Using OSM and Geographic Information Science

McGill Open Mapping Group

Demo of OpenStreetMap.org + Slido

A Primer on GIS

Geographical Information System (GIS)

Geographic Information Science

Vector

Raster

| AI | EPS | CGM |
| PDF | SVG | CDR |

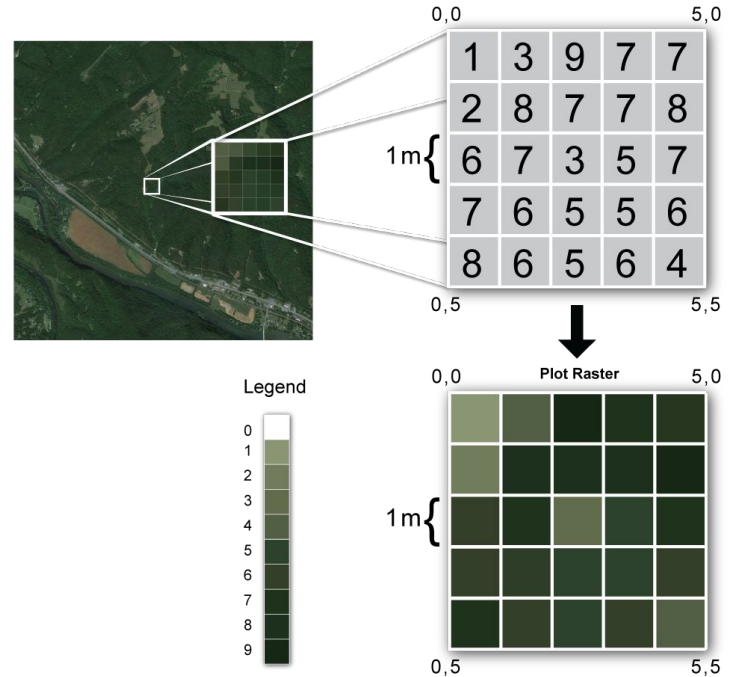| BMP | TIFF | PCX |
| GIF | PNG | JPEG |
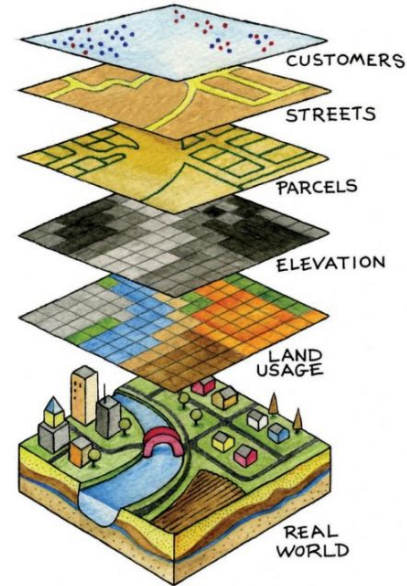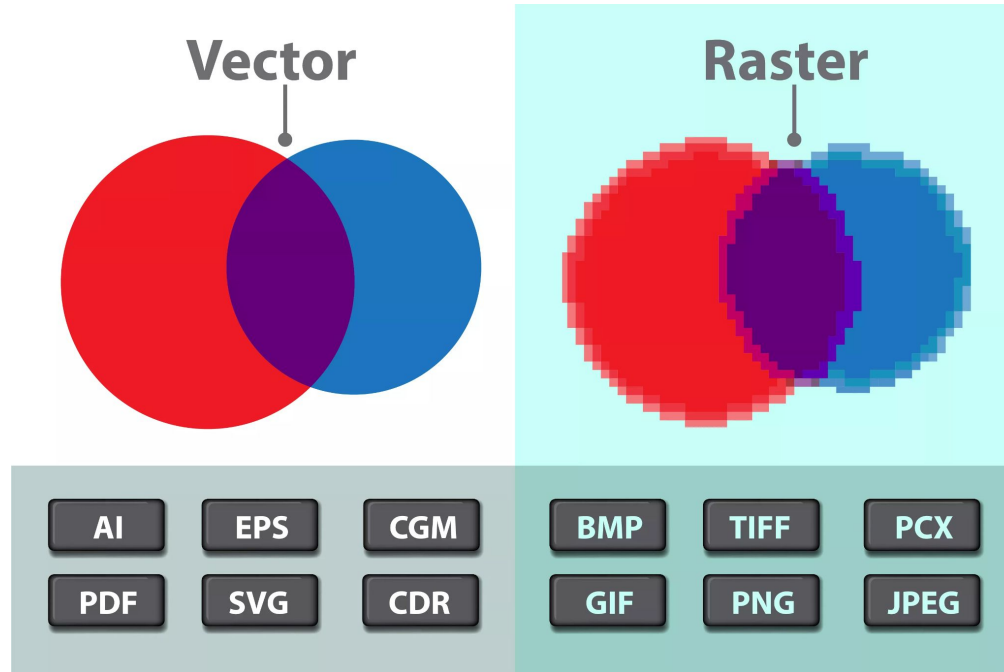
GIS - Raster Data

