1. Teammates information

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2. The initial design, which will describe in detail the steps and different ways to initialize your project.

Initialize project:
One of the first steps is to classify the buildings as following - academic building, library, hospital, parks/empty spaces, residence halls/apartments.
Buildings in part F:

1. Architecture Building:
     Points of Interest: Academic Building, Library.
2. Fine Arts Building:
    Points of interest: academic building.
3. Music Building:
    Points of Interest: Academic Building.
4. Smart Hospital:
    Points of Interest: Hospital.

After classifying the buildings, we started working on representing these buildings, their respective entrances and walking paths in Google MyMaps as polygons, points and lines respectively. Once this was done, we exported all the shapes as a kml file which could be later loaded into the spatial database. Then we imported this kml file into spatialite database. Now it can be used to queried upon from the terminal.

<u>Initial Design:</u>

The design is build a spatial database with the obtained KML file, this serves as the base layer. The QGIS, which is a geographic information system, sits on top of the spatial database layer. Now, the QGIS will have the access to spatial data from the spatial database in order to perform any given query. With the QGIS on top of spatial database, we can write custom code to use QGIS and this forms the third layer.

3. Data and methods to collect/obtain it.
<u>Data:</u>

Here the main data according to the first milestone is the KML file which is the short form of Keyhole Markup Language - and we have been assigned part F of the map which basically includes 4 buildings - Architecture Building, Fine Arts, Music Building and the Smart Hospital, this is one of the most complex parts of the entire UTA maps since it even includes bridges that go across the campus to the other side. The KML file includes mainly three types of data - Polygons, LineString and Points. The Polygons are used to represent the buildings, the LineStrings - to represent all the walking paths around the buildings, and that belong to our path, Points are used to represent all the entrances of the buildings. We are not converting the KML file into shapefile because the softwares and platforms which we are planning to use do not require to convert into shapefile.

<u>Methods:</u>

As far as the polygons are concerned, we have used Google MyMaps where we have sketched out the polygons using the satellite view. To be sure of all the entrances and the complex entry paths, we took a tour of that campus area marking all the entrances and paths that we were unsure about. One important part of the data collection was to ensure synchronization between groups around us, so we had to communicate and agree on common end points of walking paths and entrances. Once we have fed in all the data into the Google MyMaps - we have exported it as a KML file - which can then be used for QGIS and SpatiaLite.

4. The system/programming language you choose to opt:

This is a project that can be divided into multiple subparts - which include the raw data in the form of a KML file, a GIS system where we can get a visual representation of the map, a DB system where the spatial data actually gets stored, and an interfacing language where we can query the system to get meaningful results.

We are using Google MyMaps - an online technology by Google where we developed the KML file using the satellite view and made the paths, by actually roaming around the campus. We are using **QGIS** for the GIS system to get visual representation of the map, we are using **SpatiaLite** as our Spatial DB to store the maps, and to which the user interface will redirect the query to. We are planning to use **Python** as our primary language for building the front end which will interact with the user.

The main reason we are choosing all of the above technologies is because of the simplicity and the support of various cookbooks and tutorials online that will help in the making of the project so that we can spend time in improving the overall design of the project - reducing the query time and improving the user interface quality.

5. A starting flowchart that displays and describes your future steps to be performed.

The future steps are illustrated in the diagram below

```
                    ┌─────────────┐
                    │    Start    │
                    └──────┬──────┘
                           ▼
         ┌─────────────────────────────────┐
         │  Setup the SpatiaLite Database - add the │
         │      classification of building  │
         └────────────────┬────────────────┘
                          ▼
         ┌─────────────────────────────────┐
         │ Connect the QGIS to the SpatiaLite database │
         └────────────────┬────────────────┘
                          ▼
         ┌─────────────────────────────────┐
         │ Finalize the programming language - between │
         │           Python and C#          │
         └────────────────┬────────────────┘
                          ▼
         ┌─────────────────────────────────┐
         │ Check connection is working between the │
         │  front end programming language and the │
         │          QGIS and SpatiaLite     │
         └────────────────┬────────────────┘
                          ▼
         ┌─────────────────────────────────┐
         │   Build the GUI for the user to interact │
         └────────────────┬────────────────┘
                          ▼
                    ┌─────────────┐
                    │    Stop     │
                    └─────────────┘
```