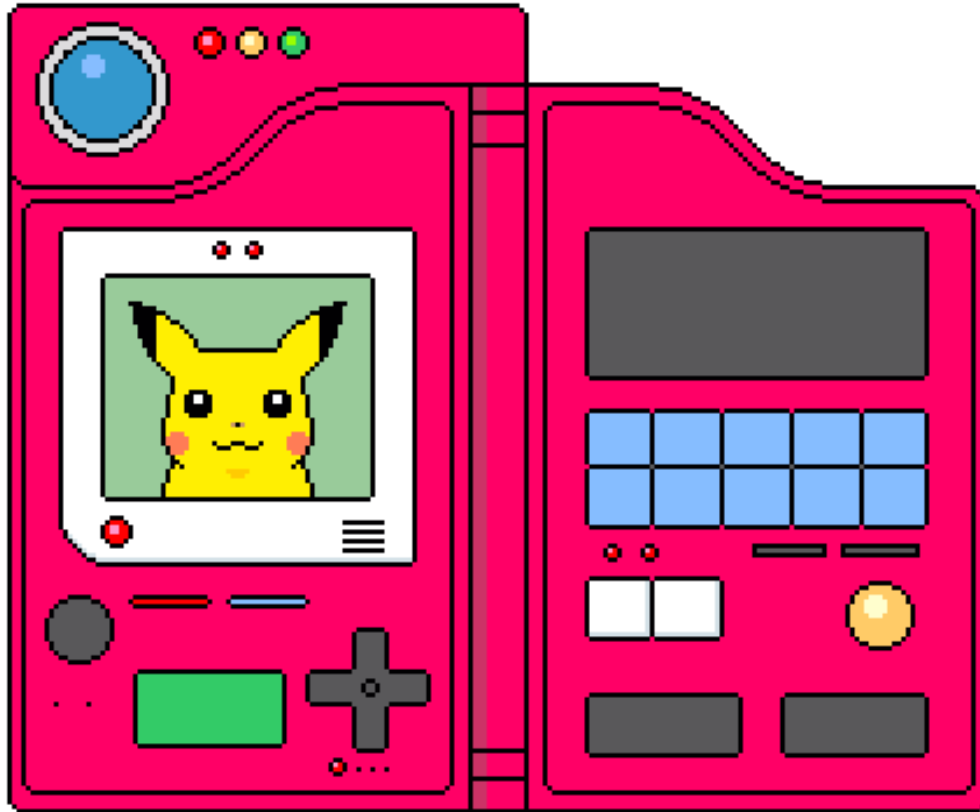


CSC 1310 PROGRAM 3

BINARY SEARCH TREES

POKEDEX



Write your own version of a Binary Tree class template that can hold values of any data type. Name this file **BinaryTree.h**. (more details about this class in the BINARYTREE.H section of this document)

Then, create a class for a Pokemon called **Pokemon** which should contain attributes for the Pokemon's index and the Pokemon's name. Name this file **Pokemon.h**. (more details about this class in the POKEMON.H section of this document)

Next, write the driver program (**Program3.cpp**) that will do the following:

- ☐ Create a Binary Tree object that can contain Pokemon objects in each tree node.
- ☐ Read all the Pokemon data from the given text file named **pokedex.txt** and for each index & name read in, create a Pokemon object. If this object is not yet in the Binary Search Tree, then insert it in the tree. Print out if the Pokemon read in was inserted in the tree or not.
- ☐ Keep track of how many Pokemon are inserted in the tree and print this number out.
- ☐ Display all the Pokemon from the Binary Search Tree in order by the index.

Refer to the sample output at the end of this document to see the format of how things should be printed out.

WHAT YOU WILL TURN IN

Zip the following files in a single zip file and upload the zip file to the submission folder in ilearn.

- ☐ **BinaryTree.h**
- ☐ **Pokemon.h**
- ☐ **Program3.cpp**
- ☐ **pokedex.txt**

BINARYTREE.H

This should be a template class which contains the following private & public members:

PRIVATE ATTRIBUTES & FUNCTIONS

- ☐ **TreeNode** `struct` containing a value of the template type, a pointer to the left **TreeNode** and a pointer to the right **TreeNode**
- ☐ A pointer to the root **TreeNode**
- ☐ Private functions:
 - **Insert** – recursive function that will insert a new node into the binary search tree
 - **destroySubTree** – recursive function that will delete all nodes in the binary search tree
 - **displayInOrder** – recursive function that will print out each node in order

PUBLIC FUNCTIONS

- ☐ **Constructor**
- ☐ **Destructor** (which should call **destroySubTree**)
- ☐ **insertNode** - should accept a template type as a parameter and create a new node with this parameter as its value and then call the **insert** function
- ☐ **displayInOrder** (should call the **displayInOrder** private function, sending the root)
- ☐ **searchNode** – should accept a template type as a parameter and return true if the node value is found and false otherwise

POKEMON.H

Pokemon class should hold the following (private) information:

- ☐ **Pokemon Index Number:** an integer
- ☐ **Pokemon Name:** a string

This class should also implement the following public functions:

- ☐ **Constructor** (setting the index & name) – use default arguments for the parameters; setting index to zero and name to “None”
- ☐ **setID**
- ☐ **setName**

