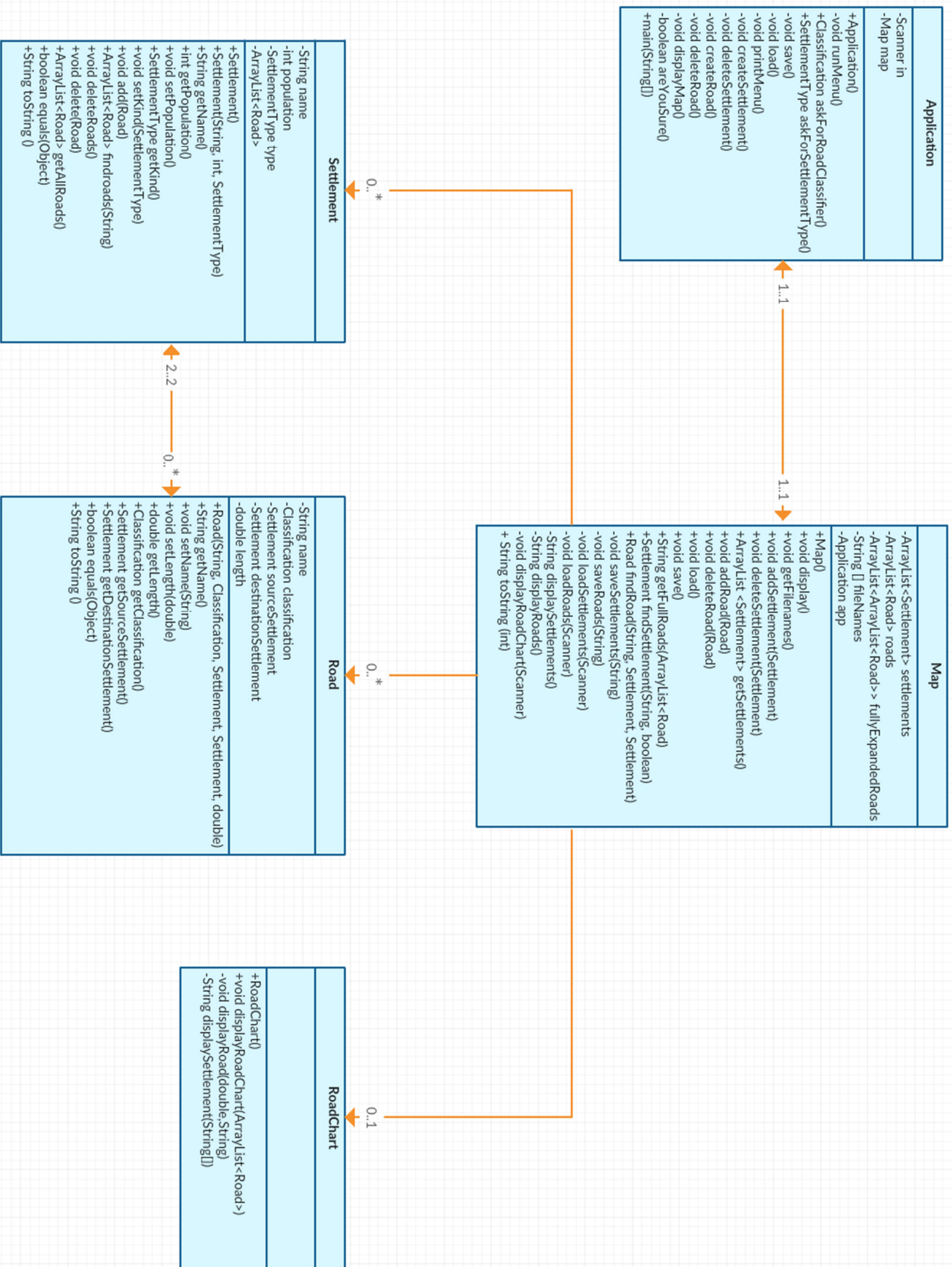


Mini Assignment: Road: Settlements and routes

Pip Turner
pit@aber.ac.uk
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UML Diagram



