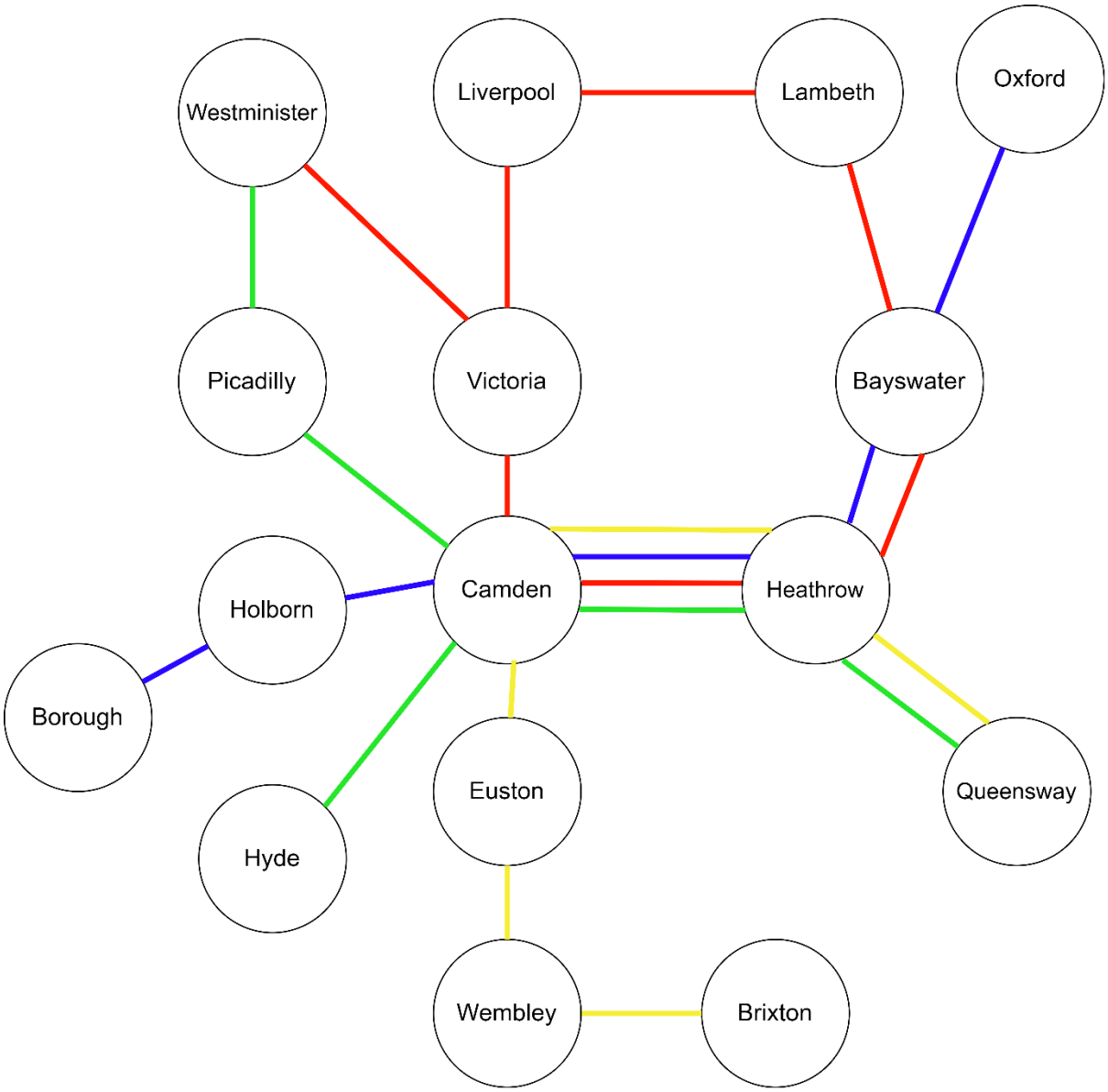
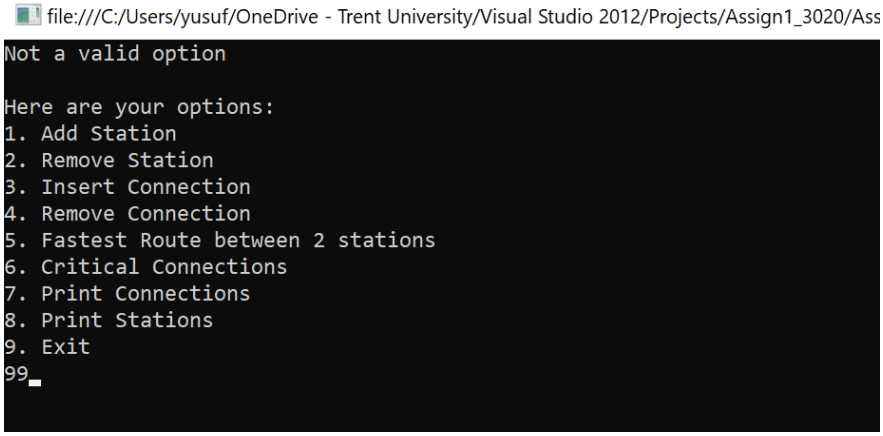
Name: Yusuf Ghodiwala
ID : 0683640
Testing Document for COIS 3020 Assignment_1.
(subway map has also been attached separately)

