CSC 1310 PROGRAM 3

Linked List / Template Classes

Travel Agent

FILES THAT MUST BE INCLUDED IN YOUR SUBMISSION

- **LinkedList.h** – header file containing your LinkedList **template** class.
- **Destination.h** – **[provided for you]** – Destination class
- **TravelAgent.cpp** – contains the main function and any additional functions you created to make the program run
- **placeFile.txt** **[provided for you]** – feel free to add more destinations to this file
- **Makefile** **[provided for you]** – if you name your files differently, then you will need to modify this file.
- **batchFile.bat** **[provided for you]** – used to run the makefile and your program with the TEST_CASE.txt as input.

- **TEST_CASE.txt [provided for you]** – sample input to test your program

DESCRIPTION

You are creating a program for a Travel Agent named Gavin O Cleirigh where you read in all your destination data from a text file (placeFile.txt) and then add each destination to a Linked List. The places should be in alphabetical order by place name in the nodes in the Linked List. Then, you will ask the user four different questions including name, salary, and then two other yes/no questions of your choice. Then, you will generate a random number and get the Linked List node value at the position of this random number and tell the user that this is where they will be travelling.

SPECIFICATIONS

LINKED LIST TEMPLATE CLASS

Create a template class named LinkedList, which will implement a singly linked list. (should be in **LinkedList.h**)

PRIVATE MEMEBERS

- Create a structure called **ListNode**, which should hold a template data type for the value and a pointer to the next ListNode
- ListNode pointer called **head** – will eventually point to the first node in the linked list
- ListNode pointer called **tail** – will eventually point to the last node in the linked list
- Integer called **numNodes** – will hold the number of nodes in the linked list

PUBLIC MEMBERS

- **Constructor** – initialize head, tail, & numNodes
- **Destructor** – deletes all nodes in the list
- **getLength** – return the number of nodes currently in the linked list (returns numNodes)

- **getNodeValue** – accepts an integer indicating the position in the linked list and will return the value in the node at that position (which is the template data type)

- **insertNode** – this function is passed a node value (pointer to a Destination). Dynamically allocate a new node with the value sent to this function. If no nodes are in the list, insert the node as the head & tail. If the Destination name alphabetically goes after tail's destination name, then insert this new node at the end of the linked list. Otherwise, you will traverse through the linked list to find the appropriate spot to insert the node so that the name is alphabetically in order.

TRAVEL AGENT PROGRAM

The program should be created in a source file named **TravelAgent.cpp**. Below is the logic of the main function.

You may separate the logic in the main function into as many other programmer-defined functions as you want and name them whatever you want.

However, your program must work as specified below:

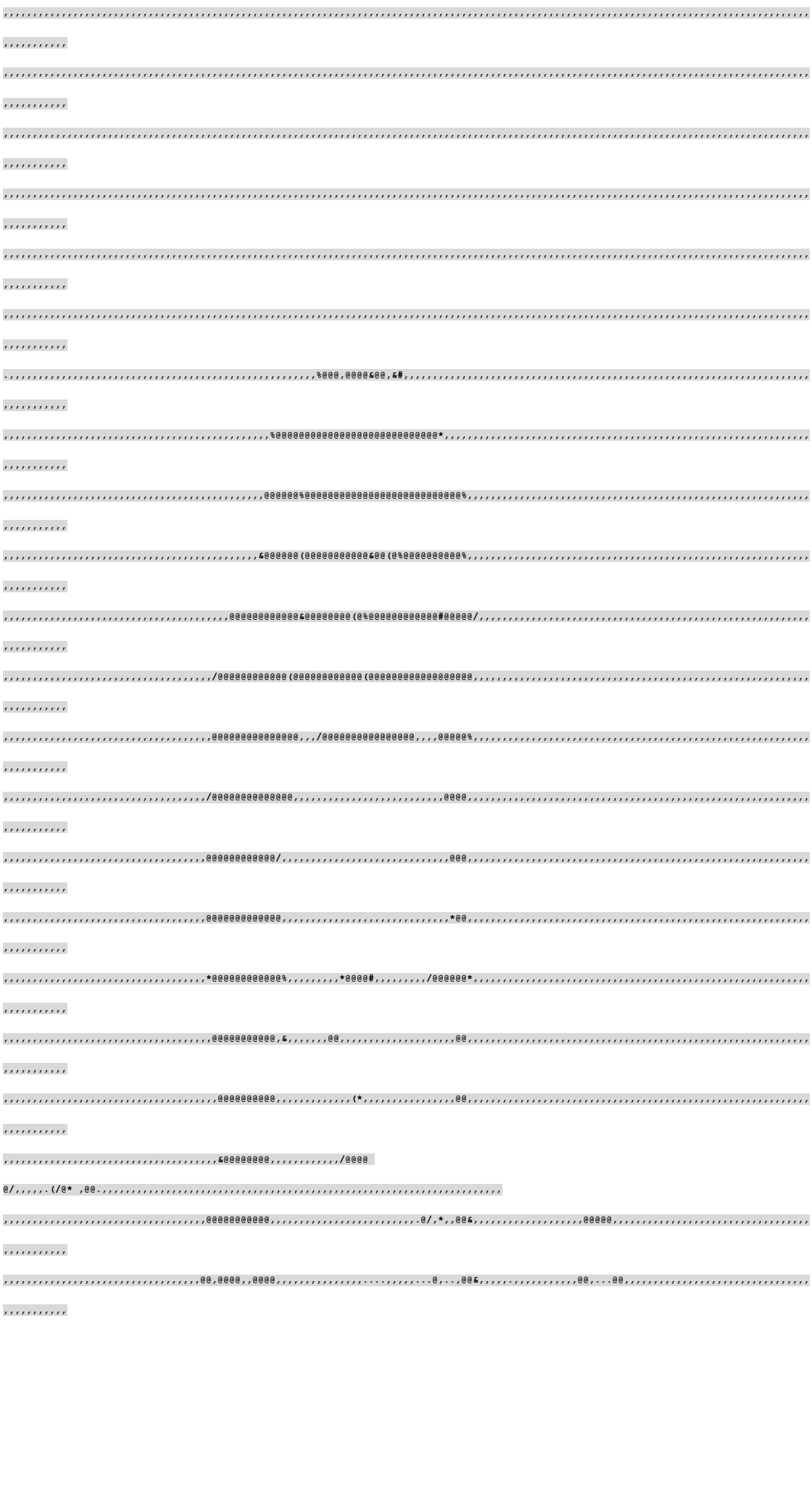
- Create a linked list using the LinkedList template class. The template data type will be <Destination*>.

