



COMP 4202

Computational Aspects of Geographic Information Systems

Testing the Performance of Various **Spatial Indexing Data Structures** for Geographic Information Systems

Implementing and comparing the time complexity and efficiency of different data structures for spatial indexing in Geographic Information Systems. The different data structures to be used are: R-tree, Quadtree, Geohash, and KD-tree.

Overview

To define, a spatial index is a type of data structure that aims to improve the performance of searching and retrieving data based on spatial queries. This project will implement 4 common spatial index data structures and compare their time complexities and efficiency.

Datasets

Esri Open Data Hub

Shapefile data can be collected into the 4 data structures to be tested and analyzed

Data Structures

R-Trees

Supports points, lines, and polygons as a tree-based data structure

Quadtrees

Supports points and polygons as a tree-based data structure

Geohashes

Supports points as a grid-based data structure

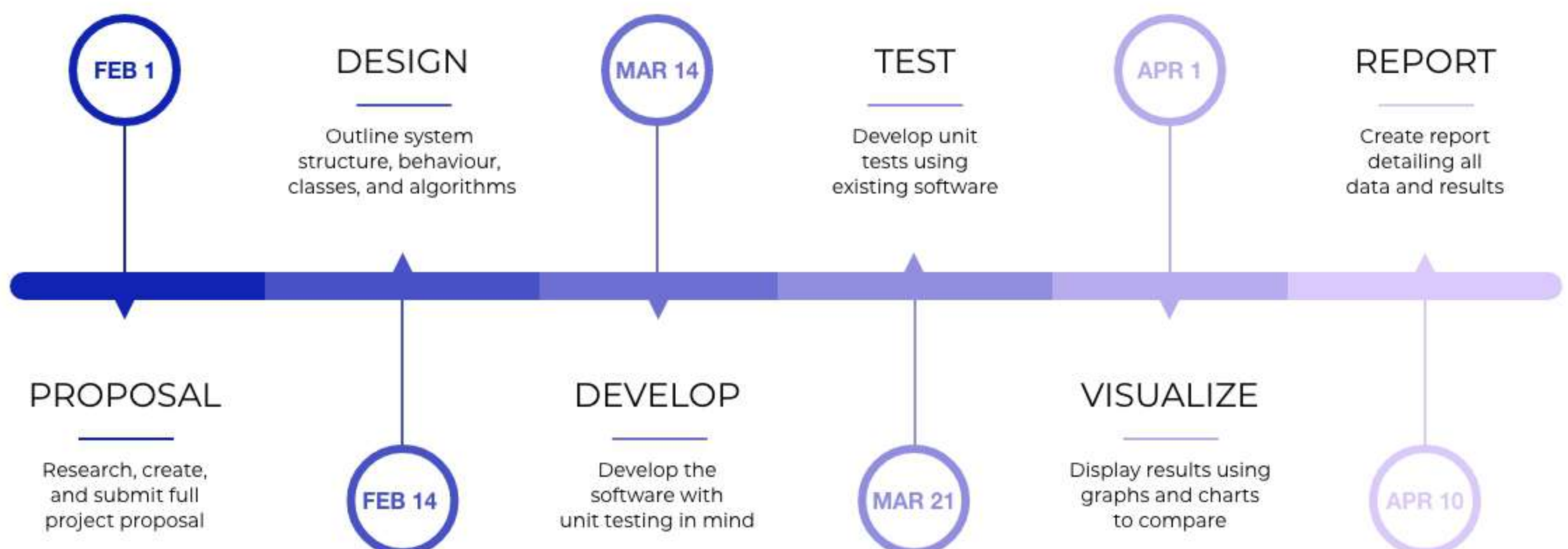
KD-Tree

Supports points as a binary tree data structure

Resources*

mapscaping.com
naturalearthdata.com
hub.arcgis.com
postgis.net

Project Timeline



* Not a definitive list of finalized resources, any future resources will be included on the final report