Programming, Problem Solving, and Algorithms

CPSC203, 2023 W2

Announcements

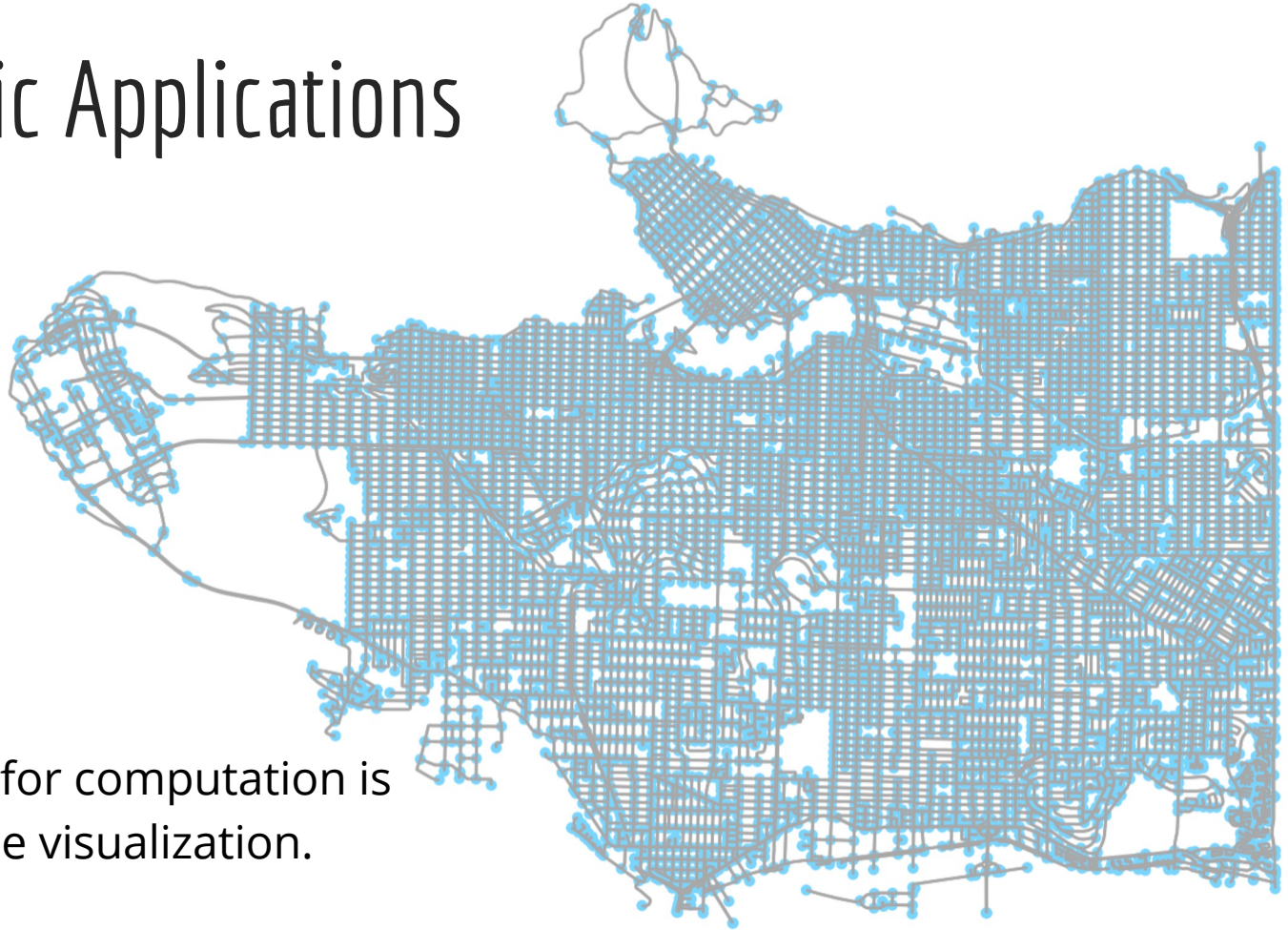
- TBD

Today's Plan...

1. Announcements! (10 mins)
2. Weekly Videos Review/Questions (10 mins)
3. Demo and live coding of OSMNX (40 mins)

Slides from the Assigned Videos

Geographic Applications



The data we use for computation is separate from the visualization.

Data:

Open Street Maps

An open-source alternative to Google Maps' *data*.

https://www.openstreetmap.org/

OSM provides an Application Programmer's Interface (API) that allows our program to request data, which is returned in a reasonable format.

Example:

```
place_names = ['UBC','Vancouver','Stanley park']

x.geocode_to_gdf(place_names)
```

	geometry	place_name	bbox_north	bbox_south	bbox_east	bbox_west
0	POLYGON ((-123.26221 49.26737, -123.26178 49.2...	University of British Columbia, West 16th Aven...	49.273124	49.243131	-123.227362	-123.262213
1	POLYGON ((-123.24492 49.27961, -123.24467 49.2...	Pacific Spirit Regional Park, West 16th Avenue...	49.279788	49.235248	-123.193671	-123.244925
2	POLYGON ((-123.22496 49.27462, -123.22475 49.2...	Vancouver, Metro Vancouver Regional District, ...	49.316171	49.198445	-123.023242	-123.224961

Map applications

Three parts:

1. Assembling the data - OSM, local data stores, statsCan, etc. This is mostly the art of assembling geodataframes.

1. Computing on the data - library osmnx simplifies graph algorithms and computation, but also supports other spatial computation.

1. Visualizing the data - matplotlib for static maps, folium for interactive maps. Other alternatives available.

Introductory Demo

https://github.students.cs.ubc.ca/CPSC203-2022W-T2/LecMaps

What surprises you in the code?

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What surprises you in the maps?

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