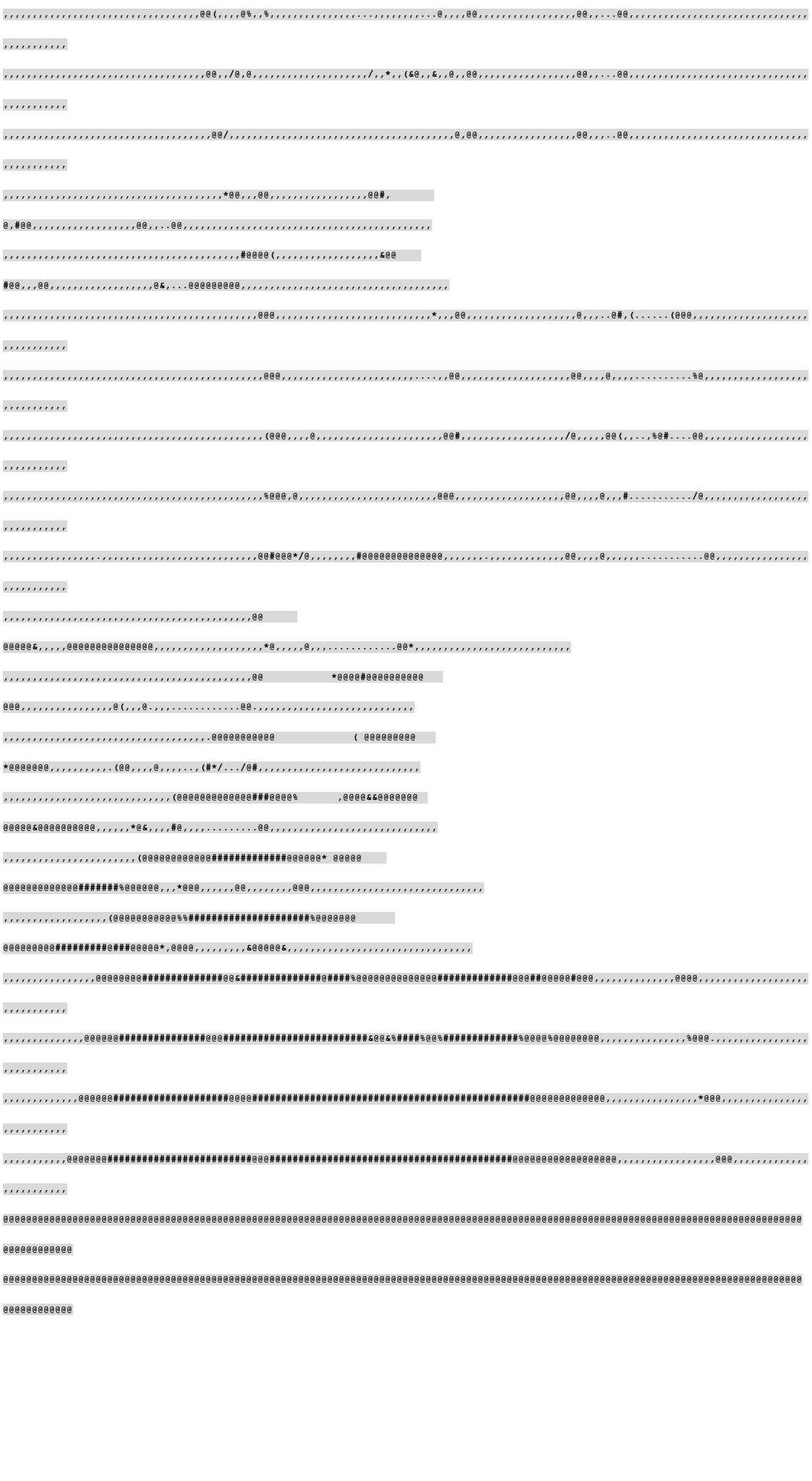
- Print out a welcome message like below.

```
Hello!  My name is Gavin O Cleirigh and I am your professional travel agent,
tour director,
and guide!
```