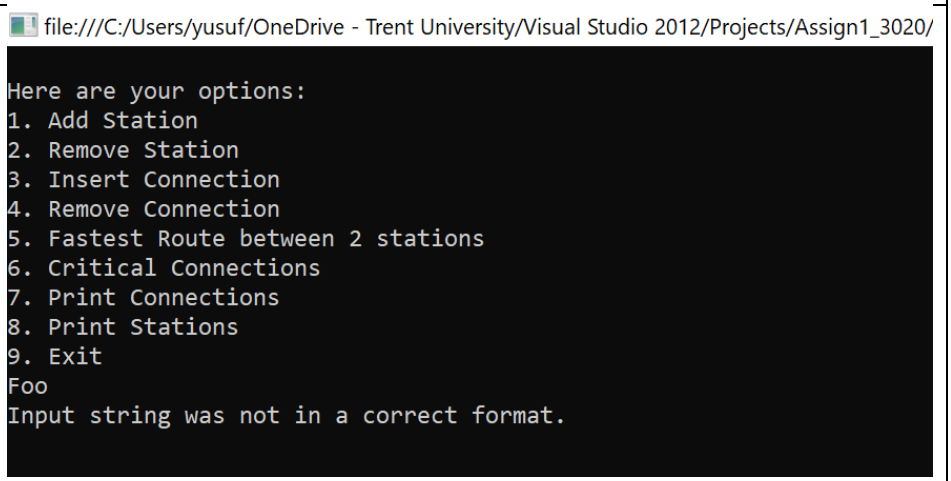
Table of Contents

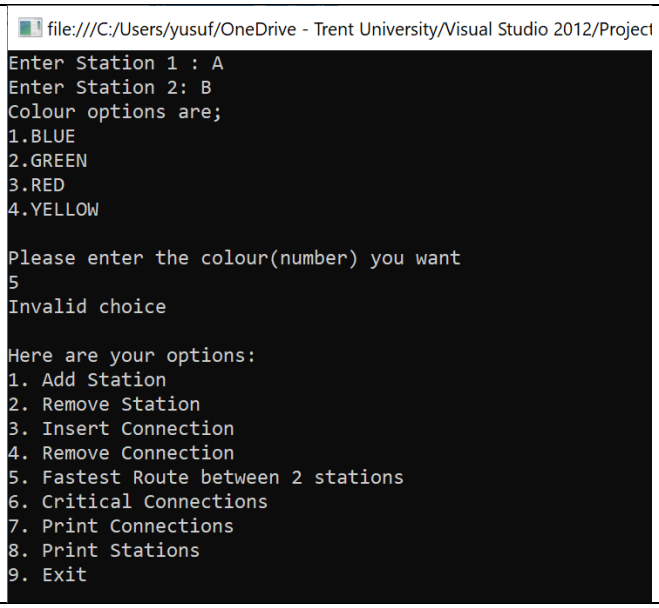
Subway Map

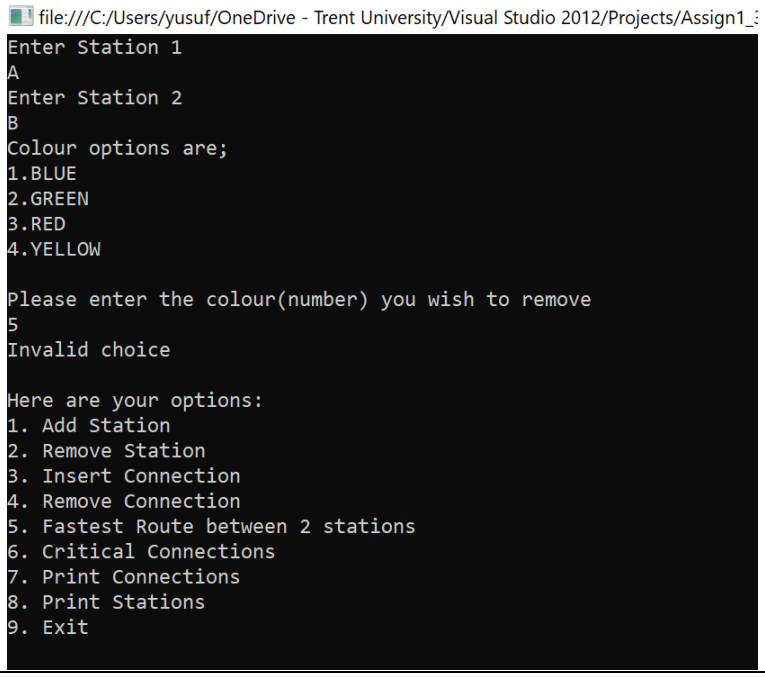

Westminister
Liverpool
Lambeth
Oxford
Picadilly
Victoria
Bayswater
Holborn
Camden
Heathrow
Borough
Euston
Queensway
Hyde
Wembley
Brixton

Validating Input for Main

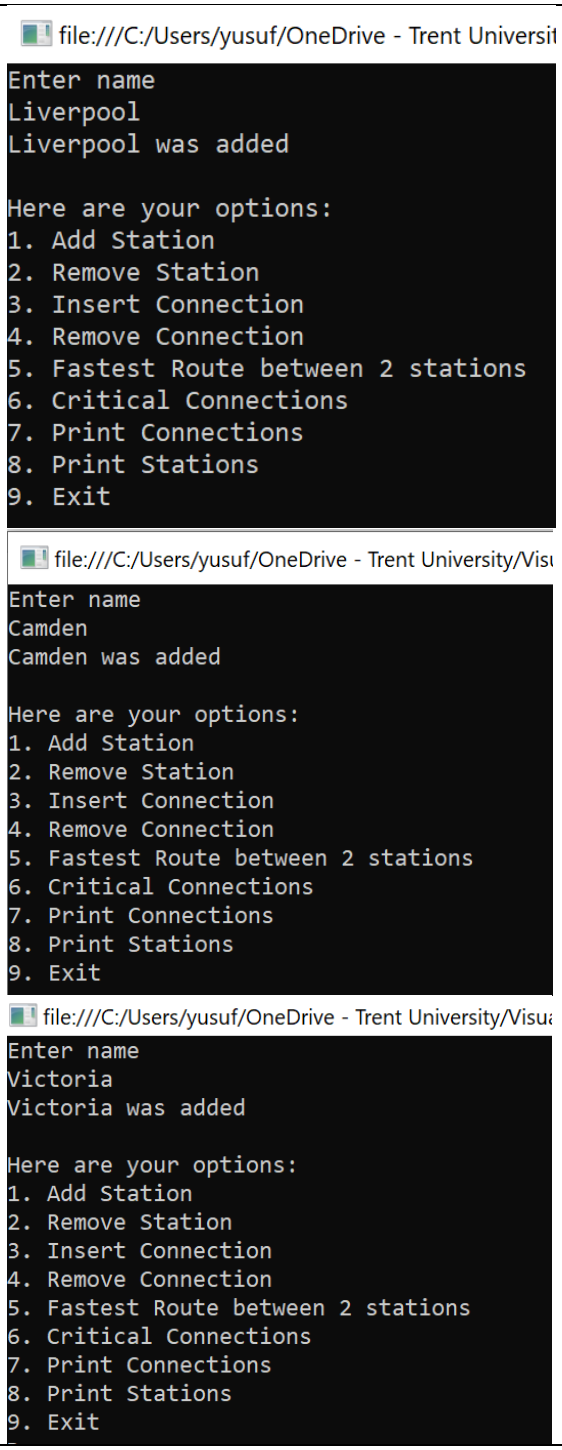
Test 1	
Description	Testing for invalid option selection
Input	99
Expected Output	“Not a valid option”
Actual Output	

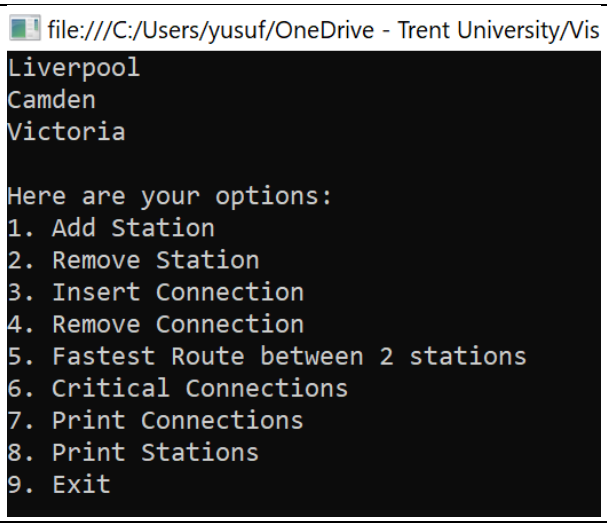
Test 2	
Description	Testing for invalid format input
Input	“Foo”
Expected Output	“Input string was not in a correct format”
Actual Output	

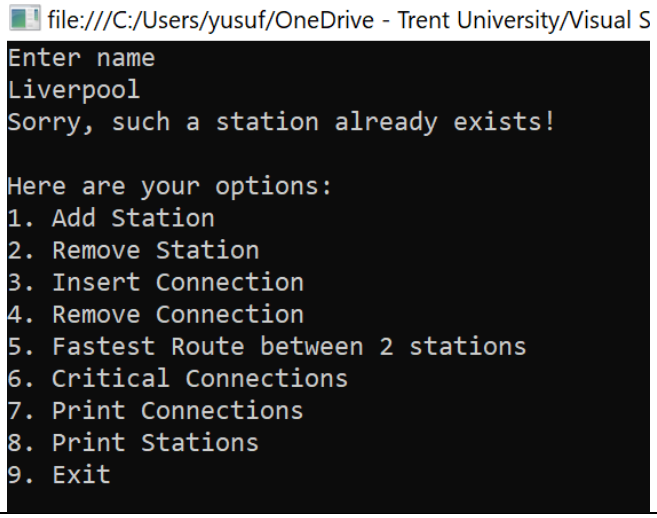
Test 3	
Description	Testing for wrong input when specifying a colour to insert a connection(edge).
Input	3, (for inserting a connection) then 5 for invalid colour choice
Expected Output	“Invalid Choice”
Actual Output	

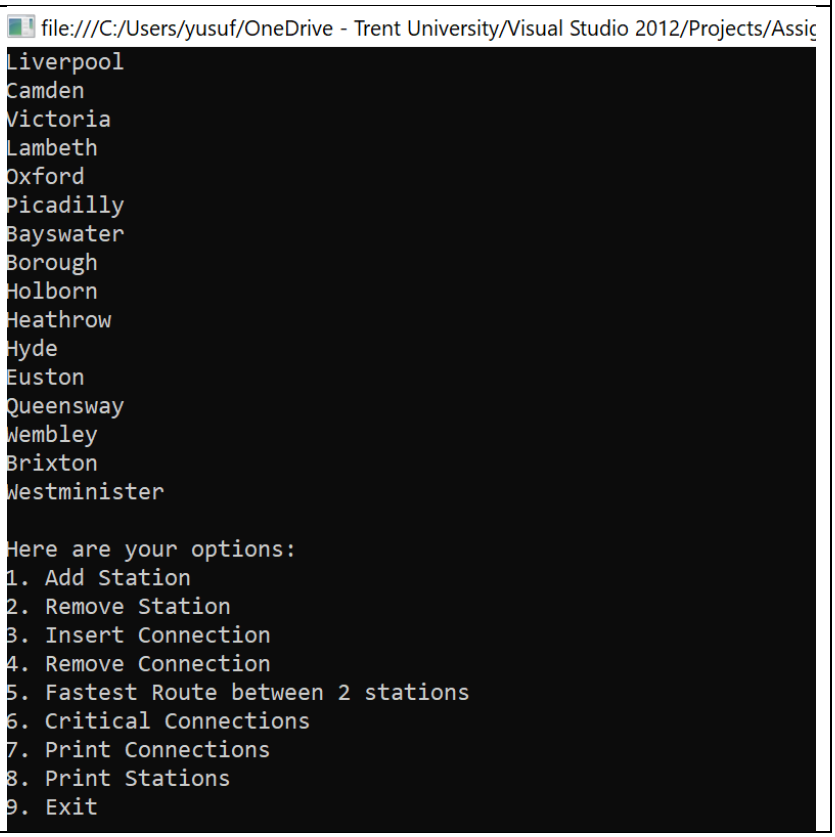
Test 4	
Description	Testing for wrong input when specifying a colour when removing a connection(edge).
Input	4, (for removing a connection) then 5 for invalid colour choice
Expected Output	“Invalid Choice”
Actual Output	