Write up

After reading through the assignment's PDF and the code provided, I began to follow the steps suggested in the PDF. Whilst the majority of the steps went well, I decided I wanted to add a few features to the program. I wanted to:

- Give the user the choice to enter custom file names when loading and saving
- Group same-named roads together when outputting the map (E.g. all the roads named "A487" would output as one long road)
- Building on this, I wanted to display the entire map using ASCII art. However, this was too complicated for the time frame I had, considering I lacked any form of co-ordinates for each settlement. Instead, I opted for displaying a road's route through settlements.

The first problem I encountered was using `scanner.nextInt()`, without using `.nextLine` immediately afterwards. This caused input to skip a step. Another I encountered with Scanners was closing identical scanners in a different class. When closed in one class, they close in all, which can break the program when getting input.

When editing an `ArrayList` whilst using a for each loop, the indexes of the list change, causing an error. The solution was to use a for loop, looping through the size of the list, getting the road each time.

I also had trouble coming up with a comprehensive way of outputting the roads once sorted, opting for a recursive solution, running the method until every road had been sorted. This method was also useful in displaying a road as a chart, as you just pass the chart a sorted array list and it outputs it accordingly. However, when first designing the output, I tried to display it landscape, rather than portrait – this massively over complicated everything!

Whenever I added a new function, or changed something significant, I tested all functions associated to the change, making sure they still worked. If they didn't I used the debugger to find the point it breaks at and then worked out why from there.

If I had more time, I would add a number of things:

- Dijkstra's algorithm

I would like to implement a way to find the shortest route from one settlement to another, using Dijkstra's algorithm, as it is an efficient way to solve the problem of shortest route.

- Data protection

Whilst I didn't have time to encrypt the text files, it would add an extra layer of security to the user's data. Extra protection could come in the form of password protected files.

Overall, I would give myself 80%. I feel like my code is a comprehensive solution to the brief given, making good use of object orientation, giving the user a lot of power over their data and outputting the map in a very readable form. However, I do feel like more could have been added, if I managed my time better. I also feel that in some places, my code gets messy. There is also some repetition of code, which is not ideal.

Screenshots

Please enter the Settlements filename (Default: "settlements.txt"):

settlements.txt

Please enter the Roads filename (Default: "roads.txt"):

roads.txt

Finished loading Settlements from settlements.txt

Finished loading Roads from roads.txt

1 - Create a Settlement

2 - Delete a Settlement

3 - Create a Road

4 - Delete a Road

5 - Display Map

6 - Load

7 - Save

q - Quit

1

Please enter your Settlement's name:

Coventry

Please enter your Settlement's population:

316900

Please enter your Settlement's type: HAMLET VILLAGE TOWN CITY cItY

1 - Create a Settlement

2 - Delete a Settlement

3 - Create a Road

4 - Delete a Road

5 - Display Map

6 - Load

7 - Save

q - Quit

2

Please enter the Settlement's Name

Coventry

Are you sure you want to delete this? y/n

y

1 - Create a Settlement

2 - Delete a Settlement

3 - Create a Road

4 - Delete a Road

5 - Display Map

6 - Load

7 - Save

q - Quit

Loading successfully

Printing the menu

Handling menu input

Creating a settlement

Deleting a settlement

```
Problems  Javadoc  Declaration  Console  [X]
<terminated> Application (7) [Java Application] C:\Program Files\Java\jre1.8.0_73\bin\javaw.exe (16 Mar 2016, 21:58:15)
Please enter the Settlements filename (Default: "settlements.txt"):
settlements.txt
Please enter the Roads filename (Default: "roads.txt"):
tarmacRoads.txt
Finished loading Settlements from settlements.txt
Exception in thread "main" java.io.FileNotFoundException: tarmacRoads.txt (The system cannot find the file specified)
    at java.io.FileInputStream.open0(Native Method)
    at java.io.FileInputStream.open(Unknown Source)
    at java.io.FileInputStream.<init>(Unknown Source)
    at java.io.FileInputStream.<init>(Unknown Source)
    at java.io.FileReader.<init>(Unknown Source)
    at Map.load(Map.java:195)
    at Application.load(Application.java:142)
    at Application.main(Application.java:315)
```