- Represents grids of data as images
- A cell in the grid represents some area in the world
- Stores numerical values, visualized as colours
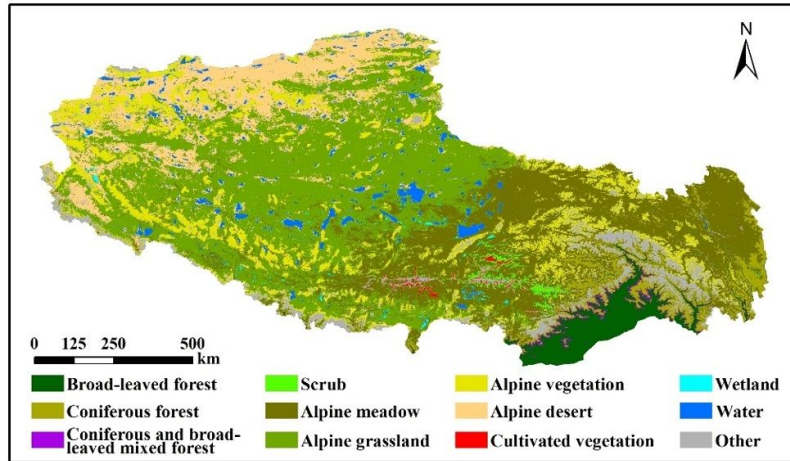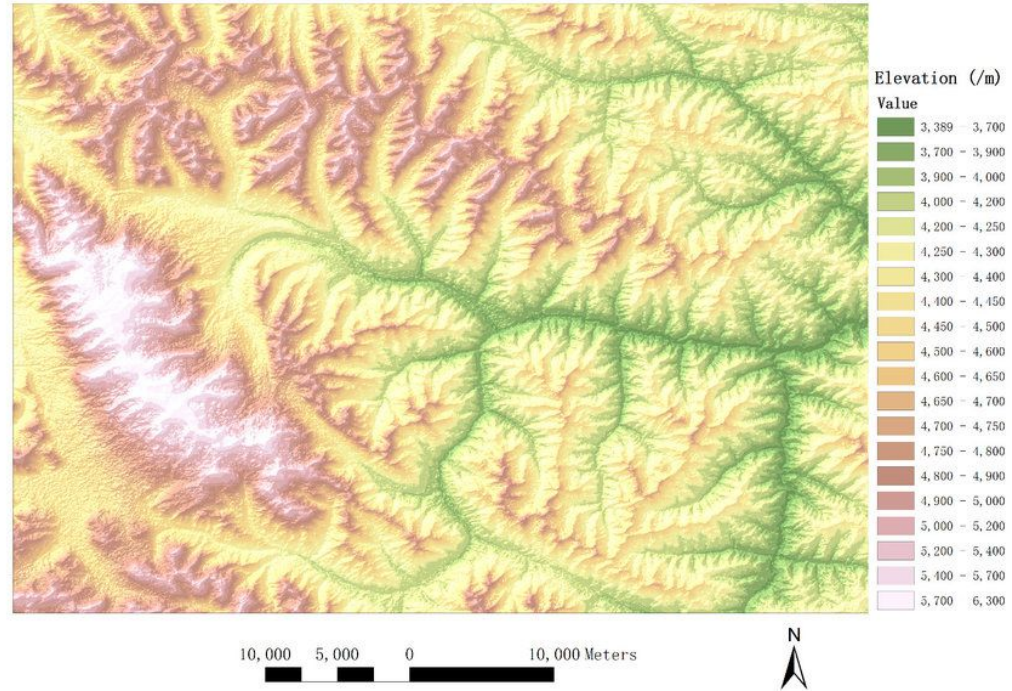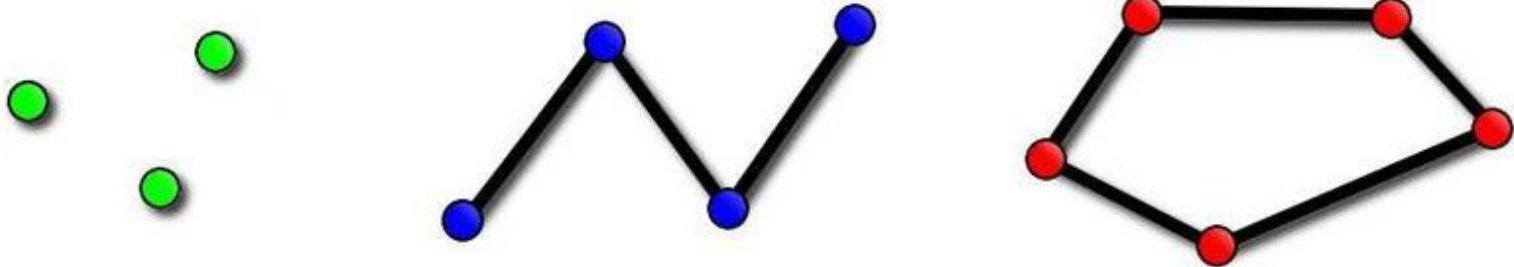- Imprecise!