Inserting Stations

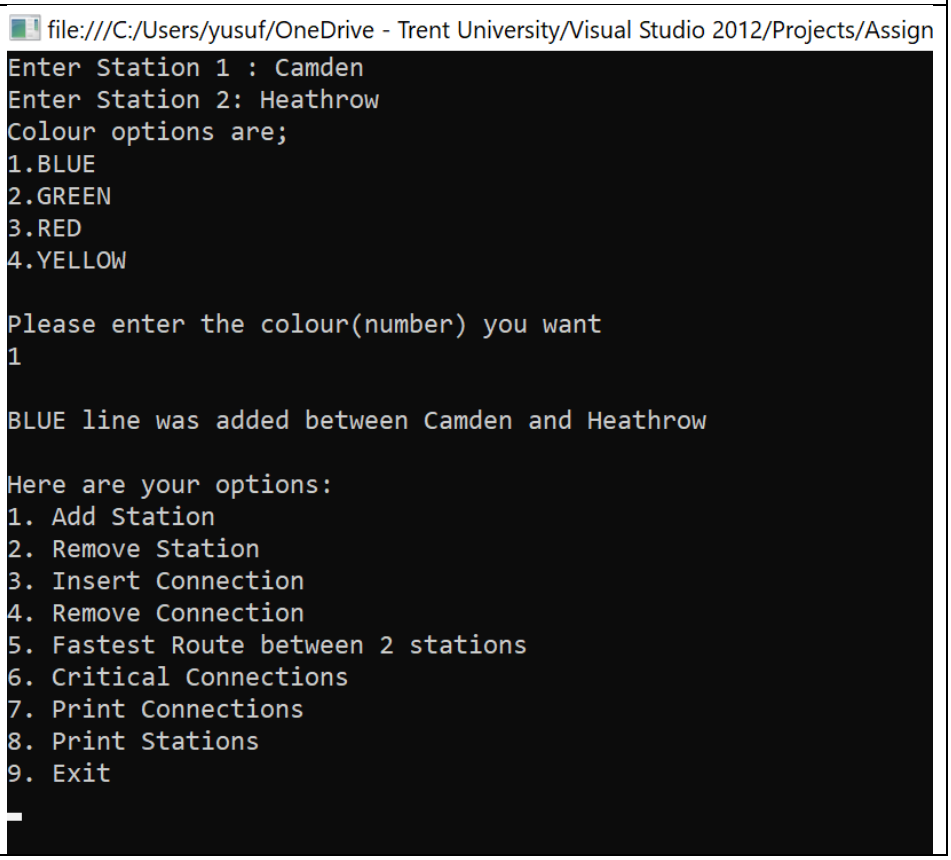
Test 5	
Description	Adding a few stations from the Subway map attached
Input	1,for adding stations and 7 to print them
Expected Output	List of stations that were added.
Actual Output	

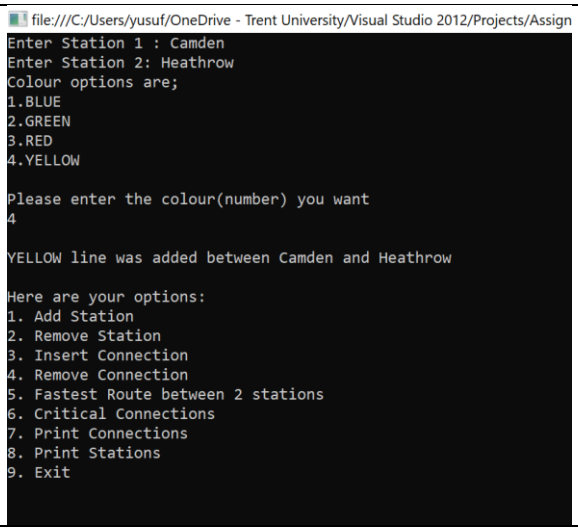
Test 6	
Description	Trying to add a station which already exists
Input	1, to add a station and “Liverpool” (again)
Expected Output	“Such a station already exists!”
Actual Output	

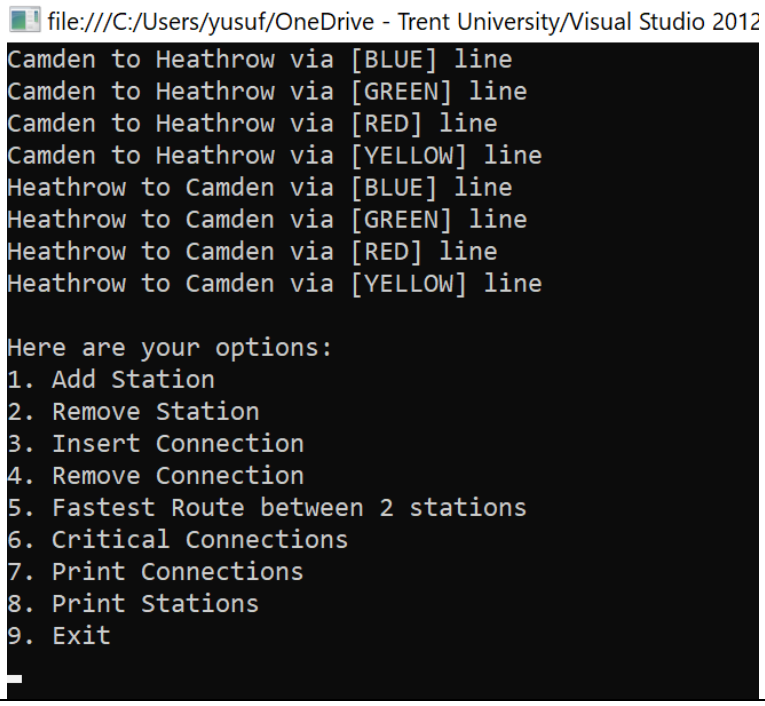
Test 7	
Description	Replicating the Subway map attached by adding all the stations
Input	Adding all the stations and then entering 7 to print them
Expected Output	List of all the stations(16)
Actual Output	

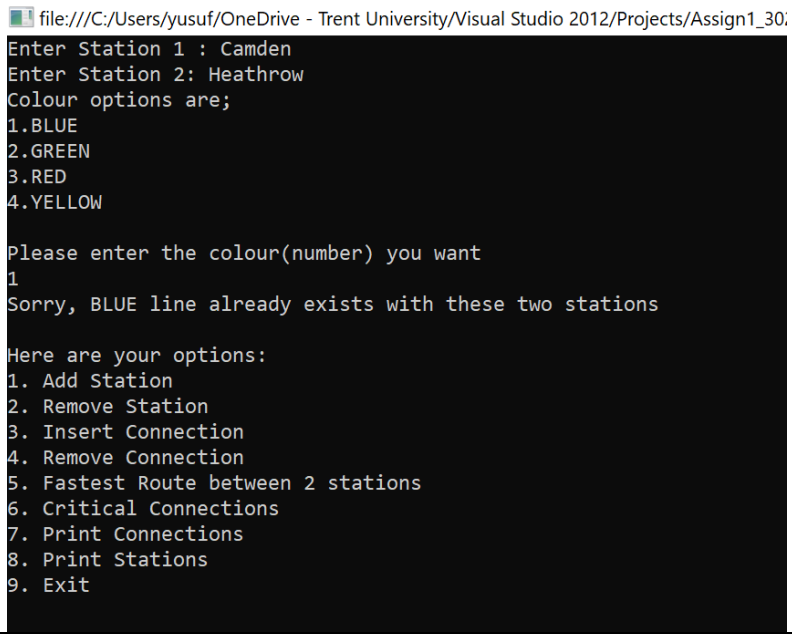
Adding Connections

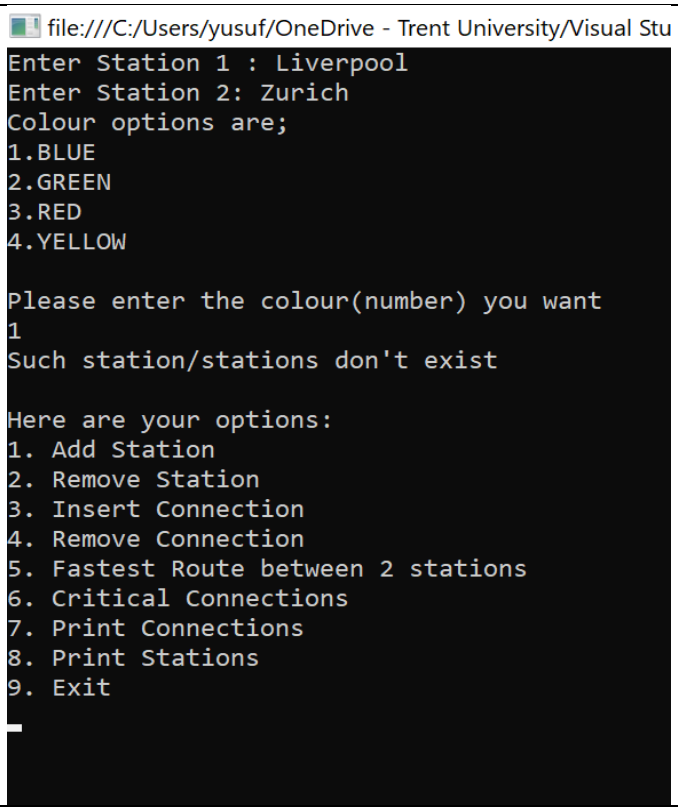
Test 8	
Description	Adding a connection between stations
Input	3, for inserting a connection then selecting ‘Camden’ and ‘Heathrow’ as the stations’ to insert a connection and then Colour Blue for the line between them
Expected Output	“BLUE line was added between Camden and Heathrow”
Actual Output	