- ☐ getID
- ☐ getName
- ☐ overloaded < operator (needed to be able to insert in binary search tree & search)
- ☐ overloaded == operator (needed to be able to search)
- ☐ overloaded << operator (needed to print out the Pokemon)

SAMPLE OUTPUT

```

Inserting Pokemon with index 83 into the Pokedex.
Inserting Pokemon with index 185 into the Pokedex.
Inserting Pokemon with index 177 into the Pokedex.
Inserting Pokemon with index 8 into the Pokedex.
Inserting Pokemon with index 178 into the Pokedex.
Inserting Pokemon with index 1 into the Pokedex.
Inserting Pokemon with index 5 into the Pokedex.
Inserting Pokemon with index 6 into the Pokedex.
Inserting Pokemon with index 11 into the Pokedex.
Inserting Pokemon with index 12 into the Pokedex.
Inserting Pokemon with index 14 into the Pokedex.
Inserting Pokemon with index 2 into the Pokedex.
Inserting Pokemon with index 3 into the Pokedex.
Inserting Pokemon with index 4 into the Pokedex.
Inserting Pokemon with index 9 into the Pokedex.
Inserting Pokemon with index 13 into the Pokedex.
Inserting Pokemon with index 28 into the Pokedex.
Inserting Pokemon with index 27 into the Pokedex.
Inserting Pokemon with index 26 into the Pokedex.
Inserting Pokemon with index 19 into the Pokedex.
Inserting Pokemon with index 17 into the Pokedex.
Inserting Pokemon with index 16 into the Pokedex.
Oops! The Pokemon with index 27 is already in the Pokedex.
Inserting Pokemon with index 132 into the Pokedex.
Inserting Pokemon with index 21 into the Pokedex.
Inserting Pokemon with index 30 into the Pokedex.
Inserting Pokemon with index 24 into the Pokedex.
Inserting Pokemon with index 23 into the Pokedex.
Inserting Pokemon with index 34 into the Pokedex.
Inserting Pokemon with index 35 into the Pokedex.
Inserting Pokemon with index 39 into the Pokedex.
Inserting Pokemon with index 37 into the Pokedex.
Inserting Pokemon with index 36 into the Pokedex.
Inserting Pokemon with index 42 into the Pokedex.
Inserting Pokemon with index 44 into the Pokedex.
Inserting Pokemon with index 45 into the Pokedex.
Inserting Pokemon with index 49 into the Pokedex.
Inserting Pokemon with index 53 into the Pokedex.
Inserting Pokemon with index 119 into the Pokedex.
Inserting Pokemon with index 188 into the Pokedex.
Inserting Pokemon with index 104 into the Pokedex.
Inserting Pokemon with index 100 into the Pokedex.
Inserting Pokemon with index 96 into the Pokedex.
Inserting Pokemon with index 84 into the Pokedex.
Oops! The Pokemon with index 185 is already in the Pokedex.

```

43 Pokemon have been added to the Pokedex!

*****POKEDEX:*****

Pokemon Index Number: 1	Name: Rhydon
Pokemon Index Number: 2	Name: Kangaskhan
Pokemon Index Number: 3	Name: Nidoran
Pokemon Index Number: 4	Name: Clefairy
Pokemon Index Number: 5	Name: Spearow
Pokemon Index Number: 6	Name: Voltorb

Pokemon Index Number: 8	Name: Slowbro
Pokemon Index Number: 9	Name: Ivysaur1
Pokemon Index Number: 11	Name: Lickitung
Pokemon Index Number: 12	Name: Exeggcute
Pokemon Index Number: 13	Name: Grimer
Pokemon Index Number: 14	Name: Gengar
Pokemon Index Number: 16	Name: Nidoqueen
Pokemon Index Number: 17	Name: Cubone
Pokemon Index Number: 19	Name: Lapras
Pokemon Index Number: 21	Name: Mew
Pokemon Index Number: 23	Name: Shellder
Pokemon Index Number: 24	Name: Tentacool
Pokemon Index Number: 26	Name: Scyther
Pokemon Index Number: 27	Name: Staryu
Pokemon Index Number: 28	Name: Blastoise
Pokemon Index Number: 30	Name: Tangela
Pokemon Index Number: 34	Name: Onix
Pokemon Index Number: 35	Name: Fearow
Pokemon Index Number: 36	Name: Pidgey
Pokemon Index Number: 37	Name: Slowpoke
Pokemon Index Number: 39	Name: Graveler
Pokemon Index Number: 42	Name: Mr. Mime
Pokemon Index Number: 44	Name: Hitmonchan
Pokemon Index Number: 45	Name: Arbok
Pokemon Index Number: 49	Name: Golem
Pokemon Index Number: 53	Name: Electabuzz
Pokemon Index Number: 83	Name: Ninetails
Pokemon Index Number: 84	Name: Pikachu
Pokemon Index Number: 96	Name: Sandshrew
Pokemon Index Number: 100	Name: Jigglypuff
Pokemon Index Number: 104	Name: Jolteon
Pokemon Index Number: 119	Name: Venemoth
Pokemon Index Number: 132	Name: Snorlax
Pokemon Index Number: 177	Name: Squirtle
Pokemon Index Number: 178	Name: Charmeleon
Pokemon Index Number: 185	Name: Oddish
Pokemon Index Number: 188	Name: Bellsprout