**Kalamazoo Route Planner Requirements**

**Functional Requirements:**

* The software shall plan a route for cycle/transit based on 2 nodes the user will enter on a map of Kalamazoo.
* The software shall use different data structures to store the necessary data collected from the user and from the open-source data (What data structures are still being determined).
* The software will then use a pathfinding algorithm with the data collected to compute either the shortest or most time efficient route.
* The pathfinding algorithm will also consider user input such as travel methods, road types, and amenities and will reroute the user if required.
* The software shall then display the route to the user via a line along the roads from start node to end node and will display turn-by-turn directions to the user.

**User Interface Requirements:**

* The software shall display a map of Kalamazoo so that the user will be able to zoom, scroll, and place nodes.
* The software shall allow the user to mark checkboxes to dictate what roads, bike lanes or not, and add or remove layers that would add amenities to the map, like stores.

**Capabilities Requirements:**

* The software will take 15-30 seconds to plan and will run on chrome, firefox and safari.

**Software Interface Requirements:**

* The software shall connect to the OpenStreetMap (OSM) API, Overpass API, and a database linked to all the data on OSM.

**Software Input/Outputs and Data Requirements:**

* The software shall take the start and end points from the user on the map.
* The software shall allow the user to select different road options via checkboxes.
  + These road options include
    - Busy or not busy roads
    - Roads with or without bike lanes
    - Roads that are safer or less crashes
    - Other typologies of roads to be determined
* The software shall allow the user to select different amenities they want displayed on the map.
  + These amenities include
    - Stores
    - Bike repair sites
    - Bus Stops
    - Restrooms
    - Restaurants and cafes
    - Other amenities are still to be determined
* The software shall output a series of directions in the web browser next to the map or drawn on the map.
* The route will be able to be exported via CSV.
* The software shall also take in data from the OSM API/database to compute the route.

**Installation and Maintenance Requirements:**

* The software will be installed on a server that will require routine maintenance and bug fixing. This is still a work in progress.