right click then select Customize Track Image. Change the number to what you want. (The bigger the number then the thicker the line)
6. Make sure to download OSM data before you start to digitize by click button

7. You are ready to mapping according to your survey data.

SUMMARY

Congratulations! You have now gained an understanding of how to use GPS. If not, try to keep a point from several locations that you think are important.

In this chapter, we learned how to collect waypoint and track as well as to open those in JOSM. Later, we will use this information to add new location to OpenStreetMap.

In the next chapter, we will learn about another survey method, which is known as Field Paper. It allows you to create map without a GPS!
Chapter 9

Field Papers

Learning Objective

• Understand how Field Papers work.
• Create and print Field Papers
• Add data for printing by using Field Papers
• Complete scan and upload Field Papers to “Field Papers” sites
• Open Field Papers into JOSM

In this chapter we will see how we can record the coordinates of a place without using GPS. We will use a tool called Field Papers. Field Papers allows you to print map location on papers, to draw objects, to add notes, and to open those papers in a JOSM, where you can add your mapping results data into OpenStreetMap.

9.1 Field Papers Overview

Before we learn more about field papers, let's see an overview of how Filed Papers works:

1. Search for a location you want to map in the OpenStreetMap website. Create a map for that location. You can select to print the map with OpenStreetMap background or you can print with satellite imagery background, if the imagery is available in your location.

Picture 9.1. Field Papers Landing Page
2. Use printed field papers to start surveying in your location. Add more places by drawing them on the map. Draw a way for street, polygon for building, and so on. Write notes from any location directly to the map or add numbers to map for connecting images with serial codes in notes, where you can write more detailed information to any objects.

3. Scan your field papers into a computer. If you don’t have any scanner, you can take a photo of Field Papers, only if your camera can take pictures with high resolution. Upload an image to the Field Papers site.

![Picture 9.2. Sample of Field Papers](image)

4. In JOSM, add Field Papers. Use the object you have drawn as a reference to add those objects to a digital map inside OpenStreetMap.

![Picture 9.3. Sample Field Papers on JOSM](image)
9.2 How Field Papers work?
If you follow how Field Papers work, as described above, you can collect geographic coordinates from somewhere accurately using paper only. How could it be?

Picture 9.4. Barcode Field Papers
When you print a field paper, those papers will printed with a barcode at bottom of a page. This barcode allows Field Papers to determine the accurate location of the map you are using to conduct the survey. Then, when you add Field Papers into JOSM, all object you have draw will display in actual location. It is like using a GPS to collect the exact coordinates, unless all you need is paper!

Now, let’s study how to make and use Field Papers.

9.3 Make and Pint Field Papers
1. Open your internet browser. In you site adress at the top of the windo, insert fieldpapers.org and press Enter.
2. Website will display like this:
3. To make a map, you may click “Make your own Atlas” or “Make” to select location you wish to print.
4. You will directed to this page:

5. In display to make an Atlas, you will found several button and menu to make arrangements for the map you want to create. To be clear about button function and how to make field papers, you can see this following image:

Picture 9.7. The Page when Making Field Papers
Steps to make Field Papers:

1. **Title**
   You can specify the title of the map you will create here.

2. **Paper size**
   You can specify paper size from the map you will print later. You will adjust paper size into Letter, A3, or A4 Size.

3. **Paper Position/Orientation**
   Paper size or orientation can be specify in this section. You can select Landscape or Portrait display.

4. **Map Background or basemap**
   You can select map background you wish to display in your paper map. Several option available in basemap setting, are as follows:
   - OpenStreetMap: Display a map made by OpenStreetMap
   - Satellite + labels: Display satellite imaginary and labels, like street name
   - Satellite only: Only display satelitte imaginary.
   - Humanitarian: Display a map with humanitarian themes. (When displaying object only related to humanitarian)

5. **Search Location**
   You can search location you wish to find faster with this button. You may type location what location you want in this box, then press Enter.

6. **Zoom in/Zoom out Map**
   Map view can be enlarged and minimized with this menu. You can zoom in and out by pressing the (+) and (-) keys. In addition, you can zoom in and out on the map by using the scroll wheel on your mouse. To move the map, you can use left click on your mouse. Please click and hold the left click button on your mouse then drag the map according to your desired location.
   When determining zoom level, note that your map should be able to clearly show the location, not too small or too large.