GIS - Raster Data - Examples

Figure 1 Vegetation map of the Xizang Autonomous Region at 250 m in 2020

GIS - Vector Data

- Represents real world features exactly using latitude & longitude
- Three types:
  - **Points:** some coordinates
  - **Lines:** an ordered list of coordinates
  - **Polygons:** an ordered list of coordinates forming an enclosed area

GIS - Vector Data - Examples

- Points
  - Represent places, e.g. the location of a store, mountaintop, or
- Lines
  - Represents linear features, e.g. roads, bus route
- Polygons
  - Represents areas, e.g. rooms, parks, political boundaries
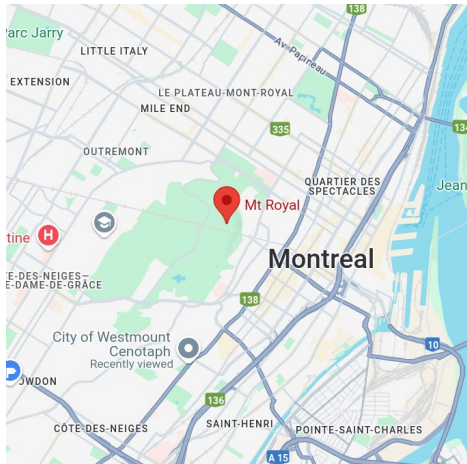
GIS - Slido