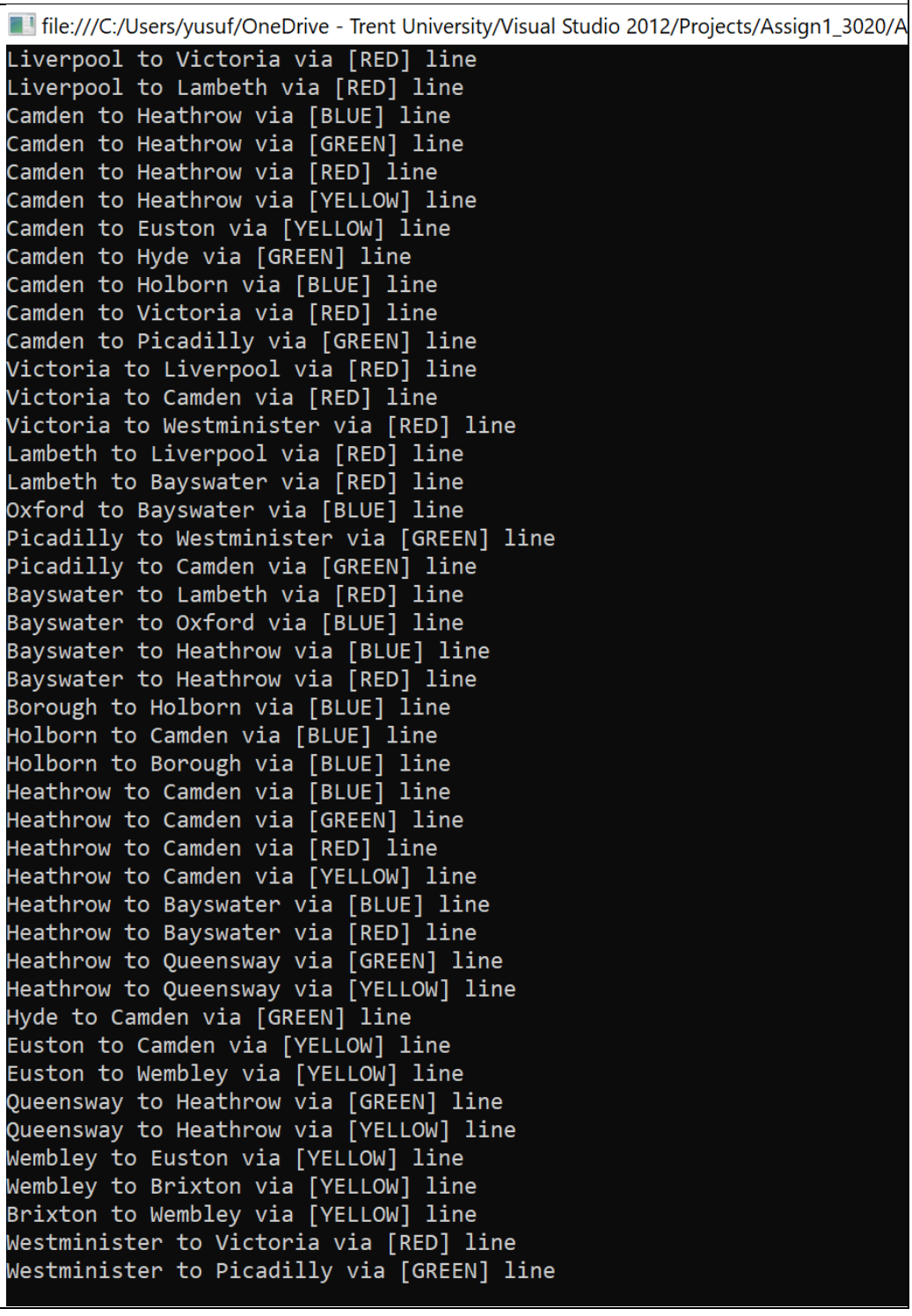
Test 9	
Description	Adding a connection between stations
Input	3, for inserting a connection then selecting ‘Camden’ and ‘Heathrow’ (again, but different colours)as the stations’ to insert a connection and then Colour Green,Red,Yellow for the line between them
Expected Output	“GREEN,RED,YELLOW, line was added between Camden and Heathrow”
Actual Output	file:///C:/Users/yusuf/OneDrive - Trent University/Visual Studio 2012/Projec Enter Station 1 : Camden Enter Station 2: Heathrow Colour options are; 1.BLUE 2.GREEN 3.RED 4.YELLOW Please enter the colour(number) you want 2 GREEN line was added between Camden and Heathrow Here are your options: 1. Add Station 2. Remove Station 3. Insert Connection 4. Remove Connection 5. Fastest Route between 2 stations 6. Critical Connections 7. Print Connections 8. Print Stations 9. Exit file:///C:/Users/yusuf/OneDrive - Trent University/Visual Studio 2012/Projects/Assign1_ Enter Station 1 : Camden Enter Station 2: Heathrow Colour options are; 1.BLUE 2.GREEN 3.RED 4.YELLOW Please enter the colour(number) you want 3 RED line was added between Camden and Heathrow Here are your options: 1. Add Station 2. Remove Station 3. Insert Connection 4. Remove Connection 5. Fastest Route between 2 stations 6. Critical Connections 7. Print Connections 8. Print Stations 9. Exit

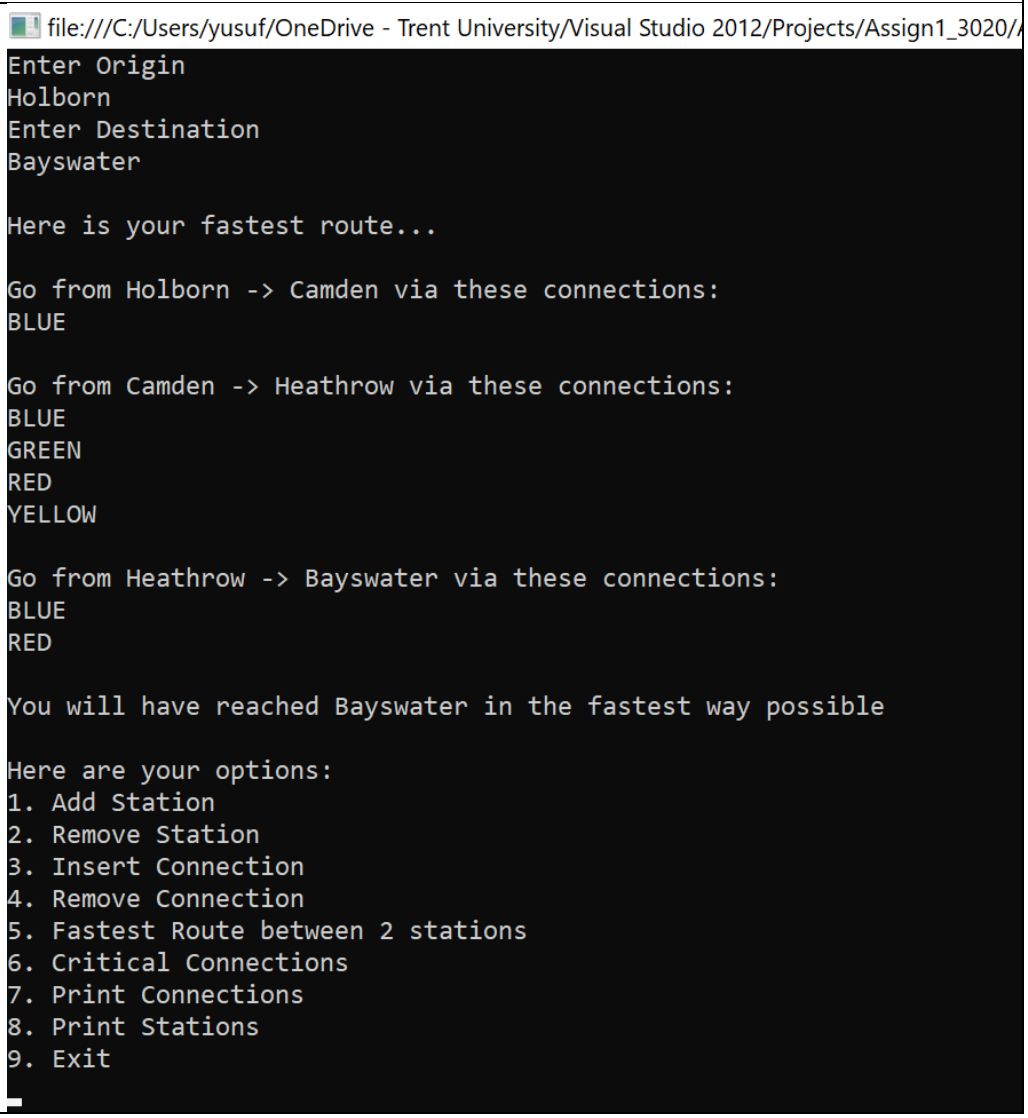
Test 10	
Description	Printing the connections inserted so far. (Camden & Heathrow)
Input	7, for printing connections
Expected Output	List of all the connections in the graph, so far. It will show up twice because the Graph is undirected.
Actual Output	