- Print out some ASCII Art that represents what Gavin may look like. In order to do this, I found a picture of a guy with his thumb up and then used this website (https://manytools.org/hacker-tools/convert-images-to-ascii-art/go/) to convert the image to ASCII. You can assume your code will be tested at an output width of 150 characters. Look at my sample output below. (I had to make the font tiny to make it fit on this page.)

```
,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
,,,,,,,,,,,
```





- Enter in the text from the **placeFile.txt** file and after the data for each place is read in, dynamically allocate a new **Destination** object. Then, place the **pointer to the Destination object** in a new LinkedList node (call the **insertNode** function).

- Next, print out all the destinations that are now in the Linked List. You can do this by having a for loop that will go from 0 to the number of nodes in the Linked List (call the **getLength** function) and then in the for loop you will call the **getNodeValue** function (sending the position of the node you want) and the function should return the value (which is a pointer to the Destination). Then, you can print out the Destination. Look at the sample output below.

```
Below are all the possible travel destinations that I can hook you up
with:


**********DESTINATION #1**********
PLACE:  Beckley, West Virginia
DESCRIPTION:  Beckley is a city in and the county seat of Raleigh
County, West Virginia, United States. It was founded on April 4, 1838.
Beckley was named in honor of John James Beckley, who was the first
Clerk of the House of Representatives and the first Librarian of
Congress.  A notable site in the city is the Beckley Exhibition Coal
Mine, a preserved coal mine that offers daily tours and a history
lesson on coal mining in Appalachia.  Sometimes there are reports of
visitors seeing the monster called the Mothman.
TRAVEL COST:  $856.34
DANGER SCORE:  8

**********DESTINATION #2**********
PLACE:  Forest of Fangorn in Middle-Earth
DESCRIPTION:  Middle-earth is the main continent of Earth in a
(supposedly imaginary) period of the Earth's past with the end of the
Third Age about 6,000 years ago. The forest of Fangorn is the last
remaining residence of Ents, who are tree-like creatures and are
considered shepherds of the trees.
TRAVEL COST:  $543965
DANGER SCORE:  9

**********DESTINATION #3**********
PLACE:  Bikini Bottom
```

DESCRIPTION: A square yellow sponge named SpongeBob SquarePants lives in a pineapple with his pet snail, Gary, in the city of Bikini Bottom on the floor of the Pacific Ocean. He works as a fry cook at the Krusty Krab.
TRAVEL COST: $98.43
DANGER SCORE: 6

**********DESTINATION #4**********
PLACE: Land of Oz
DESCRIPTION: Oz is roughly rectangular in shape, and divided along the diagonals into four countries: Munchkin Country (but commonly referred to as 'Munchkinland' in adaptations) in the East, Winkie Country in the West (sometimes West and East are reversed on maps of Oz, see West and East below), Gillikin Country in the North, and Quadling Country in the South. In the center of Oz, where the diagonals cross, is the fabled Emerald City, capital of the land of Oz and seat to the monarch of Oz, Princess Ozma. Oz is completely surrounded on all four sides by a desert which insulates the citizens of the Land of Oz from discovery and invasion. Oz is mostly a peaceful land.
TRAVEL COST: $12345.5
DANGER SCORE: 3

**********DESTINATION #5**********
PLACE: Melmac (planet)
DESCRIPTION: Melmac is a strange planet located in the Aldente Nebula in the Andromeda Galaxy. It is the homeworld of ALF. Residents of the planet were called Melmacians and they were characterized as being short, furry creatures who have remarkable longevity and multiple stomachs. Melmac is located six parsecs past the Hydra-Centaurus Supercluster. Melmac is very much like Earth but it has two moons, it is oddly shaped and made of melmac. Melmac has green skies and blue grass, and it orbits a purple sun.
TRAVEL COST: $54394.5
DANGER SCORE: 2