Join at
slido.com
#9232 031

GIS Software

- How to use create and use geographic data?
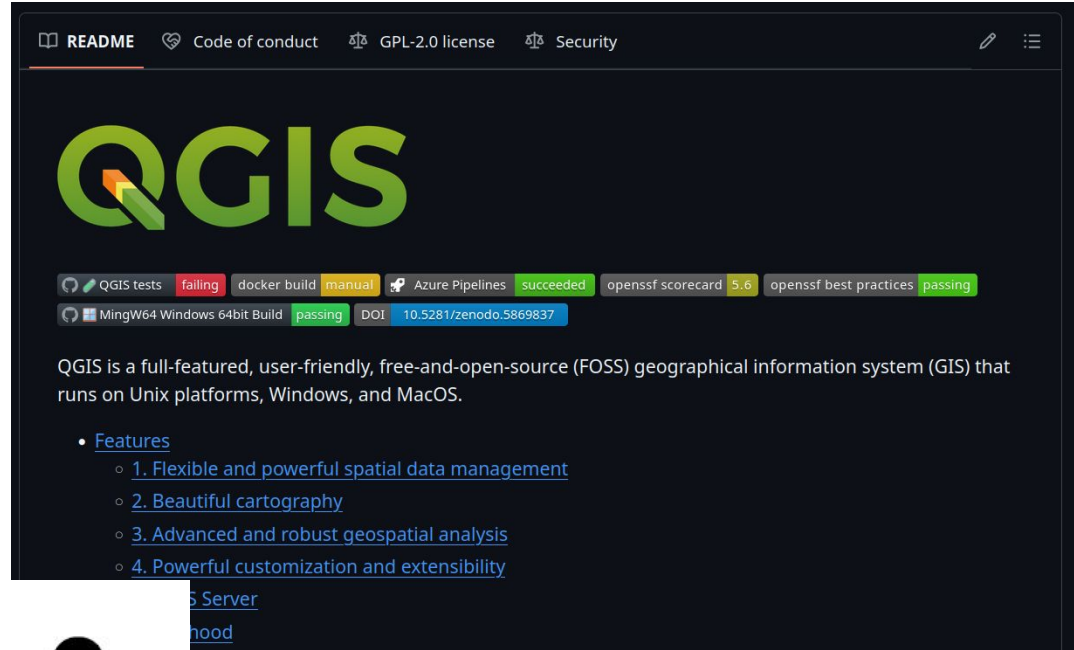- How to identify connections between data?
- How to produce maps?

GIS software!

GIS Software

- David vs Goliath

README   Code of conduct   GPL-2.0 license   Security

QGIS

| QGIS tests `failing` | docker build `manual` | Azure Pipelines `succeeded` | openssf scorecard `5.6` | openssf best practices `passing` |
| MingW64 Windows 64bit Build `passing` | DOI `10.5281/zenodo.5869837` |

QGIS is a full-featured, user-friendly, free-and-open-source (FOSS) geographical information system (GIS) that runs on Unix platforms, Windows, and MacOS.

- Features
  - 1. Flexible and powerful spatial data management
  - 2. Beautiful cartography
  - 3. Advanced and robust geospatial analysis
  - 4. Powerful customization and extensibility
  - S Server
  - hood

QGIS & OSM for Research

Research question: the Economist Intelligence Unit has tasked us with determining the most liveable neighborhood in Montreal out of 7 options for their 2024 Canada report.

EIU report

The Canadian Liveability Index 2024

EIU's index quantifies the challenges presented to an individual's lifestyle in Canada's only liveable city, Montreal.

Find out which Montreal neighborhood topped our rankings for the third consecutive year.

Download free summary

QGIS & OSM for Research

Research question: the Economist Intelligence Unit has tasked us with determining the most liveable neighborhood in Montreal out of 7 options. The metrics are as follows:

1. Coffee shops good *(# of cafes within 500 m = α)*

2. Fast food bad *(# of fast food locations within 500 m = β)*

3. Bus stops good *(# of bus stops within 500 m = δ)*

Liveability index = **3α + δ - β²**

(highly paid engineers determined this metric)

QGIS & Research Live Demo

QGIS & OSM for Serious Research

- Copernicus Open Data Portal
- National census data

… and more!

Parks, Transit, and Trees: Where is there all three in Eastern Montreal?