7. **Add/Reduce Box**
Box we mean here is number of papers, you need to print a map. The more you determine the box, the more paper you need. In the example, the box to be printed is as much as 6 sheets of paper.

8. Make Atlas

If all the settings have been done, you can simply create a map by pressing the button “Make Atlas”.

6. If you are done, setting up in a paper map you wish to create, then next step is to print the map. After you push button “Make Atlas”, you will directed to pages to show your map is under process by Server.

7. When finished, a page will appear that indicates that your map has been printed. You can directly download the map by pressing the "Download PDF" button on the bottom right of your map.
8. After the download is complete, you can open the map file. Congratulations you have successfully created your field papers!

9.4 Using Field Papers in the Field.
Take your Field Paper out, and use it as a guide to walk and identify new places not on the map. Draw lines for roads, polygons for buildings, and so on. Write notes about each location directly on the map, or add numbers on the map that are linked to a number in your notebook, where you can write more detailed information on each object. If you are satisfied with your additions to the paper map, then you can add them digitally to OpenStreetMap.

9.5 Scan and Upload Field Papers
Field papers are very easy if we want to do the mapping process. While it is convenient, it does not mean that the data we have collected from the mapping results in field papers can automatically fit into the OpenStreetMap server. We still need to insert our Field Paper into JOSM, add our information digitally, and save our changes in OpenStreetMap.
1. First step is scanning Field Paper to your computer. You can done this by insta
scanner to your computer, scan your paper, and save as a image files. If you don’t
have scanner, you can take picture from your Field Paper use camera. However,
you should be careful that the photos taken are of good quality. Make sure Field
Paper is on a flat surface and your camera is directly in front of it. Also make
sure to include barcodes on the photo because Field Paper will not work without
barcodes. Below are examples of images that have been scanned / photographed:

![Field Paper Photo](image)

**Picture 9.10. Field Papers Photo**

2. After you have scanned field paper and saved in your computer, open your internet
browser and go back to fieldpapers.org site, life previously.

3. To upload your documents, you can click tab “Upload” in the left top of browser
or click “Capture your Note” in the left bottom of your browser pages.
4. Click “Select File” and navigate to where your scanned field papers file. After you find the image file you want, please click Open.

5. You will be requested to wait for a few minutes to upload your field papers, depending on your internet connection. When the upload has finished, you will see your display like this:
Before we open Field Papers in JOSM, we need to install the JOSM Field Papers plugin. The plugin adds additional functionality to JOSM. The Field Papers plugin allows us to open our Field Paper that has been scanned as a background, the same way to view satellite imagery as a background.
1. Open JOSM and go to Edit > Preferences
2. Click to Plugin Tab
3. Find Field Papers plugin and check the box next to it. Click OK.

![Plugin Field Papers](image)

4. Restart JOSM.

### 9.7 Open Field Papers in JOSM

Now you can open your Field Paper in JOSM and use to add information you have collect to OpenStreetMap. Back to Field Paper sites, by typing fieldpapers.org to your internet browser, like before.

1. Click Tab “Watch” and then Click “Snapshot”
2. Find your field papers in the list and click. You will view display like this:

![Uploaded Field Papers](image)

3. To open field papers on JOSM, we need to copy ID pictures from the field papers you have scanned before. Then, in the search bar at the top of your
internet browser, choose text and press CTRL + C on your keyboard and copy. The text should look the same like this:


4. On the top menu of JOSM, click "Field Papers". Then click on "Scanned Map ..."

5. Press CTRL+V in your keyboard to paste text you have copied from Field Papers site.

6. Press OK

7. If everything working well, you should see your Field Paper open in JOSM. In the next chapter, we'll see how to add the places you map in OpenStreetMap.
You can also use Field Paper that you have scanned in other online OSM editors such as iD or Potlatch2 by clicking the "Edit in iD" or "Edit in Potlatch" link on the Scanned Field Papers page.
Let’s Try!

After you add the data in OSM, those data will be saved to OSM map. If you wish to add new data from previous map, You can print a Field Paper that includes changes to the data you create. Repeat this process as much as possible. The more often you map, the better the results you'll get!

