# Course 3 Project Overview

Mapping applications such as Google Maps have changed the way millions of people live. For many people, the last time they had to "give someone directions" to their home or office was years ago! But how do these technologies work? At their heart is a data structure called a graph. Once you understand and can implement graphs and graph algorithms, you can implement a huge part of the core functionality of these sophisticated mapping applications!

The project for this course is to build a mapping application with the ability to provide and visualize routes from one point to another in a map. Each week you'll add a bit more functionality to your mapping application through the project associated with that week, and in the last week of the course you'll have the opportunity to do an extension to your tool of your choosing.

The code you'll be developing here is what's called "back-end" code, in that you'll be working with road data, but not directly with the front-end interface. Separating the back-end functionality from the front end interface is a very common software engineering practice, and in this class the ideas we're learning fit firmly into this back-end functionality. But just developing back-end code can be dry, so we provide you with a front end map interface that uses the Google Maps API. This interface may look like Google Maps, but it needs **your code** to work! By the end of the course, you'll have built something that really looks and feels like Google Maps! Admittedly, it will be quite primitive compared to the real Google Maps, but hey, you're just **one person** coding for **one month (and part-time, at that)**. The real Google Maps took months or years to develop with a team of many professional engineers.

If you feel inspired, you're always welcome to play with the front-end code as well. Although we will not explicitly cover it in this course, we encourage you to seek external resources and play around if you are interested.

## Project learning outcomes

- Design classes to implement a graph in Java

- Implement basic graph search algorithms including breadth first search, Dijkstra's Algorithm, and A* Search.

- Work with real-world geographic road data

- Review your peers' software design

This might not seem like a lot, but the software engineering tasks will be much trickier here than in our previous courses as we are providing you with very little starter code for the core of the project.

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