Author: Nicholas Foisy
18 December 2023
GEOG201 - Final Exam

Data source:
City of Montreal (2023),
Société de transport de Montréal (2023),
Copernicus Data Space Ecosystem (2023),
OpenStreetMap Contributors (2023)

Legend

Neighborhood with lower presence of greenery (mean NDVI < 0.2)

Neighborhood with higher presence of greenery (mean NDVI > 0.2)

Area with high-quality access to transit & parks
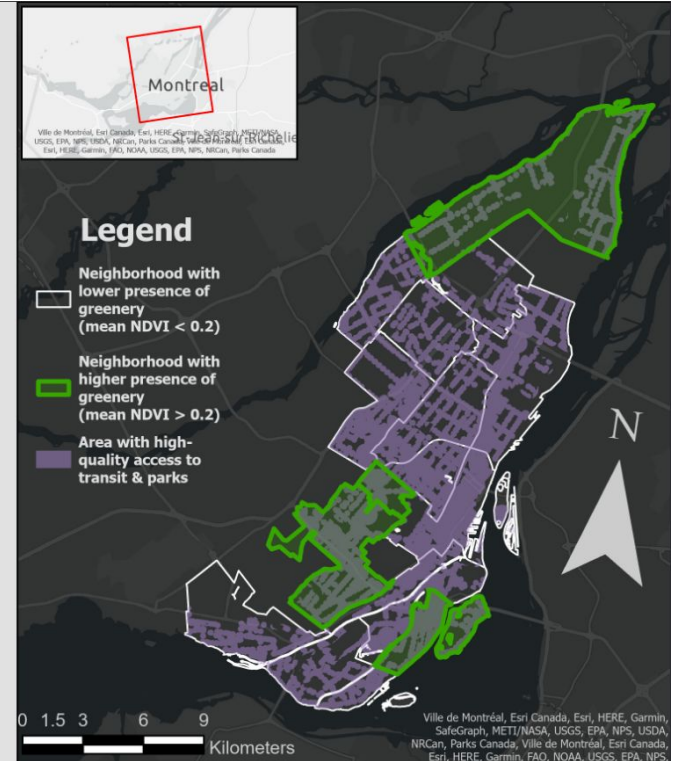
Curbcut & Web Mapping