**SUMMARY**

Congratulations! In this chapter you have learned the process to use Field Papers and how they work. You have studied how to print, to map, and to scan a field paper and how you can use them to improve OpenStreetMap. Next, you can learn how to solve if data conflict in OpenStreetMap.
Chapter 10

Solving Data Conflict in OpenStreetMap

Learning Objective

- To understand definition from data conflict OSM to JOSM
- To understand types of data conflict in JOSM
- To figure out and to practice how to fix data conflict in JOSM
- To understand how to avoid data conflict in JOSM

10.1 Definition of data conflict OSM in JOSM

Sometimes, when you are working in JOSM and when you upload an edited map, you will receive messages like this:

![Picture 10.1 Conflicts on JOSM](image)

Those messages appear when you have a data conflict in OpenStreetMap. This is happening when you download OpenStreetMap data to show in JOSM, and then when you're editing, someone else also downloads the same area as you change it, and save the changes to OpenStreetMap. So when you try to upload data with your version, the server will read different data from the data you send with the one already saved in
OSM first. So the server will reject the data you send and give a warning to JOSM because the server does not know which version of the incoming data that should be saved into the server.

10.2 Types of data conflict in JOSM

Now you already know what data conflicts are inside OpenStreetMap and how it can happen. Conflict in JOSM does not only happen to one type of object, but it can happen to other objects that you change or add. There are 3 types of conflicts that are often encountered in JOSM, i.e.:

1. Properties Conflict

It is a conflict that is seen based on the position of an object, can be a node, way or polygon.
In the picture above is an example of the conflict properties. Initial version of data downloaded from OSM, the position of a circular object is right in the middle of the line. User A, which in this case is someone else, moved the object slightly towards the South. While the OSM data version that User B uses, the object is moved slightly towards the North. User A first uploads the data into the server, so that the version of the object on the server in accordance with the position of objects that exist in User A. When User B tries to upload the data into the server, the server will see a change in the same object but with the position different, this is what will cause data conflicts for the object.
2. **Tags conflict**

It is a conflict, where there are different attributes information from the same object. The difference can be in the value or even the key of the object:

![Image of tags conflict example]

In the picture above, different information viewed from key amenity and value. Although the object is the same object, but the information inside is equally different. Object in the user A, have amenity information = Police, while in the user B the object is amenity=cinema. When uploaded, conflict will appear and it will look like this:

![Image of tag difference between server and local computer]

**Picture 10.5. Tags Conflict Example**

**Picture 10.6. Tag Difference between Server and Local Computer**
3. Nodes Conflict

This conflict happens when an object consists of several points receiving addition or deletion from those objects which cause sequential change from a point who made those objects.

If you see the picture above, in the beginning a line have point sequences in the number of 1-5. Then, there are two users who downloaded the object with the same version. User A, download those ways and delete point number 5 and add point number 13. After that, User A will upload the data in the server. Meanwhile, user B delete point number 3 and add point number 6. When user B try to upload those data to server OSM, server will reject those data and conflict node happen.
10.3 How to Solve Data Conflict in JOSM

The process of solving conflicts are quite simple in JOSM, althought can initially be confusing. Basically, for all conflicts that occur, JOSM will provide two options - your version object and another version of different person residing on the server. You must choose whether you want to keep using your version or the new version on the server.

![Picture 10.9. Select Synchronization of All Datasets to Check All Data in Server](image)

When conflict window appears, you may most likely select the button "Only Sincronize" in the beginning. But if you select this option, you may receive conflict message continously. Therefore, you should select the "Synchronize all dataset..." button so that you can resolve conflicts at once.

![Picture 10.10. List of Conflict after Selecting 'Syncronizing All Datasets'](image)

Conflict only appears from two different edits at the same time. If there are three or more conflict exist, then conflict chain will appear simultaneously. While you can only choose or combine two conflicts at the same time. You can choose your version, another version, or combine both.
The conflict messages may seem complicated, but it is actually simple. Conflict at the above example according to properties, the object position in earth surface. On the above example, if you feel confident that your version is the most appropriate version, you can click arrow in your version, then join into Merged Version or an improved version.
Once you have selected which version you think best, then click “Apply Settlement”. After completing a conflict you can resolve another conflict until the conflict list is no longer visible and you can start uploading your changes.