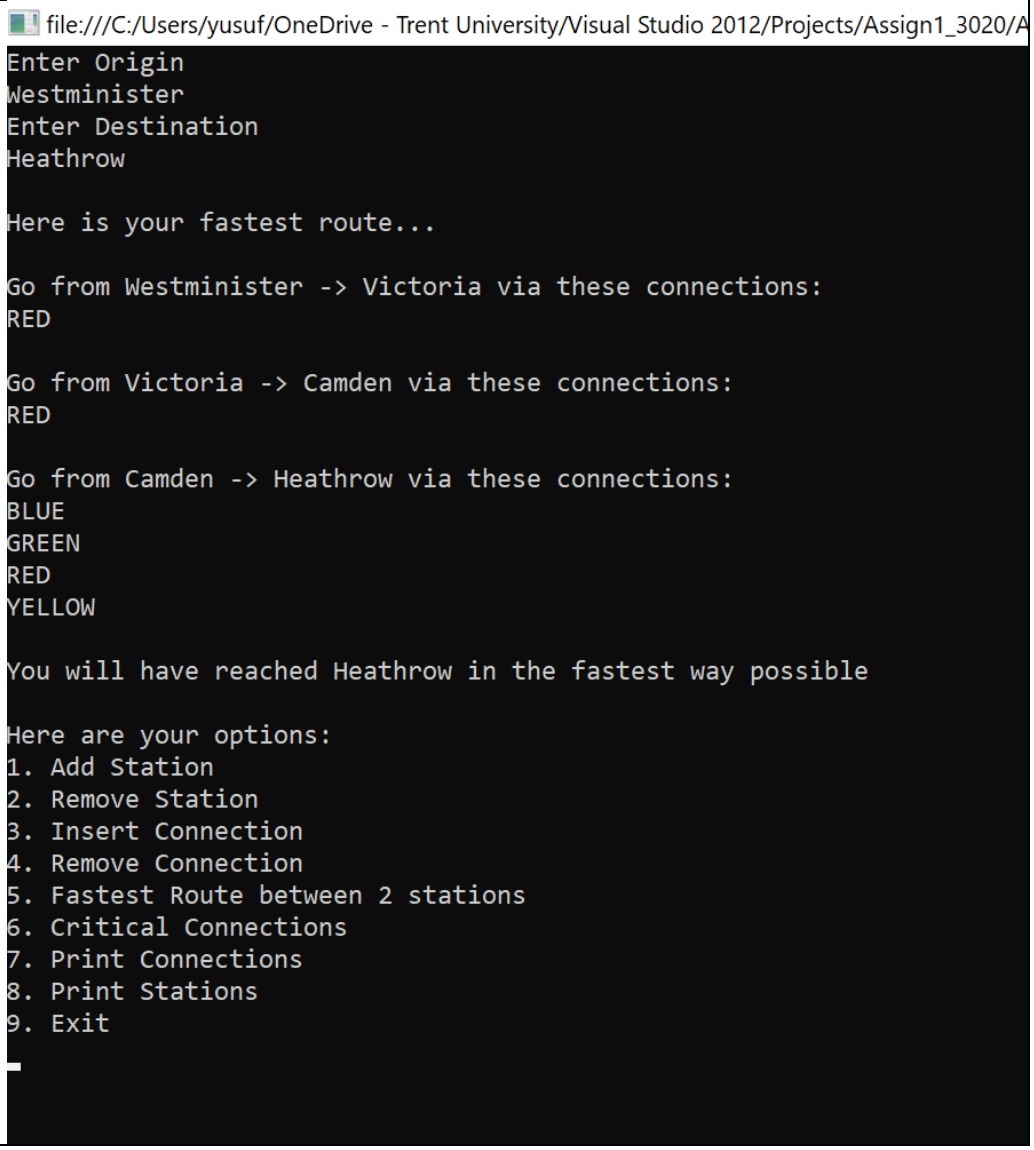
Test 11	
Description	Adding a connection which already exists between two stations
Input	3, for inserting a connection then selecting ‘Camden’ and ‘Heathrow’ and trying to insert Colour Blue again
Expected Output	“Sorry, BLUE line already exists between these two stations.
Actual Output	

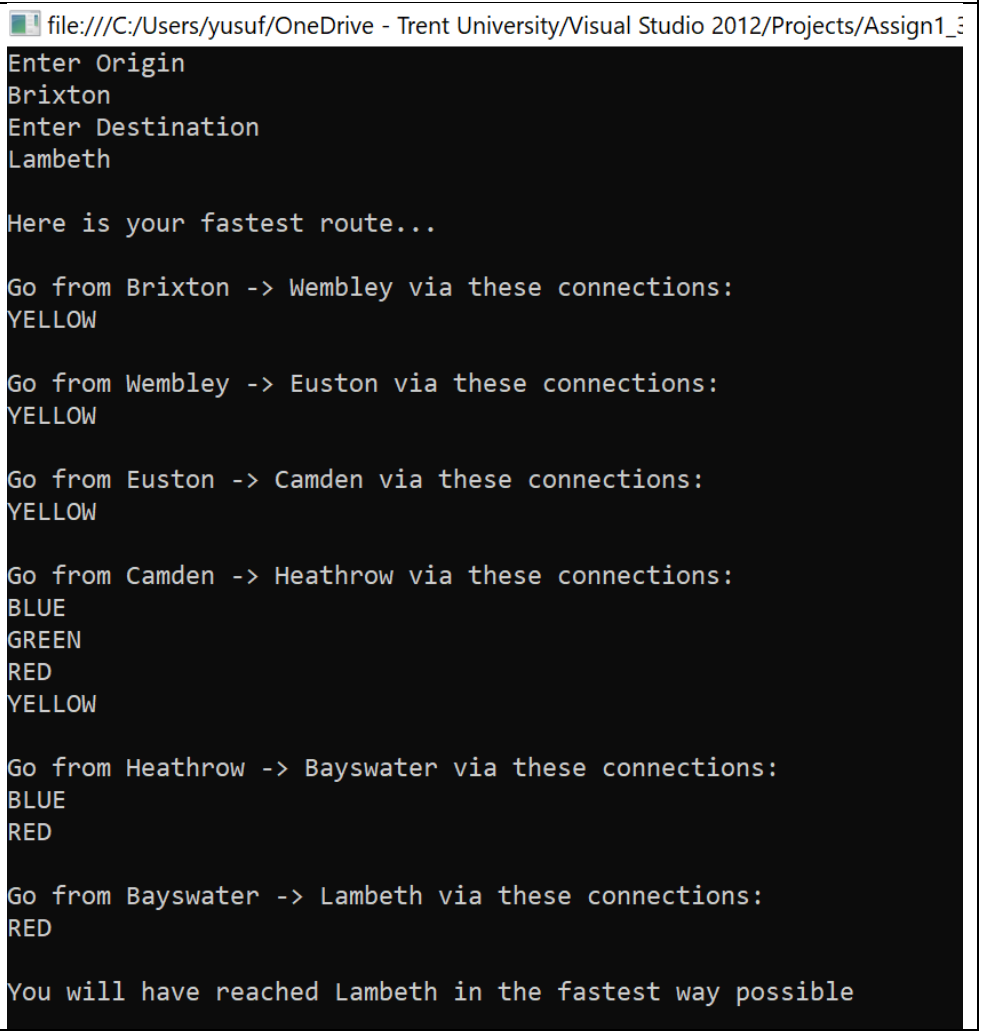
Test 12	
Description	Adding a connection between a station that doesn't exist. Zurich doesn't exist in the system
Input	3, for inserting a connection then selecting 'Liverpool' and 'Zurich'.
Expected Output	"Such station/stations don't exist"
Actual Output	

