

Part II. Build The Road Network

Prerequisite: correctly SUMO installation.

Tools:

note Need java 8 for Java Openstreetmap to open the 'jar' file

Commands to install the java-1.8 on Ubuntu 14.04 LTS

```
sudo add-apt-repository ppa:webupd8team/java -y
```

```
sudo apt-get update
```

```
sudo apt-get install oracle-java8-installer
```

```
sudo apt-get install oracle-java8-set-default
```

```
java -version
```

1. Tool-generated map

NETGENERATE: <http://sumo.dlr.de/wiki/NETGENERATE>

- If the SUMO is successfully installed, in a terminal type netconvert, there will be some information about this tool.

```
kwoncesc@kwoncesc-VirtualBox:~$ netconvert
SUMO netconvert Version 0.22.0
Copyright (C) 2001-2014 DLR and contributors; http://sumo.dlr.de
License GPLv3+: GNU GPL Version 3 or later <http://gnu.org/licenses/gpl.html>
Use --help to get the list of options.
kwoncesc@kwoncesc-VirtualBox:~$
```

- Usage

refer to: netgenerate --help

example:

```
netgenerate -g --grid.x-number 5 --grid.y-number 7 --tls.guess -L 3 -S 20
```

```
netgenerate -c <CONFIGURATION>
```

create net from given configuration

```
netgenerate --grid [grid-network options] -o <OUTPUTFILE>
```

create grid net

```
netgenerate --spider [spider-network options] -o <OUTPUTFILE>
```

create spider net

```
netgenerate --rand [random-network options] -o <OUTPUTFILE>
```

create random net

Examples:

```
netconvert -c <CONFIGURATION>
```

generate net with options read from file

```
netconvert -n ./nodes.xml -e ./edges.xml -v -t ./owntypes.xml
```

generate net with given nodes, edges, and edge types doing verbose output

```
kwoncesc@kwoncesc-VirtualBox:~$ netgenerate -g --grid.x-number 7 --grid.y-number 8 --tls.guess -L 3 -S 20 -o test.net.xml
Success.
```

2. Real-world map

a. OpenStreetMap: <https://www.openstreetmap.org/>

- In the top of the page: Export
- Left side: Manually select a different area
- Adjust the area then Export, the file is map.osm to save

