

Homework 4

100 Points

Binary Search Trees

Write a menu-driven program that implements a simple BST-based database.

Input File: academy_award_films.txt. Create the input file using the data shown on the next page (year and title of an Academy Award-winning film).

The program reads data from a text file and inserts them into the BST. Since the input file is already sorted, you will have to write code to randomize it before building the tree. Once the tree has been built, present the user with a menu:

S – Search by a unique key (year)

D – Recursive Depth-First Traversals: inorder, preorder, postorder

I – Iterative Depth-First Traversals: inorder, preorder, postorder (use a stack) // EC – 1Point

B – Tree Breadth-First Traversal: Print by level (Use a queue)

T – Print tree as an indented list (show level numbers)// see below

G – Print the items with a key greater than a given target key. Prompt the user to enter the target key. For instance, if the user enters 50, display the values greater than 50 that are found in the tree as shown below:

60 70 80

M - Show Menu, and

Q – Quit.

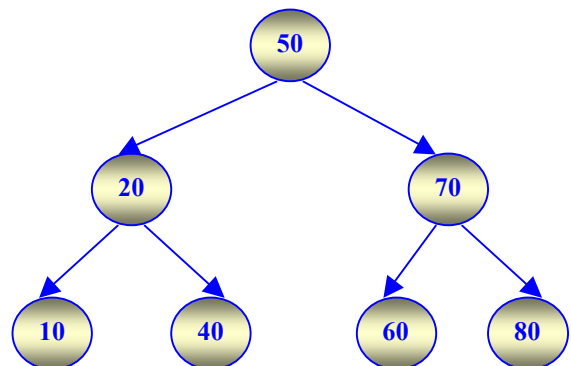
Provide at least one test case for each option, except for search, for which provide more test cases. Send the output to the screen. When done, copy and paste it to BST_Output.txt.

Grading

- | | |
|-------------------------------------|------|
| 1. Build BST | – 20 |
| 2. Recursive Depth-First Traversals | – 10 |
| 3. Breadth-First Traversal | – 10 |
| 4. Print Tree | – 15 |
| 5. Print sub-tree | – 20 |
| 7. Search BST | – 15 |
| 8. Destroy Tree | – 5 |
| 9. main() | – 5 |

Print tree as an indented list as shown below

```
1. 50
   2. 70
      3. 80
      3. 60
   2. 20
      3. 40
      3. 10
```



Input File: academy_award_films.txt. Create the input file using the data shown below (year and title of an Academy Award-winning film).

2013 12 Years a Slave
2012 Argo
2011 The Artist
2010 The King's Speech
2009 The Hurt Locker
2008 Slumdog Millionaire
2007 No Country for Old Men
2006 The Departed
2005 Crash
2004 Million Dollar Baby
2003 The Lord of the Rings: The Return of the King
2002 Chicago
2001 A Beautiful Mind
2000 Gladiator
1999 American Beauty
1998 Shakespeare in Love
1997 Titanic
1996 The English Patient