**Requirement Specification**

**Purpose**

The purpose of this software product is to create an easy to use class library that can be used to create location based applications, that display information to the user dependant on their location. It should be able to replace the core functionality of the app [Derry Smart Tour](https://www.derrysmarttour.com).

**Functional Requirements**

The class library should:

1. Store GPS coordinates that define a location and integration with the data created by the user programmer.
2. be able to determine which location contains a specified GPS point worldwide, the library should be able to use either polygons circles or polylines to do this.
3. be able to determine distances and generate lists of locations with a specified distance and nearest locations
4. be able to determine the bearing between a specified point and the location and determine the locations that are at a specified bearing from a specified point.
5. Determine which locations are within a coordinate, send events as this changes and update a UI compatible list of sorted closest locations.
6. be able to determine the shortest route between a list of locations and give directions to each of them in turn.

**Non-Functional Requirements**

The class library should have high enough performance so low end smartphones can process a new GPS position at least once per second with 100 plus locations.

The class library should be fully compatible with Xamarin.Forms and run on Android Tablets & Mobile, iOS Tablets & Mobiles and Universal Windows Platform. The portability of the library should be high were possible and have at least partial support for web apps.