The same applies to conflict types in tags/attribute information. In this type of conflict you will be given a comparison between existing data on the server with existing data on your computer. You will be asked to choose which information you think is correct. If you feel that the attribute information you entered is the correct information, select that information into the aggregated version and the select “Apply Settlement”.

There is a difference in resolving the type of conflict on the node. This type of conflict looks more complicated because of the many colors that appear on the conflict window display. But if you understand the explanation that will be explained below, of course, the settlement of conflicts on this node will be easier.

As mentioned earlier (sub-chapter on types of conflict). This conflict occurs when a user changes a sequence of an existing line in OpenStreetMap. If you notice in the picture above, there are 3 types of colors for the type of node/point conflict. Each color
has a different meaning. The green color indicates that the node has not changed (nodes/dots numbered 1&2). The red color indicates that the node is an additional node that exists only in each version of the data (either server version or version on your own computer). As for the orange color means that the node/point is changing the position of the sequence.

To solve it we can combine the existing data on the server with existing data on our computer or we can also use the existing data on us/server as a whole.

All conflicts that appear on your JOSM must be completed because **you will not be able to upload your changes until the list of all existing conflicts is resolved.**

### 10.4 How to Avoid Data Conflict in JOSM

You certainly do not want to experience conflicts when you make changes or additions to OSM data. There are several ways you can minimize the conflict.

1. **Upload your change result periodically**

   To minimize the occurrence of a number of conflicts, it is important to upload your edits regularly. Conflict appears more for those who edit their entire territory first and delay to upload it. The best thing is, download the area you’re working on, making changes or add data, then upload as quickly as possible.

   The longer the time lag between downloading the data by uploading the change, the more likely it is that someone has edited/changed the data at that time. If you are forced to delay uploading data that you have modified, before you upload, you must first check the condition of the data by clicking on the “Update Data” button in the “File” menu.
2. Only make changes and add data to the area you download

Changing and adding data in specific areas can reduce the risk of conflict. You must be sure that you are not editing outside the area you have downloaded and you are sharing based on Task Manager. This step can avoid many users editing the same area. You can easily see where the outside area of your downloaded area in JOSM, because the background of the outside area there are diagonal lines, not only black.

3. Using Tasking Manager

HOT Tasking Manager is tool or media where mapmakers can divide an area into multiple grids, then can work with other mapmakers to map a region in a more organized way. In addition to being more organized, the tasking manager is also one way to avoid conflict, since it does not allow more than one person to map out the same area.
The mapmakers in the area can select a box on the grid you want to map, and when they finish mapping, they can mark the box as completed or finished mapping. In this way, a team of people scattered in different regions can coordinate together to complete the mapping on the grid.

To see how the tasking manager works, let’s take a closer look.

1. Open your internet browser and open the website task.hotosm.org. You will see a page like this.

![Task Manager initial view](image)

1. Click “Log in using your OpenStreetMap account”

![OSM logging page](image)
2. By clicking on the button, you agree to this application accessing your OpenStreetMap account. Click “Save Changes”.

![OpenStreetMap Authorization]

**Picture 10.18. Account Authentication in Task Manager**

3. Now you will see a list of current projects. The lists contains projects from different countries where they coordinate to do the mapping.

![Project List]

**Picture 10.19. Projects in Task Manager**

4. Click on one of the projects to see more information.
5. This page shows all the things you need to know about the project. On the left side of the page is a description of the mapping project and how to set it. You can click on the tabs to see more information.

6. On the right side there is a grid that shows the area being mapped.
   a. The orange grid box has been mapped
   b. The green box has been mapped and has been checked by others and validated its data
   c. Box with yellow edges means someone else is working on a map of the area
   d. Other empty/gray boxes are missing or has not been mapped yet

2. On the “Contribute” tab you can select the task or grid you want to work on. Please select a box to work on, then click “Start Mapping”.

3. Then select “Edit with JOSM” (If not successful please open your JOSM and enable “Enable Remote Control” first).
You can also open the area automatically for editing using JOSM, iD Editor, Potlach 2, Field Papers.

You can now edit the area using the instructions available on the project information. When you finish editing and uploading it to OSM server, you can go back to the tasking manager and add comments about the changes you made. Click “Mark task as done” to let other mappers know you have completed the grid box. If you cannot complete the box, click “Stop Mapping” so that the box can be done by other mappers.