Handling a non-existent file

- 1 - Create a Settlement
- 2 - Delete a Settlement
- 3 - Create a Road
- 4 - Delete a Road
- 5 - Display Map
- 6 - Load
- 7 - Save
- q - Quit

1

Please enter your Settlement's name:

Coventry

Please enter your Settlement's population:

316900

Please enter your Settlement's type: HAMLET VILLAGE TOWN CITY COUNTRY

COUNTRY is not one of the options. Try again.

Please enter your Settlement's type: HAMLET VILLAGE TOWN CITY city

- 1 - Create a Settlement
- 2 - Delete a Settlement
- 3 - Create a Road
- 4 - Delete a Road
- 5 - Display Map
- 6 - Load
- 7 - Save
- q - Quit

2

Please enter the Settlement's Name

West Ham

The map does not contain the Settlement: West Ham

- 1 - Create a Settlement
- 2 - Delete a Settlement
- 3 - Create a Road
- 4 - Delete a Road
- 5 - Display Map
- 6 - Load
- 7 - Save
- q - Quit

Handling a wrong Settlement Type

Handling a non-existent Settlement

3

Please enter your Road's name:

M6

Please enter a road classification: M A B U

Creating a road

M

Please enter your Road's source Settlement's name:

Birmingham

Please enter your Road's destination Settlement's name:

Coventry

Please enter your Road's length:

5

- 1 - Create a Settlement
- 2 - Delete a Settlement
- 3 - Create a Road
- 4 - Delete a Road
- 5 - Display Map
- 6 - Load
- 7 - Save
- q - Quit

4

Please enter the Road's name:

M6

Please enter the Road's source Settlement's name

Birmingham

Please enter the Road's destination Settlement's name

Coventry

Are you sure you want to delete this? y/n

Deleting a road

y

- 1 - Create a Settlement
- 2 - Delete a Settlement
- 3 - Create a Road
- 4 - Delete a Road
- 5 - Display Map
- 6 - Load
- 7 - Save
- q - Quit

3

Please enter your Road's name:

M6

Please enter a road classification: M A B U

Umbrella

UMBRELLA is not one of the options. Try again.

Please enter a road classification: M A B U

M

Please enter your Road's source Settlement's name:

Glasgow

The map does not contain the Settlement: Glasgow

- 1 - Create a Settlement
- 2 - Delete a Settlement
- 3 - Create a Road
- 4 - Delete a Road
- 5 - Display Map
- 6 - Load
- 7 - Save
- q - Quit

Handling incorrect
classification

4

Please enter the Road's name:

M6

Please enter the Road's source Settlement's name

Glasgow

The map does not contain the Settlement: Glasgow

- 1 - Create a Settlement
- 2 - Delete a Settlement
- 3 - Create a Road
- 4 - Delete a Road
- 5 - Display Map
- 6 - Load
- 7 - Save
- q - Quit

Handling an incorrect
settlement name, when
adding a road

Handling an incorrect
settlement name, when
deleting a road

```
1 - Create a Settlement
2 - Delete a Settlement
3 - Create a Road
4 - Delete a Road
5 - Display Map
6 - Load
7 - Save
q - Quit
```

5

```
1. Display Settlements
2. Display Roads
3. Display Settlements and Roads
4. Display Road as Chart
```

1

-----Settlements-----

Aberystwyth.

Aberystwyth is a TOWN with a population of 20000.