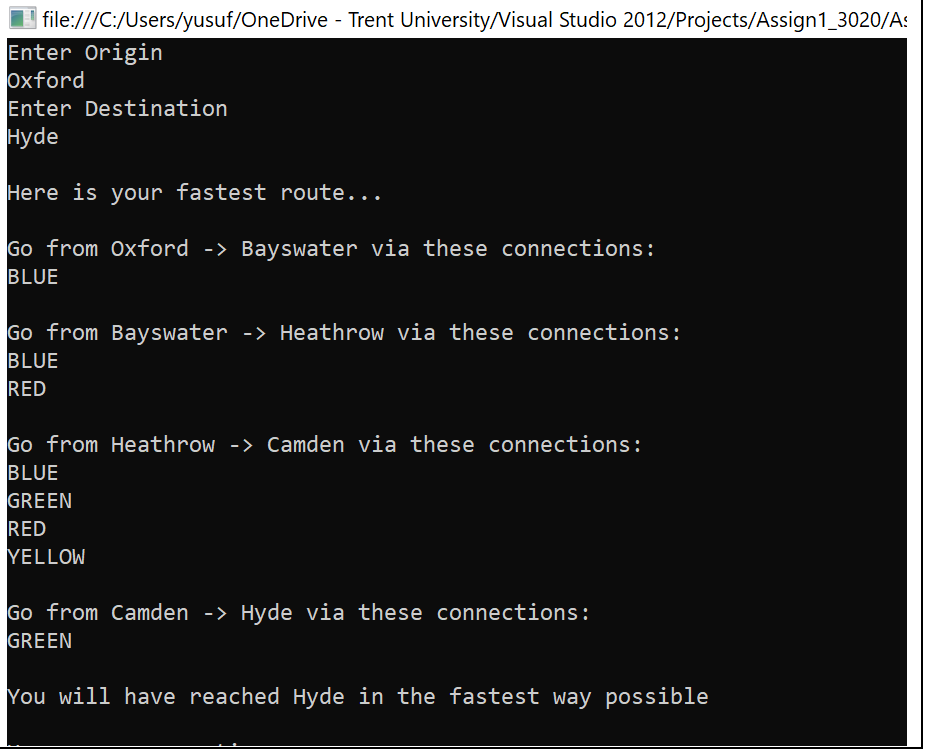
Test 13	
Description	Added all the connection as per the Subway Map attached.
Actual Output	

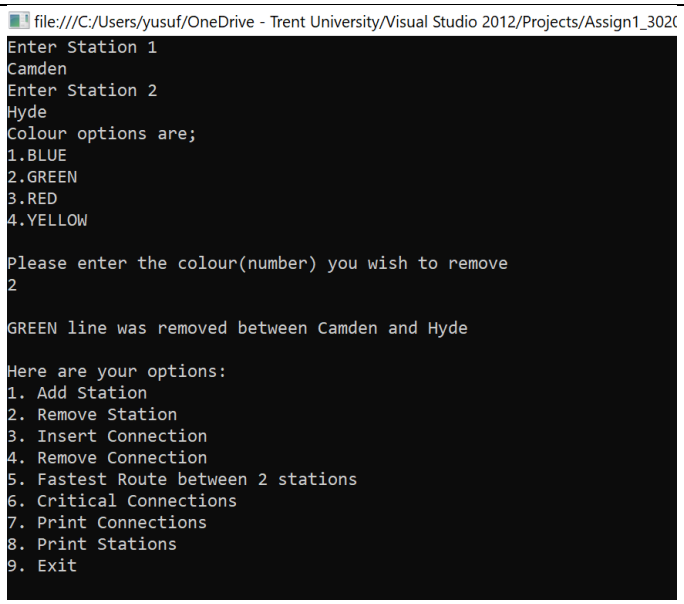
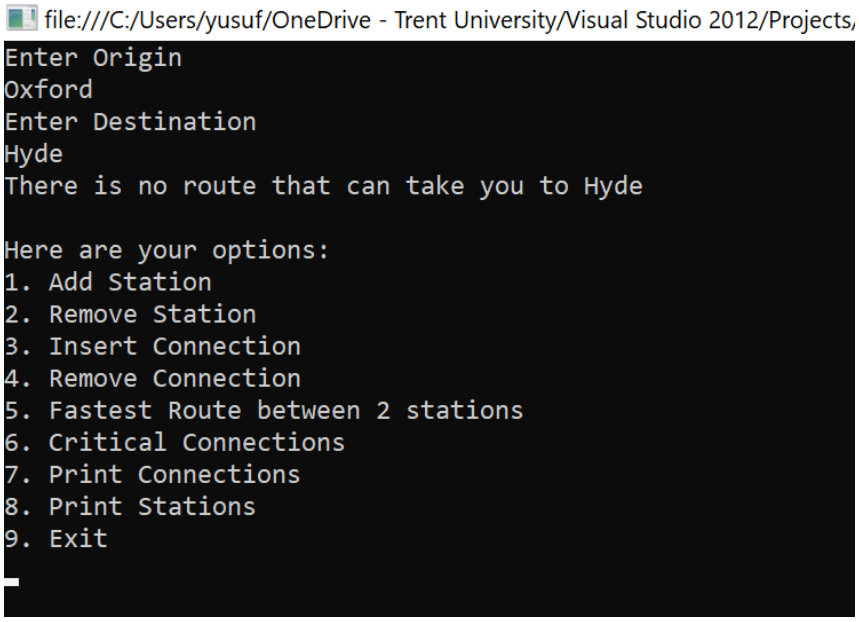
Fastest Route

Test 14	
Description	Fastest Route (Breadth First Search)
Input	5, for option and, 'Holborn' as my origin and 'Bayswater' as my destination. (There are multiple ways to get there but BFS will enable us to find the fastest one i.e the first time I hit 'Bayswater', that's the fastest path.
Expected Output	The fastest route. (I added all the possible lines you can take to, if available, from a station to another.
Actual Output	

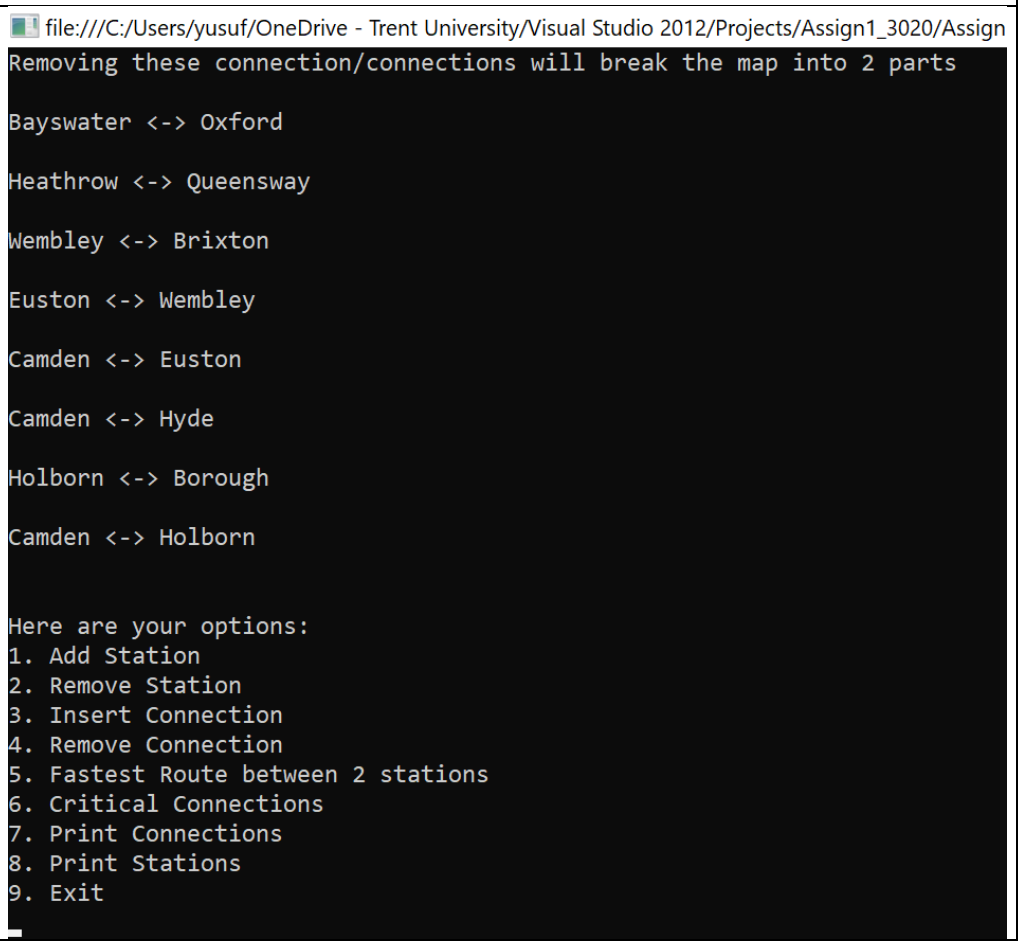
Test 15	
Description	Fastest Route
Input	Trying for more cases, now origin is Westminister & Destination is Heathrow
Expected Output	The fastest route. (I added all the possible lines you can take to, if available, from a station to another.
Actual Output	