**Summary**

You have now learned what OpenStreetMap data conflicts are in JOSM and the types of data conflicts that often appear in JOSM. In addition, you have also learned how to resolve data conflicts and how to avoid data conflicts. Periodic uploads can minimize the occurrence of data conflicts and the use of tasking managers is one of the recommended ways to avoid data conflicts and to collaborate with others in mapping out a place in OpenStreetMap.
Chapter 11

Satellite Image Shift (Imagery Offset)

Learning Objectives

• To understand the definition of imagery offset
• To practice how to fix imagery offset
• To practice how to store an imagery offset database

11.1 What is Imagery Offset?

Using satellite imagery is one of the common approaches used in creating OpenStreetMap maps. Mapmakers usually use Bing Satellites as backgrounds when creating their own maps or other satellite images from other parties. We have learned how to use satellite imagery as a background in previous activities.

Satellite image service providers usually have georeferenced their satellite imagery, but some satellite images are not perfectly located. This usually occurs in montainous areas or hills areas, where it is very difficult to draw flat images according to the surface of the earth that has contours. When you display a picture in JOSM, it sometimes shifts ten meters or more from the real position. This is called Imagery Offset.

We have learned that there are two ways to create maps, first by using satellite imagery to identify a visibility on the surface of the earth and one of them using GPS to record tracks and waypoints and then add them to OpenStreetMap. Lots of advantages in the use of satellite imagery. This will make it easy for you, the mapmaker, to see the whole picture, to observe some details of the image, aside from you gaining knowledge about the area, and it will be easy to draw roads, buildings and areas, while one of the advantages of GPS is not experiencing shift like a satellite image. A GPS will always provide the exact latitude and longitude position. One of the disadvantages is that
satellite signals can be disturbed by high buildings and mountains, but in this case it is easy to know the error. Show GPS tracks on this satellite image and compare it with Bing image below

Picture 11.1. Satellite imagery is shifting

That way we will know that GPS tracks are accurate and satellite imagery underneath is shifting. Now we will definitely ask, “if satellite imagery is shifting, how can we use and map accurately?”

11.2 Fixing the Imagery Offset

11.2.1 Fixing the Imagery Offset in iD Editor

A. Activate the OpenStreetMap GPS traces

Before we check whether the satellite imagery in the area we are going to map is shifting or not, we need GPS track as a reference. To view GPS tracks in iD Editor, you can do it by:

1. Click **Background Setting** which is located in right side of iD editor toolbar
2. Check/Enable OpenStreetMap GPS traces option
3. This feature will display the existing GPS tracks in the OpenStreetMap database. If in your area there is no display of GPS track, this means that in your area there is no GPS track entered.

![Image showing GPS tracks and imagery settings]

*Picture 11.2. The GPS track results are derived from the OSM server*

**B. Fix the Imagery Offset**

After you display the GPS track in the iD Editor, you can determine whether the satellite image in the area you want to map is shifting or not. If it turns out the satellite image is shifting, you can fix it by:

1. Open the **Background Setting** menu located on the right toolbar of the iD Editor.
2. Select sub menu **Adjust Imagery Offset**
3. Use the arrow keys to move satellite image in the direction corresponding to the GPS position. The number in the middle will change if you shift the image.

4. To restore the settings you can click on the arrow button located on the bottom right corner, or change the offset value to 0,0.

**11.2.2 Fixing the Imagery Offset in JOSM**

**A. Downloading GPS Track**

One of the best reference to set up satellite imagery is to use GPS tracks. The more GPS tracks you have, the more accurately you can fix the imagery offset. Currently
OpenStreetMap users often upload their GPS tracks into OSM database, we can download them and use them to improve the position of our satellite imagery.

1. Click on download button

2. Check the box next to “GPS Data” located at the top position of Download window. Select your area and click “Download”.