b. Java OpenStreetMap Editor(JOSM): <https://josm.openstreetmap.de/>

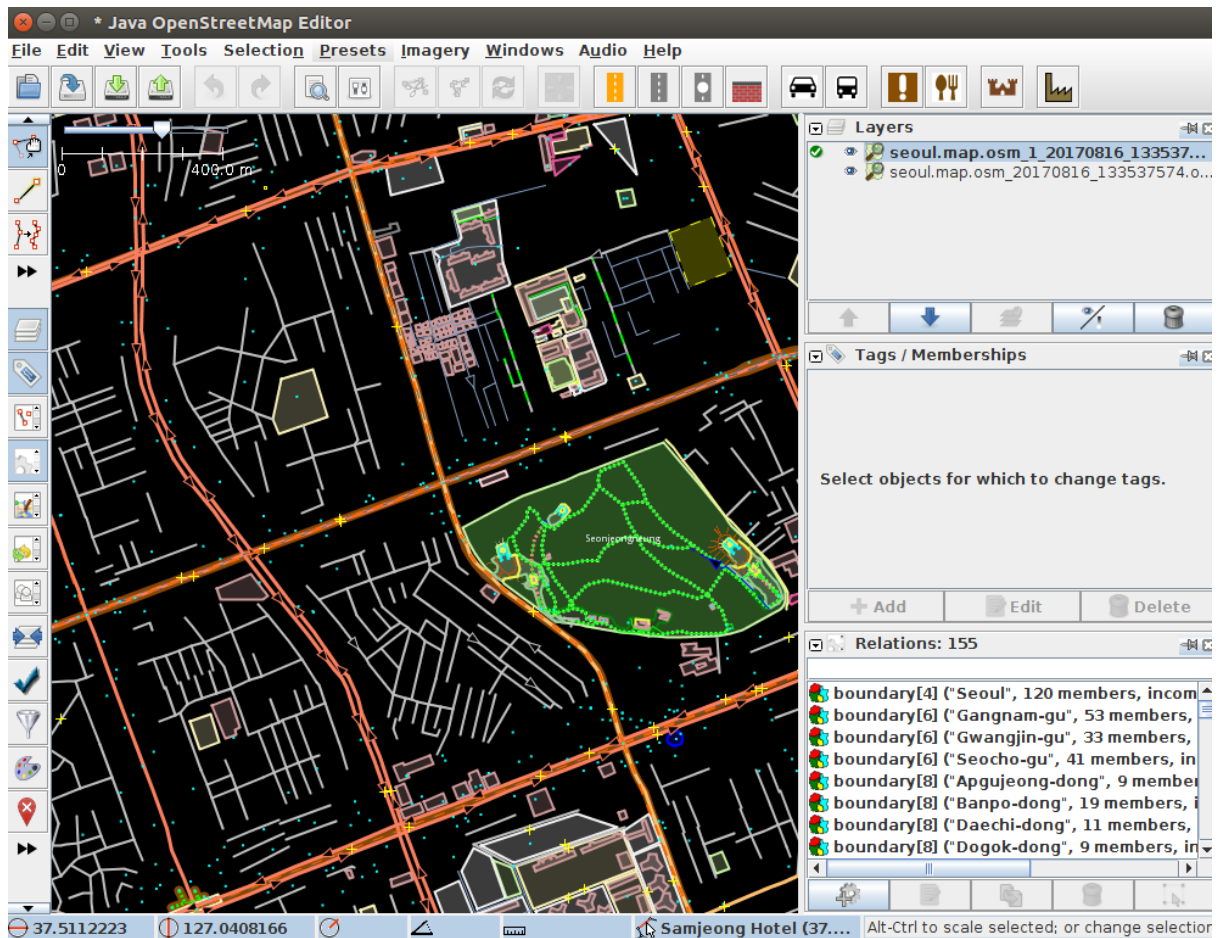
- Download josm-tested.jar on the web page.
- Click how to run, or type `java -jar josm-tested.jar` after going to position of josm-tested.jar in a terminal

