CSC2001:ASSIGNMENT 5: GRAPHS

# 1.OOP design

Graph class(which contains the Edge class and Vertex Class) generates graphs given the dataset generated by Graphgen and GraphExperiment class(the main class). It contains methods to generate the shortest path to the node. Dijkstra’s method will be used for the experiment.

Two classes were constructed; Graphgen(Graph Generator) and GraphExperiment. Graphgen takes in the parameter for the Number of vertices, edges and cost limit; It creates and writes to a text file(in data folder as data\_V\_E where V and E are the vertex and edge numbers ) the Nodes, Edges and costs associated with each edge. Nodes are generated randomly and conditions are put in place to remove the possibility of generating repeat nodes. The class also generates a DataX.txt, where X is the number of the dataset containing the number of vertices,edges, vertex operation count, edge operation count, Priority queue counts, and ElogV.

GraphExperiment sets the Number of vertices, edges, and cost limit for the Graphgen class to create data that will be used to generate Graphs using the Graph class. It also calculates ElogV and sums the number of operations that will be written to DataX text file. The class generates 42 experiments and compiles the results per run into a DataX file using different edges and vertices limits. A total of 4 experiments (using a set 42 parameters ie Vertex and Edge number) to test the different graphs that can be made by the Dijkstra shortest path method in Graphs were run.

# 2. DATA and RESULTS

4 files of DataX.txt were generated. The following graphs show the results for each run.

1.The first experiment used the following edge and vertex pairs:

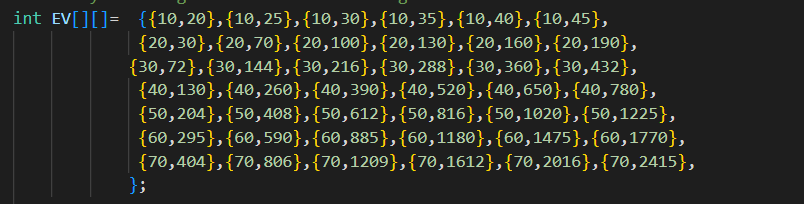


Figure - **6 pairs of V and E for different sets of V: Uniformly distributed Edges**

Path to datasets and DATA1.txt/

Datasets: data/DATA1

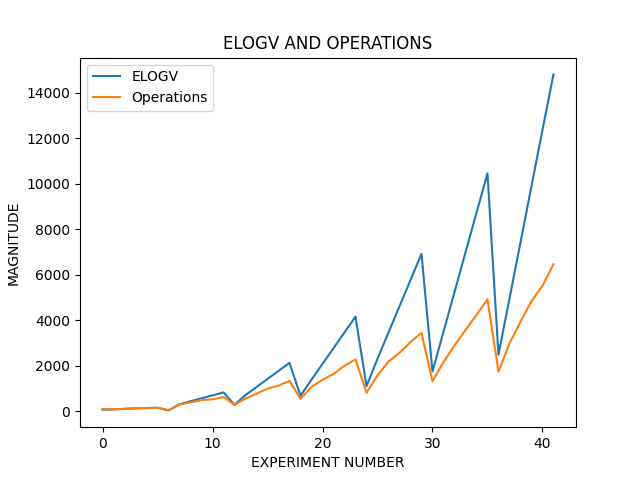
Data1.txt: data/COUNTS/

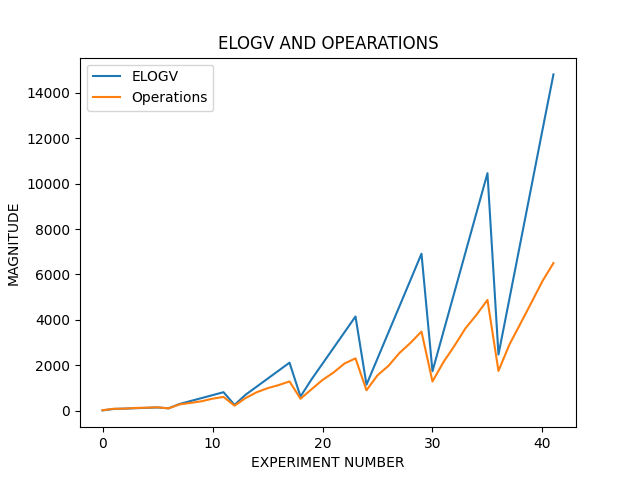
2. The second experiment was run using data located in :

Datasets: data/DATA2

Data2.txt:data/COUNTS/

## ELOG(V) and Operations compared

1. 



# DISCUSSION OF RESULTS

# 4. CREATIVITY

# 5. GIT USAGE LOG