Modelling the world with OpenStreetMaps Workshop

McGill Open Mapping Group

Basics of geospatial data
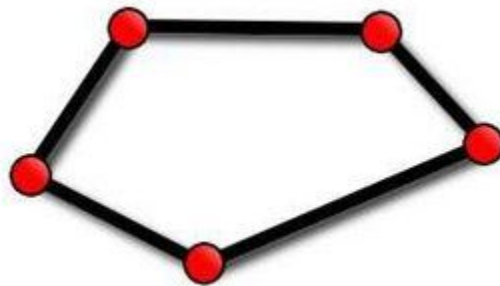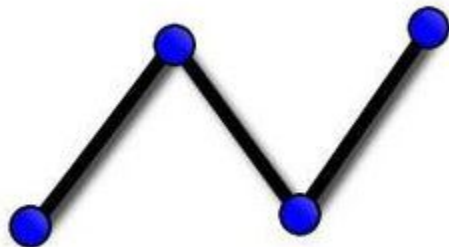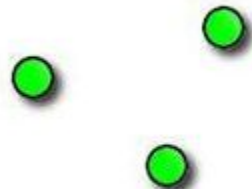
How to represent places?
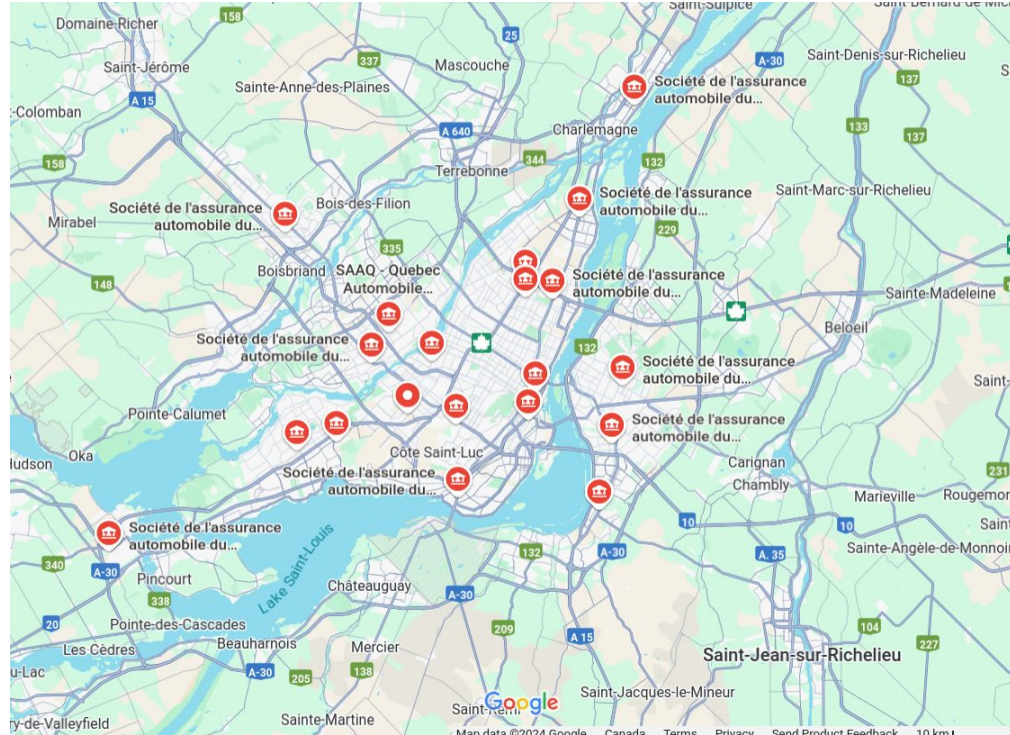
How to represent streets?
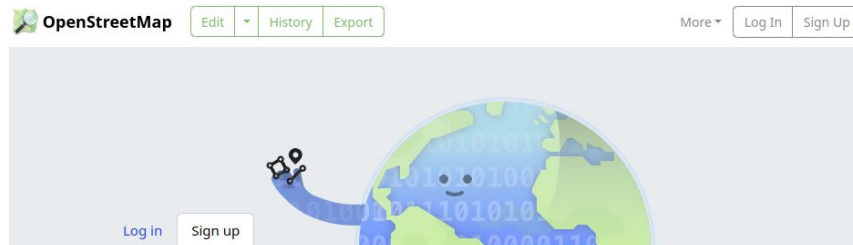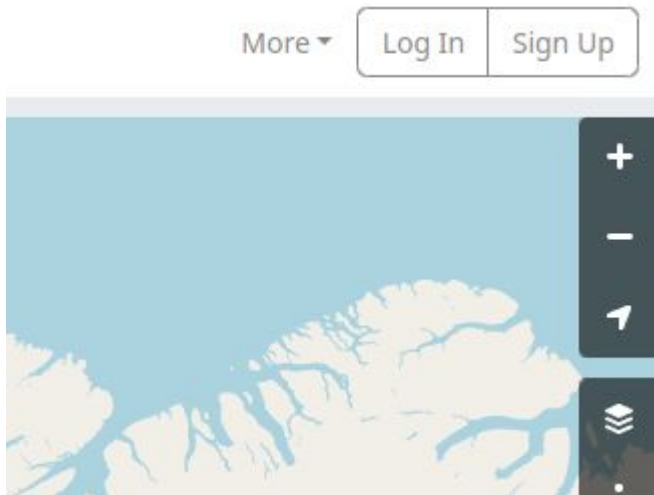
How to represent buildings and rooms?