3. It will download an additional layer in JOSM which consists of GPS tracks. Depending on how many tracks are already uploaded by OSM users, you may see some tracks or even no GPS tracks at all:

B. Fixing the Imagery Offset

Once you have downloaded your GPS track you will probably know if your satellite image is shifting or not when viewed from existing GPS tracks. If you already know that your satellite image is shifting from position that should be the same as the GPS track, you can fix it by

1. To set up satellite imagery, click on the “Set up Offset Imagery” button at the top of JOSM.
2. An image offset setting box will appear, use left click and hold on your mouse to move the image so that it will be positioned parallel to the GPS track. The GPS track must be positioned the same as the road image as close as possible. You will see the offset number will change in the box.

![Image Offset Setting Box](image)

**Picture 11.3. Imagery Offset Setting box**

3. If necessary, you can save this shift setting by entering the name of the marker and click OK. You can then automatically apply the same settings to go to Imagery > Imagery Offset > and click on the bookmarks you saved.

4. If you do not want to save the shift, click OK without having to enter the name of the marker.

What if there is no GPS track in OpenStreetMap and you do not have GPS? Without GPS tracks, it would be very difficult to organize imagery. If it’s a relatively empty area, you might be able to map it first and fix it later. It would be better to map an area with offset than not map at all.
11.3 Obtain the Imagery Offset Database

There is one alternative way to find out whether the satellite image in the area is shifting or not by checking the imagery offset database (http://offsets.textual.ru/). If you find that your region is having imagery offset, you can use the additional tool that is imagery_offset_db. Through this additional device, you can check whether the area you are in has a database related to imagery offset or not.

Click on Imagery > obtain imagery offset to check whether your region is having imagery offset or not. Otherwise, a message will appear as follows:

![Notification if there is no imagery offset database](image)

If your area does not have a imagery offset database, you can shift the satellite image through Imagery Offset Setting feature.

After you successfully shift the image, you can save the image shift value into the imagery offset database by:

1. Click Imagery > Saving the Imagery Offset

![Saving the Imagery Offset](image)

2. Comment on the value of the imagery offset you are about to upload, the comment you write may be the shifting location, the reference point on which to shift the image, how far the shifting difference, etc. If finish, click OK
3. When you select **Imagery > Obtain the Imagery Offset** you will obtain the list of imagery offset database in your region as follows:

![Database of Imagery Offset](image)

**Summary**

You now understand what a imagery offset is and how to fix imagery offset through both the iD Editor and JOSM. You can fix the imagery offset by downloading GPS data already uploaded by other users to the OSM server. However, if the data is not available, you may be able to map the area first. Because it would be better to map the area than not at all.
Chapter 12

Obtain the OSM Data

Learning Objectives:

• Able to practice how to obtain OSM data in GeoFabrik
• Able to practice how to obtain OSM data in HOT Export
• Able to practice how to obtain OSM data in Overpass Turbo

After you learn how to add and to edit data in OpenStreetMap (OSM), in this chapter we will learn how to obtain OSM data for your various needs. You can use OSM data as a backup of your map data or the data you can work as needed by using Geographic Information System software such as QGIS (www.qgis.org).

12.1 Geofabrik

If you want to obtain one country’s OSM data, you can get the data in the GeoFabrik website. GeoFabrik is a german-made site that provides OSM data in various types for all countries in the world. To access it, you just need to go to GeoFabrik website (download.geofabrik.de).
If you successfully open geofabrik website, you will be presented eight sub-regions for all countries in the world. The purpose of the division of the region is certainly to facilitate users search for their country. Indonesia can be found in the Asian section by clicking the Asian sub-region within the blue table.

Download OpenStreetMap data for this region:

**Asia**

[one level up]

**Commonly Used Formats**
- asia-latest.osm.pbf, suitable for Osmium, Osmosis, imposm, osm2pgsql, mkngmap, and others. This file was last modified 3 hours ago and contains all OSM data up to 2017-01-11T20:28:02Z. File size: 3.9 GB; MDS sum: e30306c73ae6bdbea9c0952e1472d3f.
- asia-latest-free.osm.pbf is not available for this region; try one of the sub-regions.

**Other Formats and Auxiliary Files**
- asia-latest.osm.bz2, yields OSM XML when decompressed; use for programs that cannot process the .pbf format. This file was last modified 3 days ago. File size: 3.9 GB; MDS sum: e30306c73ae6bdbea9c0952e1472d3f.
- poly files that describe the extent of this region.
- .osm.gz files that contain all changes in this region, suitable e.g. for Osmosis updates
- raw directory index allowing you to see and download older files

**Sub Regions**
Click on the region name to see the overview page for that region, or select one of the file extension links for quick access.