**********DESTINATION #6**********
PLACE: Narnia (world)
DESCRIPTION: The mystical world of Narnia is a disc-shaped world (unlike Earth, which is spherical), with the sky like a great dome that meets the world around its circumference, on which the other side, and indeed all around the world's edges, is the mysterious land called Aslan's Country. The guardian and creator of the Narnian World, with the help of a few people, is the Great Lion, Aslan,

```
himself who sent people (mostly children) from our own earth on
missions to save Narnian society from destruction.
TRAVEL COST:  $0.75
DANGER SCORE:  7

**********DESTINATION #7**********
PLACE:  Strawberryland
DESCRIPTION:  Strawberryland is where Strawberry Shortcake lives with
her calico cat Custard.  Her house resembles a shortcake. Her friends
are Huckleberry Pie, Blueberry Muffin, Raspberry Tart, Plum Puddin
and toddler Apple Dumplin who also live close by.
TRAVEL COST:  $5643.87
DANGER SCORE:  1
```

- Now you will ask the user four questions. This is to give the customer the false thought that you are actually choosing a destination based on something personal about them. The first question needs to be their name (including spaces). The second question needs to be their salary. If the user enters a letter instead of a number then force them to re-enter their data and make sure it is a positive number. The third and fourth questions can be whatever you want but they have to be yes/no questions. Read in the user's answer as a char ('y' or 'n'). If the user did not enter a character or did not enter in a 'y' or a 'n' then force them to re-enter their data. You can validate the user's data type to make sure it matches the variable you are reading into easily with !cin. Look at my program segment below to check if the user entered in a character.

```
char response;
cout << "Enter a character:  ";
cin >> response;
while(!cin)
{
    cin.clear(); //removes all error flags on the stream

    /*  The ignore below will remove all leftover characters or numbers
        from keyboard buffer to start with fresh input.
        Also, you must #include <limits> to use numeric_limits
    */
    cin.ignore(numeric_limits<streamsize>::max(),'\n');
```

```
    cout << "Oops!  You entered something wonky.  Please enter a character:
";
    cin >> response;
}
```

Sample Output 1 of User Input (when user enters in expected data types & values):

```
**************************************************************************

Please answer the following four questions and I will determine the place
you should travel.

       1. What is your full name?     Kevin Malone

       2. How much money do you make per year? 93842

       3. Do you like the taste of fruity pebbles cereal? (y or n)    y

       4. Is planet Earth flat? (y or n)      y
```

Sample Output 2 of User Input when user enters wrong data types:

```
**************************************************************************
****
Please answer the following four questions and I will determine the place
you should travel.
       1. What is your full name?     Spongebob Squarepants
       2. How much money do you make per year? f

Oops!  You entered something wonky.  Please enter a number with no symbols or
commas.
       2. How much money do you make per year? 10345
       3. Do you like the taste of fruity pebbles cereal? (y or n)?    3

Oops!  You entered something wonky.  Please enter the letter y or n.
       3. Do you like the taste of fruity pebbles cereal? (y or n)?    y
       4. Is planet Earth flat? (y or n)      6

Oops!  You entered something wonky.  Please enter the letter y or n.
       4. Is planet Earth flat? (y or n)      n
```

- Now, generate a random number between 0 and the number of nodes in the linked list (subtracting 1). You will then call the

getNodeValue Linked List function to get the value of the node at this position number. Sample output is below.

```
Spongebob Squarepants, based on your salary ($10345) and the fact that you
like Fruity Pebbles cereal and you do not think that Earth is flat, you are
going to travel to the following Destination!

PLACE:  Land of Oz

DESCRIPTION:  Oz is roughly rectangular in shape, and divided along the
diagonals into four countries: Munchkin Country (but commonly referred to as
'Munchkinland' in adaptations) in the East, Winkie Country in the West
(sometimes West and East are reversed on maps of Oz, see West and East
below), Gillikin Country in the North, and Quadling Country in the South. In
the center of Oz, where the diagonals cross, is the fabled Emerald City,
capital of the land of Oz and seat to the monarch of Oz, Princess Ozma.  Oz
is completely surrounded on all four sides by a desert which insulates the
citizens of the Land of Oz from discovery and invasion. Oz is mostly a
peaceful land.

TRAVEL COST:  $12345.5

DANGER SCORE:  3
```

- Last, print “HAVE FUN!!”

```
HAVE FUN!!
```

HOW TO TURN IN YOUR PROGRAM

- Zip all the files required to compile & run your program (including the files given to you).
- Upload it to the PROGRAM 2 submission folder in ilearn by the due date.