Beyond two dimensions

OSM Editors

- OSM iD Editor (classic)
- Facebook's Rapid Editor,
- powered by AI™
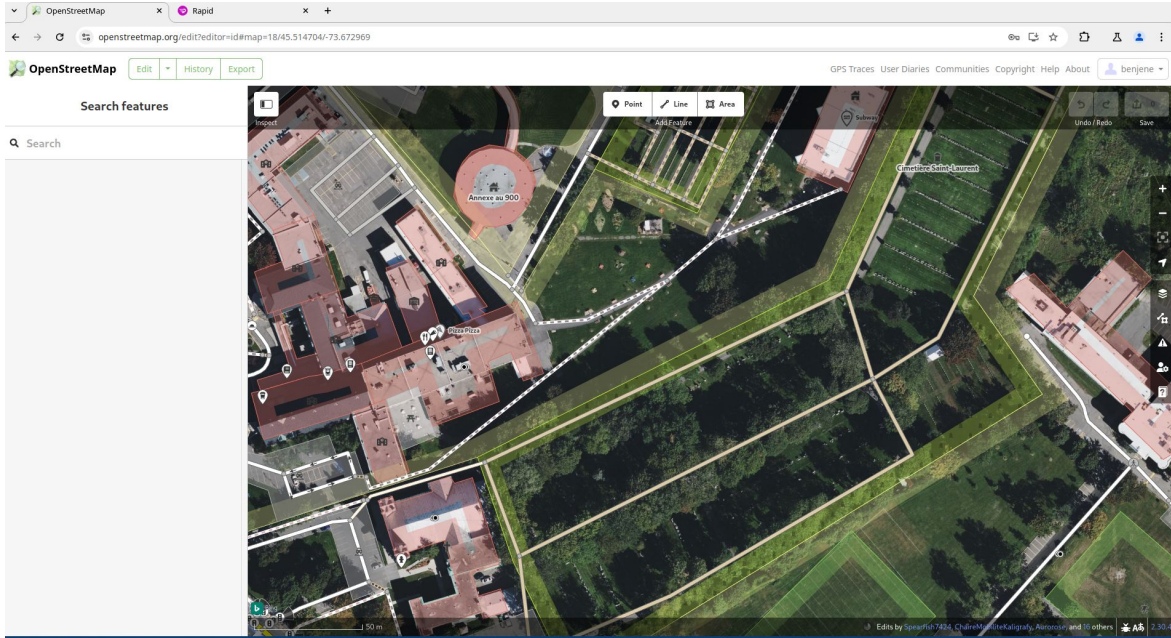
Account creation

openstreetmap.org

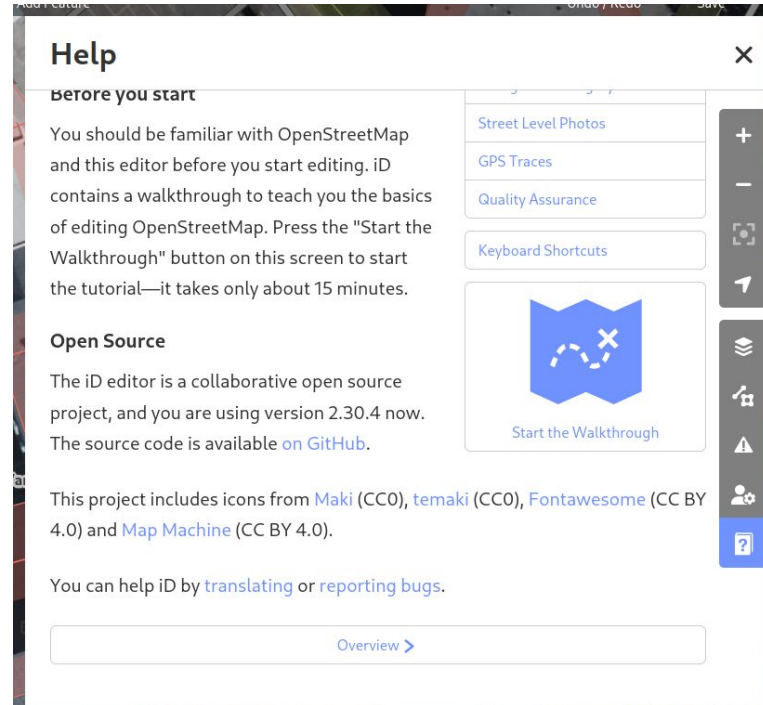# OSM Mapping Tutorial

1. Go to openstreetmap.org
2. Click on Edit
3. Help > Start the Walkthrough

Mapping things around Vanier