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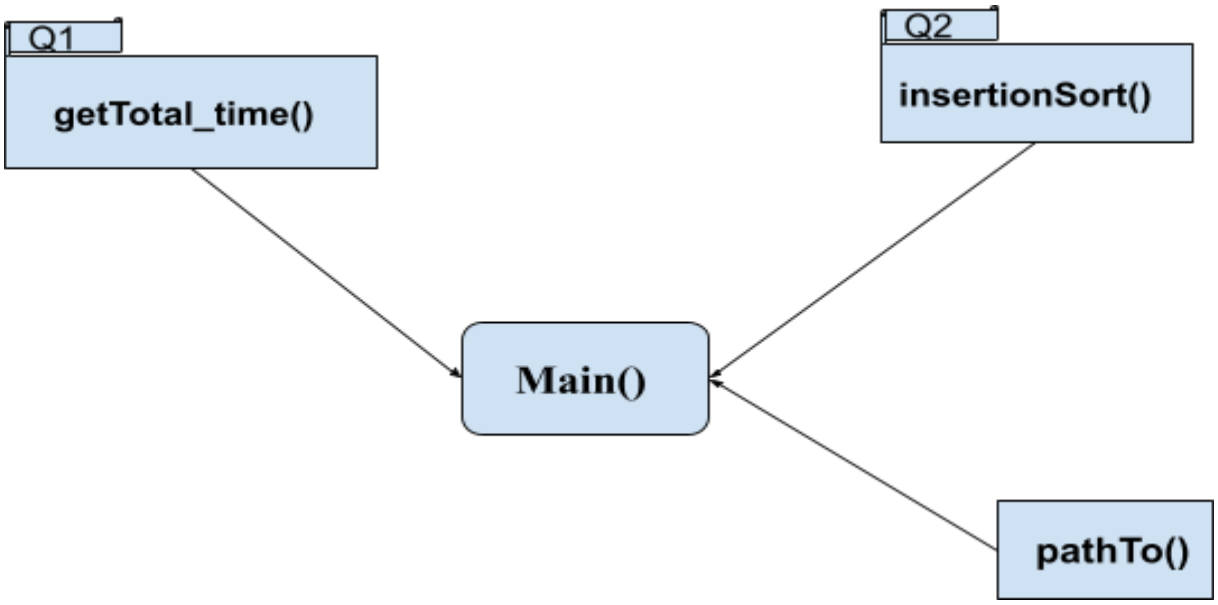
CMPE 224 - SEC 01
Assignment/ HW-1

PA REPORT- 1

Problem Statement and Code Design

This assignment deals with 2 problems.First one requires finding the shortest path between vertices in the graph and calculating the total_time required through the journey. To do this, I implemented a method that calculates the total_time and makes the necessary calculations to get the desired output. The second part requires finding a cyclic path within the Graph between vertices.My code includes several sub-parts to make it modular. These sub modules are basically defined using a structure chart below.



Implementation, Functionality

To explain the functionality of this program, we have to dive into the methods mentioned above.

How does it work?

First of all, we have to implement the Graph, Bag, BreadthFirstPath, Stack and a Queue Class for both of these problems since we are dealing with graphs. With Question 1, the

main() is where we are reading inputs from the user and using those inputs to create edges between the vertices of the graph then, **getTotal_time()** calculates the time is takes from one vertex of the graph to another vertex by creating a linked list that saves values from the stack of the **pathTo()** to it and then uses that in a loop to calculate the time. The second Question is similar to the first one except we need to find a cycle between the vertices of the graph. We later use **insertionSort()** To print the values in ascending order. Below are some methods regarding the implementation of the programme explained in detail

1. **getTotal_time()**: *This method calculates the total_time required to travel between all the paths.*
2. **insertionSort()**: *Sorts an array of integers using the insertion sort algorithm.*
3. **pathTo()**: *This method is used to find the shortest path between the source and a vertex in the Graph.*
4. **remove()**: *Removes the first occurrence of a specified item from the Bag list.*

FINAL ASSESSMENTS

This assignment overall was not a complicated one but had quite some tricks ingrained into it. I had trouble figuring out the cyclic path for question 2 and also took some time to figure out the total_time for Q1. In the end, I was able to overcome these issues through trials after trials. I did learn one or two tricks while doing this assignment and enjoyed the journey to the end. This assignment was also a refresher for me as it made me look back into some of the classes like the Stacks and sort algorithms to optimize my code. Overall, I'm grateful for the journey and await for the next coming assignments.