<table>
<thead>
<tr>
<th>Sub Region</th>
<th>.osm.pbf</th>
<th>.shp.zip</th>
<th>.osm.bz2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Afghanistan</td>
<td>.osm.pbf (14.4 MB)</td>
<td>.shp.zip</td>
<td>.osm.bz2</td>
</tr>
<tr>
<td>Azerbaijan</td>
<td>.osm.pbf (14.4 MB)</td>
<td>.shp.zip</td>
<td>.osm.bz2</td>
</tr>
<tr>
<td>Bangladesh</td>
<td>.osm.pbf (12.7 MB)</td>
<td>.shp.zip</td>
<td>.osm.bz2</td>
</tr>
</tbody>
</table>

**Picture 12.2. Asian region in Geofabrik**

After Asian region appears on the top page, you can see some list of countries that exist in Asia. To get Indonesian data, click on Indonesia country on the blue table.

Download OpenStreetMap data for this region:

**Indonesia**

[one level up]

**Commonly Used Formats**
- indonesia-latest.osm.pbf, suitable for Osmium, Osmosis, imposm, osm2pgsql, mkngmap, and others. This file was last modified 3 hours ago and contains all OSM data up to 2017-01-11T20:28:02Z. File size: 244 MB; MDS sum: d709c0355a66d759d0b5f44a5f43796.
- Indonesia-latest-free.shp.zip, yields a number of ESRI compatible shape files when unzipped. ([Format description PDF]) This file was last modified 2 hours ago. File size: 534 MB.

**Other Formats and Auxiliary Files**
- indonesia-latest.osm.bz2, yields OSM XML when decompressed; use for programs that cannot process the .pbf format. This file was last modified 1 day ago. File size: 452 MB; MDS sum: ceab139251aff558e8f8e9e13596830.
- poly file that describes the extent of this region.
- .osm.gz files that contain all changes in this region, suitable e.g. for Osmosis updates
- raw directory index allowing you to see and download older files

**Picture 12.3. Indonesia region in Geofabrik**

You will see the country Indonesia with some frequently used files. To download files that you will use in spatial data processing software such as QGIS or ArcGIS, you can
download the file Indonesia-latest-free.shp.zip. To download other files commonly used for Osmosis, Osmium, osm2pgsql, etc. Please download the file named Indonesia-latest.osm.pbf.

For spatial files, when you extract the file you will be presented several files of type point, line, and polygon. You can also see the date the data was created. Usually Geofabrik update every 24 hours, so if you upload data in OSM, you will not be able to get the data automatically but you have to wait the following day to be able to download data from server. To download the old data, Geofabrik only provides data for the last two months. To get it you can click the raw directory index option.

12.2 HOT Exports

You currently know how to download OpenStreetMap data for one country. But what if you want to download OpenStreetMap data for a specific region? Is there a tool to download OpenStreetMap data for a specific region?

The answer to that question is to use HOT Exports. With tools developed by HOT, we can download specific OpenStreetMap data for the region we want. However, through HOT Exports we can not download regions like America, Europe, and Australia, because currently HOT Exports only supports some areas only.
By using HOT Exports we can also get some types of file like shp, garmin, google earth kmz, obf, and sql. To use it:

1. Open website export.hotosm.org it will appear the front page of HOT Export. Click Login to OpenStreetMap to start exporting data using your OSM account.

2. If you have successfully signed in using OpenStreetMap account, you can immediately start selecting the region you want to download by dragging the map to the right to where you want and create a box by clicking on Select Export Area. To create a box, it’s the same way to download OpenStreetMap data using JOSM, left click and hold your mouse on the map and create the area box you want to download.
3. Enter the export name you want to create. Export name is better if the area to be downloaded. For the description section fill in the description of the export needs of the area.