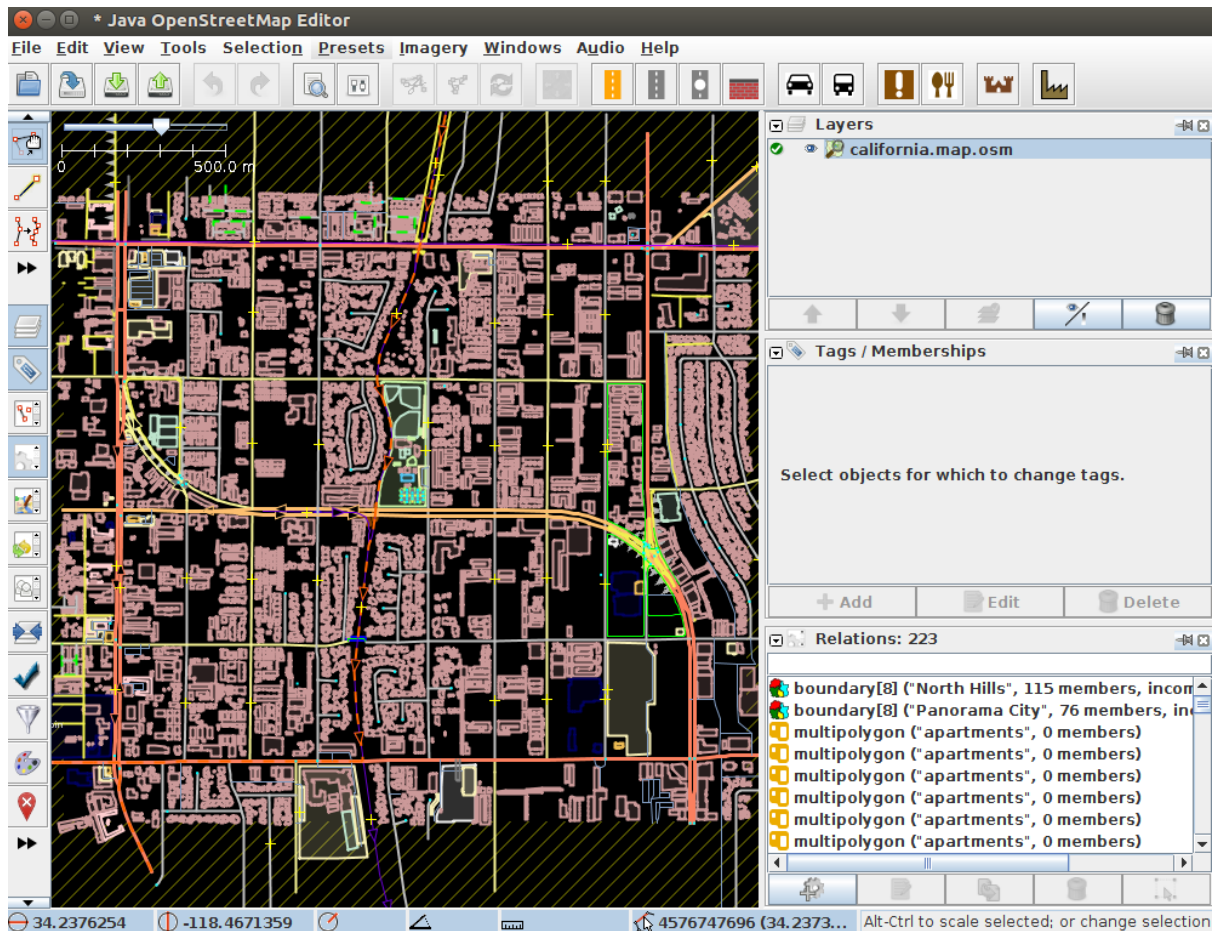
```

kwoncesc@kwoncesc-VirtualBox:~$ java -jar josm-tested.jar
2017-08-16 12:45:14.813 INFO: Log level is at INFO (INFO, 800)
2017-08-16 12:45:24.536 INFO: GET https://josm.openstreetmap.de/wiki/StartupPage -> 200
2017-08-16 12:45:25.988 INFO: GET https://api.openstreetmap.org/api/capabilities -> 200 (434 B)
2017-08-16 12:45:25.990 INFO: OK
2017-08-16 12:45:32.993 INFO: GET https://josm.openstreetmap.de/maps -> 200
[INFO] CompositeCacheManager - Instance is null, returning unconfigured instance
[WARN] ThreadPoolManager - No configuration settings found. Using hardcoded default values for all pools.
[INFO] CompositeCacheManager - Setting default auxiliaries to null
[INFO] CompositeCacheManager - setting defaultCompositeCacheAttributes to [ useLateral = true, useRemote = true, useDisk = true, maxObjs = 1000, maxSpoolPerRun = -1, diskUsagePattern = UPDATE, spoolChunkSize = 2 ]
[INFO] CompositeCacheManager - setting defaultElementAttributes to [ IS_LATERAL = true, IS_SPOOL = true, IS_REMOTE = true, IS_ETERNAL = false, MaxLifeSeconds = -1, IdleTime = -1, CreateTime = 1502855136368, LastAccessTime = 1502855136368, getTimeToLiveSeconds() = -1, createTime = 1502855136368 ]
[INFO] CompositeCacheConfigurator - Parsed regions []
[INFO] CompositeCacheManager - Finished configuration in 153 ms.
[INFO] CompositeCacheConfigurator - No special ElementAttribute class defined for key [jcs.region.TMS.elementAttributes], using default class.
[INFO] AbstractDoubleLinkedListMemoryCache - initialized MemoryCache for TMS
[INFO] CompositeCache - Constructed cache with name [TMS] and cache attributes [ useLateral = true, useRemote = true, useDisk = true, maxObjs = 0, maxSpoolPerRun = -1, diskUsagePattern = UPDATE, spoolChunkSize = 2 ]
[INFO] BlockDiskCache - Region [TMS_BLOCK_v2] Constructing BlockDiskCache with attributes
BlockDiskAttributes
  DiskPath [/home/kwoncesc/.cache/JOSM/tiles]
  MaxKeySize [524288]
  MaxPurgatorySize [5000]
  BlockSizeBytes [4096]
  KeyPersistenceIntervalSeconds [300]
  DiskLimitType [SIZE]
[INFO] BlockDiskCache - Region [TMS_BLOCK_v2] Cache file root directory: [/home/kwoncesc/.cache/JOSM/tiles]
[INFO] BlockDisk - Constructing BlockDisk, blockSizeBytes [4096]
[INFO] BlockDiskKeyStore - Region [TMS_BLOCK_v2] Cache file root directory [/home/kwoncesc/.cache/JOSM/tiles]
[INFO] BlockDiskKeyStore - Region [TMS_BLOCK_v2] Key File [/home/kwoncesc/.cache/JOSM/tiles/TMS_BLOCK_v2.key]
[INFO] BlockDiskKeyStore - Region [TMS_BLOCK_v2] Loading keys for /home/kwoncesc/.cache/JOSM/tiles/TMS_BLOCK_v2.key
[INFO] BlockDiskKeyStore - Region [TMS_BLOCK_v2] Set maxKeySize to: '524288'
[INFO] BlockDiskKeyStore - Region [TMS_BLOCK_v2] Loaded keys from [TMS_BLOCK_v2], key count: 2; up to 524288 will be available.
[INFO] BlockDiskCache - Region [TMS_BLOCK_v2] Block Disk Cache is alive.

