Project Overview/Goals

- Create a Digital map of Union University
- Limit my map to one specific location (PAC, building)
- Possibly make it to be in a position to give direction to different rooms within PAC. (student).
- Use of GPS capabilities.
Project Plan

- Use database for my project.
- Employ **Spatial database** - is a database that is optimized to store and query data related to objects in space.
- Represents the physical location and shape of objects
  
  This includes:
  
  > point- single coordinate
  > lines– set of two or more coordinates
  > polygons- set of two or more closed line strings
  > Complex objects such as building or a country
Under Spatial databases

- There are 3 spatial databases with more-or-less functionality.
  - Oracle RDBMS with spatial or Locator
  - SQL Server 2008 with Spatial
  - PostgresSQL with postGIS
- After considering limitations for each of the 3, I chose to use SQL Server 2008.
  *Reason*: Most of its functionality operations work.
SQL Server 2008

- Recent entrant into the spatial database arena.
- It includes spatial types, functions and indexes.
- Unlike the rest Microsoft included full spatial functionality in every edition of SQL Server.
- Accurate calculation based on SRID.
- Full complement of OGC spatial methods:
  - Intersects, Contains, Crosses, Touches
  - Distance, Length, Area
  - DE-9IM - find complex relationship between any two geometry.
Data Types

- Provides 2 new data types to store spatial data
  i) Geometry – assume a flat coordinate system.
  ii) Geography – it takes into account the shape of the earth.
- However, both data types share many of the same methods and properties.
Inserting GPS Data

- When dealing with GPS data, you only need to store it in SQL database.
- Store the latitudes/longitude points as numbers
- This can be done by using AsText() function

```sql
$sql = "SELECT `key`, AsText(`location`) AS `location`, `name` FROM `spatial_points``;";```
Inserting Spatial point

```sql
$sql = "INSERT INTO `spatial_points`
( `key`, `location`, `name` ) VALUES
( NULL,
  ( GeomFromText( 'POINT(".$lat." ".$lng.")' ) ),
  '$name'
)";
```
Displaying Spatial Data?

- SQL S 2008 has built-in way to visualize data on a map.
- Has a spatial Results tab, in SQL Server Management Studio.
- Use a .NET – based geometry library that supports OGC standards.
- Integrate with geospatial services, such as Microsoft Virtual Earth.
Virtual Earth SDK

- Use GeoServer for rendering.
- It's an open source software server that allows users to share and edit geospatial data.
- Written in Java
- Can publish data from any major spatial data source using open standards
Query Spatial Database

- The extra boxes are just for holding the result of queries.
- One specific building.
Sources