4. After that click on the File Formats tab. In this section you are asked to specify the file format you want to get. You can just select all types of files but this will certainly result in a longer process than by selecting the files you need.
5. After selecting the file type you want to download, please click on the next tab that is Tree Tag. In this tab you will select two data model types, namely Humanitarian Data Model (HDM) or OSM Data Model. If you select HDM, this means that data that will be processed by HOT Exports is data that has links to disaster goals, such as places of worship, disaster sites, health sites, residential land use, etc. If you select the OSM data model, the data that will be processed by HOT Exports are general data in OpenStreetMap, such as dams, coastlines, relationships, all amenities and facilities, all road networks, and etc.

6. After that you can click the next Tab, Preset File. On this tab you can upload your own preset and use them to download specific data that suits your presets.

### Notes:

**ESRI SHP (OSM Schema):** if you select this file, HOT Exports will present all attribute data which available in OSM into 3 file types (polygons, dots, and lines)

**ESRI SHP (Thematic Schema):** if you select this file, HOT Exports will divide the OSM data into the corresponding dataset with the theme (road network, amenity, etc.). This type of choice will also divide the OSM data into 3 file types (polygons, dots, and lines).

**Garmin Map:** an image suitable for your GPS. The contents of this files are routing, road network information, map elements, and map labels.

**Google Earth KMZ:** this is a compressed file of kml files commonly used for Google Earth.

**OSMAnd OBF:** OSMAnd is a navigation app that runs on Android and iOS that supports offline maps and directions.

**SQLite SQL:** if you want to enter OSM data into database processing software like MySQL or PostgreSQL, you can enable this option.
If you do not have a preset file, you can ignore it by going to the next tab of Export Details.

7. In the Export Details tab, you will see a summary of your export activities as well as additional options for your export. The additional options is whether you want to save your export area privately or publicly, and publicly publish your exports. If you already agree with your export settings, click the Create Export button located below your export summary.

Then the server will directly process your request. The process depends on the size of the area you choose and also the server’s capacity. All exports requests either you made or other users made will appear on the “Exports” page.

Picture 12.7. Export View completed in HOT Export
12.3 Overpass-turbo

If you only need one object in the OSM data, then the right choice is to use Overpass Turbo site. Suppose you only need a school object for the area of Jakarta and surrounding areas. How to download OpenStreetMap data using turbo overpasses are:

1. Open your browser and type http://overpass-turbo.eu/

2. You can start doing a location search that you want to download on the OpenStreetMap Slippy Map located on the right. You can pan and zoom the map with a sign (+) and zoom out the map with a sign (-). You can do a search directly by typing in the search box as below, for example Jakarta. There will be several areas related to Jakarta, you can choose the one corresponding to the region you want to download.

![Initial View of Overpass Turbo](image)

3. If you do not want to download OpenStreetMap data across Jakarta, you can zoom out the area and draw the boundaries to be downloaded by clicking "manually select box" in the toolbar on the left of the map. Draw a box that you customize with the region.
5. Next to download OSM data based on one object e.g. school, you click Menu Wizard. In the Wizard menu, you can filter the data by using the JOSN Query, can simply be tags that consist of Key and Value on the object, such as school then write in the wizard of amenity = school.

6. Click **Build and Run Query**, wait a few minutes until the selected school object in the region appears, as the picture below will show the whole school object with all data types in OSM.
7. If you only want the data type in the form of point / node. You can edit in the Query box on the left how to remove school with type way and relation, then click **Run** menu located at top left. The result is a school object with a point data type that will be filtered. You can also add other more detailed queries in the box and click Run.

```
// This has been generated by the overpass-turbo wizard.
The original search was:
"amenity=school"
[out:json][timeout:2s];
// gather results
// query part for: "amenity=school"
node:"amenity=school"([bbox]);
way:"amenity=school"([bbox]);
relation:"amenity=school"([bbox]);
// print results
out body;
>; out skel et;
```

![Picture 12.11. School Object Search Result](image)

3. To download the school data you can click Export Menu, there are several data formats that you can choose such as geoJSON, GPX, KML, .osm format, etc. If you are not familiar with geoJSON, you can choose level0 to download the .osm data format that you can later use by using QGIS or other mapping software.
Summary

You have now been able to find out how to get OpenStreetMap data with Geofabrik, HOT Export and Overpass-turbo. Geofabrik allows you to retrieve OpenStreetMap data for one country, while HOT Export allows you to retrieve data for one region you want. If you want to retrieve only specific data on a particular tag, you can use overpass-turbo as the data retrieval medium.