Test 16	
Description	Fastest Route
Input	Trying for more cases, now origin is Brixton & Destination is Lambeth
Expected Output	The fastest route. (I added all the possible lines you can take to, if available, from a station to another). Note : There are multiple ways which are both fastest in this example, the program will pick a path that first came across to the destination using BFS.
Actual Output	

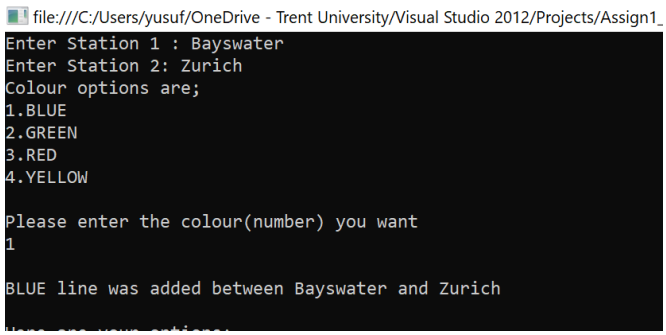
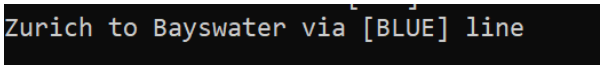
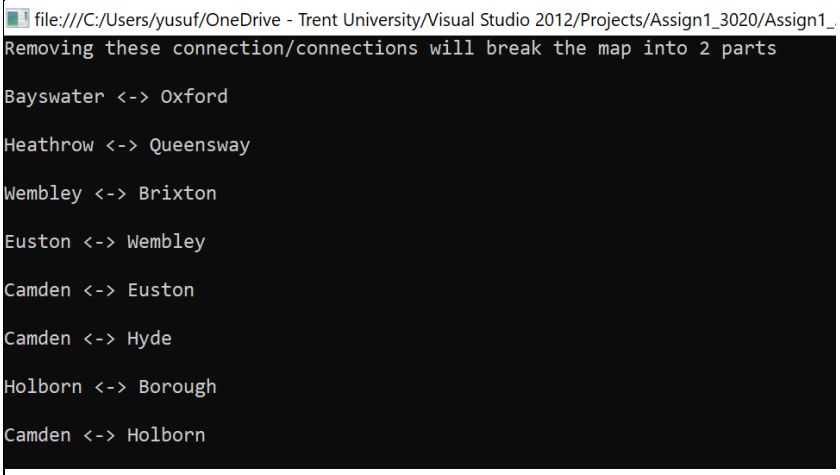
Test 17	
Description	Fastest Route
Input	Trying for more cases, now origin is Oxford & Destination is Hyde
Expected Output	The fastest route. (I added all the possible lines you can take to, if available, from a station to another).
Actual Output	

Test 18	
Description	Fastest Route & Removing Connection
Input	Trying to calculate a fastest route which doesn't exist due to a connection being removed. Let's try removing the connection between Camden and Hyde(Green) for the moment and input a destination to Hyde. (This ties in with Critical Connections which shall be next)
Expected Output	"There is no route you can take to Hyde"
Actual Output	 

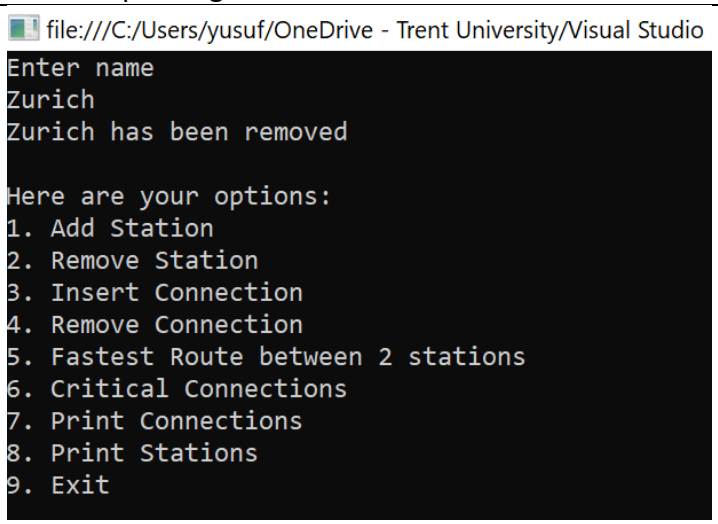
Critical Connections

Test 19	
Description	Critical Connections. These are connections between stations(edges), if removed, will break the Graph/Map into two 2 parts. Like the previous test case where removing a connection meant that we can no longer visit that station
Input	No input required, just select option 7
Expected Output	All the critical connections in the map.
Actual Output	

Test 20	
Description	Adding a station and critical connection to test CriticalConnections() again temporarily.
Input	Zurich as the new Station & Victoria and Zurich as the new connection(RED). If this connection is removed, it will break the graph in 2 parts
Expected Output	Zurich and Victoria will show up as a critical a connection.
Actual Output	file:///C:/Users/yusuf/OneDrive - Trent Universi Liverpool Camden Victoria Lambeth Oxford Picadilly Bayswater Borough Holborn Heathrow Hyde Euston Queensway Wembley Brixton Westminister Zurich (Zurich has been added, I printed the list of stations). Zurich to Victoria via [RED] line (Zurich and Victoria connection added, done by printing list of connections) file:///C:/Users/yusuf/OneDrive - Trent University/Visual Studio 2012/Projects/Assign1_3020/Assign1_3020/b Removing these connection/connections will break the map into 2 parts Bayswater <-> Oxford Heathrow <-> Queensway Wembley <-> Brixton Euston <-> Wembley Camden <-> Euston Camden <-> Hyde Holborn <-> Borough Camden <-> Holborn Victoria <-> Zurich (Zurich and Victoria shows up as a critical connection)

Test 21	
Description	Adding a back-edge(alternative way to get to Zurich besides Victoria) to test CriticalConnection() again.
Input	Adding a connection between Zurich and Bayswater
Expected Output	Zurich and Victoria or Bayswater and Zurich will NOT show up as a Critical Connection because there are alternative paths to get to Zurich and removing them won't break the graph/map.
Actual Output	  (printed the connection)  (Zurich doesn't show up as a Critical Connection as expected).

Remove Station

Test 22	
Description	Testing RemoveStation() by removing Zurich from the previous test case
Input	2, to remove Connection and then specifying Colour.
Expected Output	Zurich will no longer appear when printing the stations as well as when printing the all the connections.
Actual Output	

file:///C:/Users/yusuf/OneDrive - Trent University/Visual Studio 2012/Projects/Assigr