```

- File->Open->*.osm, then the downloaded file is opened
- Pruning, modifying, simplifying etc. on map can be done here (mostly it's to delete a bad road segment), then save.





c. NETCONVERT: <http://sumo.dlr.de/wiki/NETCONVERT>

- If the SUMO is correctly installed, in a terminal type netconvert, there will be some information about this tool.

```
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SUMO netconvert Version 0.22.0
Copyright (C) 2001-2014 DLR and contributors; http://sumo.dlr.de
License GPLv3+: GNU GPL Version 3 or later <http://gnu.org/licenses/gpl.html>
Use --help to get the list of options.
```

- Usage

refer to: netconvert --help

example:

```
netconvert --osm-files ./*.osm --remove-edges.by- vclass
hov,taxi,bus,delivery,truck,tram,rail_urban,rail,rail_electric,motorcycle,bicycle,pedestrian -o
*.net.xml
netconvert -s *.net.xml --tls.guess
```

```
kwoncesc@kwoncesc-VirtualBox:~$ netconvert --osm-files /home/kwoncesc/california.map.osm -o californi
a.net.xml
Warning: No way found for reference '507662303' in relation '7395329'
Warning: No way found for reference '507662303' in relation '7395329'
Warning: Ignoring restriction relation '7395329' with unknown from-way.
Warning: Ignoring restriction relation '7395329' with unknown to-way.
Warning: Ignoring restriction relation '7403075' with unknown to-way.
Warning: Ignoring restriction relation '7403075' with unknown via.
Warning: Ignoring restriction relation '7403101' with unknown from-way.
Warning: Ignoring restriction relation '7403101' with unknown to-way.
Warning: to-edge of restriction relation could not be determined
Warning: Ignoring restriction relation '7403108'.
Warning: Found sharp turn with radius 7.22 at the end of edge -32892812
Warning: Found sharp turn with radius 3.32 at the start of edge -452160206#1
Warning: Found sharp turn with radius 4.24 at the start of edge -467066220#0
Warning: Found angle of 117.52 degrees at edge -505474172, segment 1
Warning: Found sharp turn with radius 7.22 at the start of edge 32892812
Warning: Found sharp turn with radius 3.32 at the end of edge 452160206#1
Warning: Found sharp turn with radius 7.52 at the start of edge 467066220#0
Warning: Found sharp turn with radius 7.33 at the end of edge 500508233
Warning: Found angle of 117.52 degrees at edge 505474172, segment 0
Warning: Junction shape for '2453255720' has distance 85.33 to its given position
Warning: The traffic light '4909460719' does not control any links; it will not be build.
Warning: Could not build program '0' for traffic light '4909460719'
Warning: The traffic light '4909462346' does not control any links; it will not be build.
Warning: Could not build program '0' for traffic light '4909462346'
Warning: Connection '500508239#1_0->500508239#0_0' is only 0.00 short.
Success.
```