DS4UM - Assignment #2

All your answers and source code should be provided in the form of a jupyter notebook. Please try to be organized in your response, following the steps and questions and adding explanations when needed.

Task 1: Building accessibility map for pedestrians in Tartu city

In this task, we will try to deal with proximity analysis along with a road network. Our objective is to measure the walk and drive time needed to access different points of interest (POI) in Tartu city from each other such as shops, restaurants, offices, gyms, bus stations, etc. To define our research question can be formulated as follows:

*Is it possible to complete our daily errand in Tartu just on foot?*

**Step 1:** Extract the road network of the city of Tartu using “osmnx”?
**Step 2:** Locate the points of interest or locations of interest? Hint use pandana and osm to extract the location of POIs in the city of Tartu.
**Step 3:** Plot the POIs and Road network of the city of Tartu?
**Step 4:** Compute the distances between the POIs and road network intersection nodes? Hint: conduct a geographical analysis using Pandana library to build a table of distances to the nearest 5 POIs from a couple of intersections.
**Step 5:** Produce an accessibility map for walking distance to the restaurants? And another accessibility map representing walkable neighborhoods in Tartu? Hint: take time as a metric.

Task 2: Identifying Nightlife using Spatial analysis and Taxi data

Please download NYC Taxi datasets for January 2020 link: https://www1.nyc.gov/site/tlc/about/tlc-trip-record-data.page
Documentation about the dataset is here: https://data.cityofnewyork.us/Transportation/2018-Yellow-Taxi-Trip-Data/t29m-gskq

**Questions:**

1. Conduct a point pattern analysis using a distance-based approach and identify if the data nature of the data is clustered, uniform, or dispersed?

2. Based on the taxi trip, define the hotspots for nightlife activities in NYC using spatial autocorrelation and Taxi datasets? (hint process a local and global analysis to determine the clusters of nightlife activity)