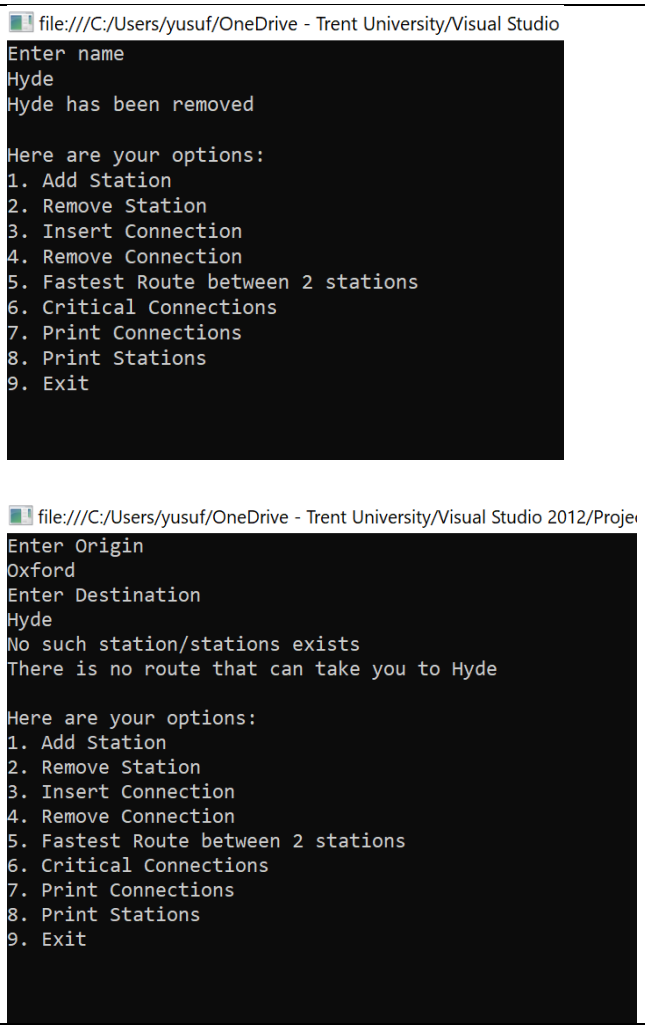
```
Camden to Hyde via [GREEN] line
Camden to Holborn via [BLUE] line
Camden to Victoria via [RED] line
Camden to Picadilly via [GREEN] line
Victoria to Liverpool via [RED] line
Victoria to Camden via [RED] line
Victoria to Westminister via [RED] line
Lambeth to Liverpool via [RED] line
Lambeth to Bayswater via [RED] line
Oxford to Bayswater via [BLUE] line
Picadilly to Westminister via [GREEN] line
Picadilly to Camden via [GREEN] line
Bayswater to Lambeth via [RED] line
Bayswater to Oxford via [BLUE] line
Bayswater to Heathrow via [BLUE] line
Bayswater to Heathrow via [RED] line
Borough to Holborn via [BLUE] line
Holborn to Camden via [BLUE] line
Holborn to Borough via [BLUE] line
Heathrow to Camden via [BLUE] line
Heathrow to Camden via [GREEN] line
Heathrow to Camden via [RED] line
Heathrow to Camden via [YELLOW] line
Heathrow to Bayswater via [BLUE] line
Heathrow to Bayswater via [RED] line
Heathrow to Queensway via [GREEN] line
Heathrow to Queensway via [YELLOW] line
Hyde to Camden via [GREEN] line
Euston to Camden via [YELLOW] line
Euston to Wembley via [YELLOW] line
Queensway to Heathrow via [GREEN] line
Queensway to Heathrow via [YELLOW] line
Wembley to Euston via [YELLOW] line
Wembley to Brixton via [YELLOW] line
Brixton to Wembley via [YELLOW] line
Westminister to Victoria via [RED] line
Westminister to Picadilly via [GREEN] line
```

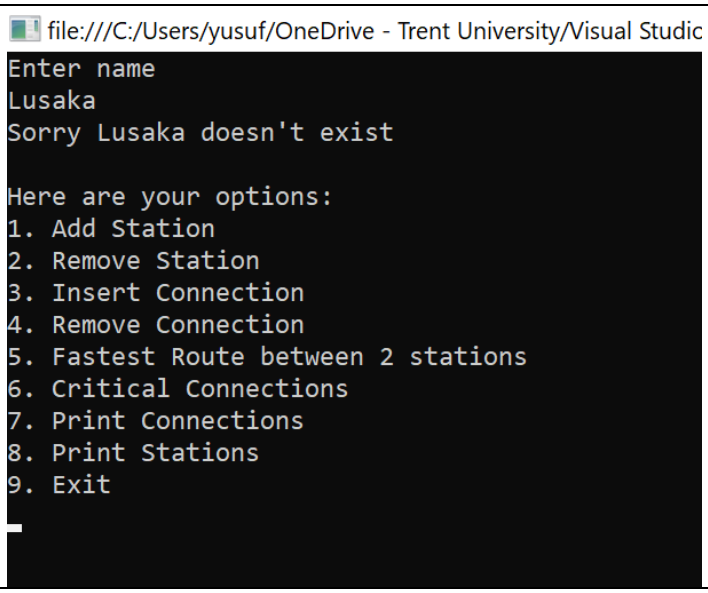
(All connection TO and FROM Zurich shall be removed)

file:///C:/Users/yusuf/OneDrive - Trent Universit

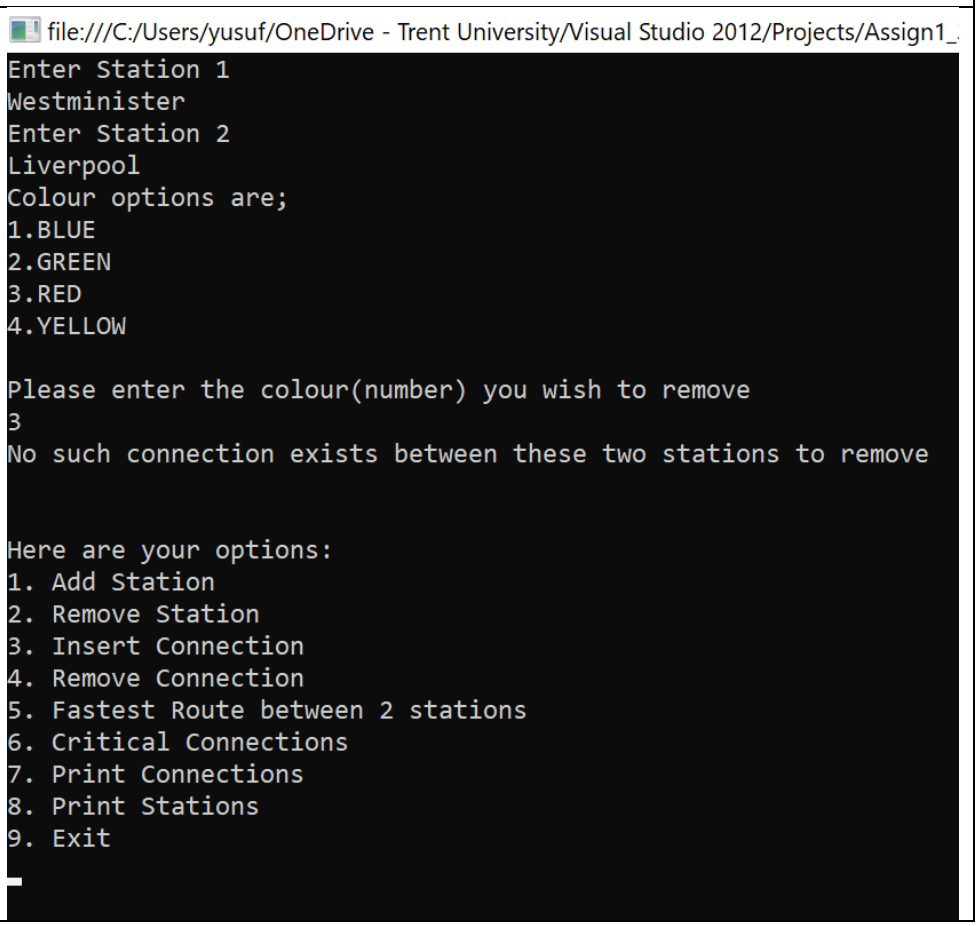
```
Liverpool
Camden
Victoria
Lambeth
Oxford
Picadilly
Bayswater
Borough
Holborn
Heathrow
Hyde
Euston
Queensway
Wembley
Brixton
Westminister
```

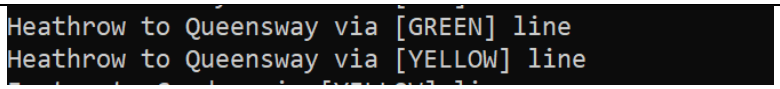
(No Zurich when printing the listing of stations)

Test 23	
Description	Testing Fastest Route by removing a station temporarily. After removing a station, there should be no route to that station
Input	2, to remove a station, 5 for fastest route between Oxford and Hyde
Expected Output	No route to Hyde
Actual Output	

Test 24	
Description	Trying to remove a station which doesn't exist.
Input	2, to remove a station and 'Lusaka' for station to be removed
Expected Output	'Sorry Lusaka doesn't exist'.
Actual Output	

Remove Connection

Test 25	
Description	Trying to remove a connection which doesn't exist.
Input	4, to remove a connection and then Westminister and Liverpool (In the map and in the system, this connection doesn't exist).
Expected Output	No such connection exists between these two stations to remove.
Actual Output	

Test 26	
Description	Trying to remove a connection which does exist between two stations but not one with the Colour specified.
Input	4, to remove a connection, and then Heathrow and Queensway as stations. (Only yellow and green line exists between them). So we input Red line to be removed.
Expected Output	No such connection exists between these two stations to remove.
Actual Output	 (To show Green & Yellow Line exists between them) (Trying to remove a Red Line)