You can get to Aberystwyth from:

Penparcau using the A487

From Aberystwyth, you can get to:

Bow Street using the A487

Llanbadarn using the A44

Welsh Pool using the M7

Bow Street.

Bow Street is a VILLAGE with a population of 2000.

You can get to Bow Street from:

Aberystwyth using the A487

From Bow Street, you can get to:

Rhydyppennau using the A487

Borth.

Borth is a VILLAGE with a population of 1500.

You can get to Borth from:

Rhydyppennau using the B4353

There are no settlements listed to get here from.

Llanbadarn.

Llanbadarn is a VILLAGE with a population of 3000.

You can get to Llanbadarn from:

Penparcau using the Hoel-Y-Bont

Aberystwyth using the A44

There are no settlements listed to get here from.

Penparcau.

Penparcau is a VILLAGE with a population of 3100.

There are no settlements listed to get to.

From Penparcau, you can get to:

Aberystwyth using the A487

Llanbadarn using the Hoel-Y-Bont

<

Displaying Settlements

```
1 - Create a Settlement
2 - Delete a Settlement
3 - Create a Road
4 - Delete a Road
5 - Display Map
6 - Load
7 - Save
q - Quit
```

5

```
1. Display Settlements
2. Display Roads
3. Display Settlements and Roads
4. Display Road as Chart
```

2

-----Roads-----

A487.

A487 is an A-road, running through:

Penparcau to Aberystwyth(0.9 miles)

Aberystwyth to Bow Street(3.4 miles)

Bow Street to Rhydyppennau(0.9 miles)

Rhydyppennau to Tal-y-bont(2.7 miles)

Hoel-Y-Bont.

Hoel-Y-Bont is an U-road, running through:

Penparcau to Llanbadarn(0.8 miles)

B4353.

B4353 is an B-road, running through:

Rhydyppennau to Borth(3.6 miles)

A44.

A44 is an A-road, running through:

Aberystwyth to Llanbadarn(1.2 miles)

M7.

M7 is an M-road, running through:

Aberystwyth to Welsh Pool(9.8 miles)

Displaying Roads


```

5
1. Display Settlements
2. Display Roads
3. Display Settlements and Roads
4. Display Road as Chart
4
Please enter the name of the road you want to display:
A487

```

```

|-----|
|Name: Penparcau|
|Population: 3100|
|Settlement Kind: VILLAGE|
|-----|
| | |
| | | (0.9 miles)
| | |
|-----|

```

```

|-----|
|Name: Aberystwyth|
|Population: 20000|
|Settlement Kind: TOWN|
|-----|
| | |
| | | (3.4 miles)
| | |
|-----|

```

```

|-----|
|Name: Bow Street|
|Population: 2000|
|Settlement Kind: VILLAGE|
|-----|
| | |
| | | (0.9 miles)
| | |
|-----|

```

```

|-----|
|Name: Rhydypennau|
|Population: 100|
|Settlement Kind: HAMLET|
|-----|
| | |
| | |
|-----|

```

```

4
Please enter the name of the road you want to display:
motorway
motorway does not exist
1 - Create a Settlement
2 - Delete a Settlement
3 - Create a Road
4 - Delete a Road
5 - Display Map
6 - Load
7 - Save
q - Quit

```

Handling a non-existent road

Displaying a "Road Chart"

7

The current Settlement file name is: settlements.txt

The current Roads file name is: roads.txt

1. Continue with these names
2. Input new names

2

Please enter the Settlements filename (Default: "settlements.txt"):

screenshotSettlements.txt

Please enter the Roads filename (Default: "roads.txt"):

screenshotRoads.txt

Finished saving Settlements to screenshotSettlements.txt

Finished saving Roads to screenshotRoads.txt

- 1 - Create a Settlement
- 2 - Delete a Settlement
- 3 - Create a Road
- 4 - Delete a Road
- 5 - Display Map
- 6 - Load
- 7 - Save
- q - Quit

q

Would you like to save? (y/n)

n

Saving and quitting