

Jewel Heist in the Magical Woods

Imagine you are the prince/ princess in an enchanted forest adventure. You carry a magical bag with a limited capacity of X units of power. There is a special tree in a forest that contains gems. Each gem has its unique magical power values. You need to pick gems from the forest's BST and keep them in your bag until your bag contains a total magical power of X units. And then..... RUNNNNN!!! Because there is a witch who caught you collecting her gems and now the witch is running after you.

In this program first insert some gems into the enchanted forest's BST using hard coded provided values. Each gem (node) should contain the gem name, its power, and the left and right node pointers in your program.

First, insert the gems in the following order, with the provided power values (hard coded values using call to the insert method. Do not take input from user).

1. "Diamond", 50
2. "Ruby", 30
3. "Sapphire", 70
4. "Pearl", 40
5. "Opal", 10
6. "Garnet", 60
7. "Zircon", 20
8. "Jade", 5

Then your menu-driven program should provide the following options:

- Display the magical tree. When user selects this option, ask which algorithm to use, pre-order, post-order, or in-order, then traverse accordingly and display the gems (nodes).
- Search for a gem by specifying its power.
- Find the gem with the highest magical power.
- Pluck (remove) a gem from the BST, and put it in your bag.

Your goal is to fill your magical bag with gems from the BST until it reaches a total magical power of X units.

- When it reaches the desired power of X units, display “You won! Now take your bag and run from the forest”.
- Ensure the bag is not overfilled. In case it is, display a message “You lost! Your bag burst. Now run and save yourself from the witch”.

Note: For ease, just use the int variable to store the current power of your bag.

```
Welcome to the magical forest.
How much magical power can your bag hold?
100

Select an option:
1. Display the magical tree.
2. Search for a gem by specifying its power.
3. Find the gem with the highest magical power.
4. Pluck a gem from the tree
1
Which traversal do you want?
1. Pre-order traversal
2. In-order traversal
3. Post-order traversal
1
Magical Tree (Pre-order): [Diamond, 50] [Ruby, 30] [Opal, 10] [Jade, 5] [Zircon, 20] [Pearl, 40] [Sapphire, 70] [Garnet, 60]

Select an option:
1. Display the magical tree.
2. Search for a gem by specifying its power.
3. Find the gem with the highest magical power.
4. Pluck a gem from the tree
1
Which traversal do you want?
1. Pre-order traversal
2. In-order traversal
3. Post-order traversal
2
Magical Tree (In-order): [Jade, 5] [Opal, 10] [Zircon, 20] [Ruby, 30] [Pearl, 40] [Diamond, 50] [Garnet, 60] [Sapphire, 70]

Select an option:
1. Display the magical tree.
2. Search for a gem by specifying its power.
3. Find the gem with the highest magical power.
4. Pluck a gem from the tree
1
Which traversal do you want?
1. Pre-order traversal
2. In-order traversal
3. Post-order traversal
3
Magical Tree (Post-order): [Jade, 5] [Zircon, 20] [Opal, 10] [Pearl, 40] [Ruby, 30] [Garnet, 60] [Sapphire, 70] [Diamond, 50]

Select an option:
1. Display the magical tree.
2. Search for a gem by specifying its power.
3. Find the gem with the highest magical power.
4. Pluck a gem from the tree
2
Enter the power to find a gem:
40
[Pearl, 40]
```

```
1. Display the magical tree.
2. Search for a gem by specifying its power.
3. Find the gem with the highest magical power.
4. Pluck a gem from the tree
3
Max power gem: [Sapphire, 70]

Select an option:
1. Display the magical tree.
2. Search for a gem by specifying its power.
3. Find the gem with the highest magical power.
4. Pluck a gem from the tree
4
Magical Tree (In-order): [Jade, 5] [Opal, 10] [Zircon, 20] [Ruby, 30] [Pearl, 40] [Diamond, 50] [Garnet, 60] [Sapphire, 70]
Which gem to pluck? Enter the power:
70
You plucked: [Sapphire, 70]
Power in bag: 70

Select an option:
1. Display the magical tree.
2. Search for a gem by specifying its power.
3. Find the gem with the highest magical power.
4. Pluck a gem from the tree
1
Which traversal do you want?
1. Pre-order traversal
2. In-order traversal
3. Post-order traversal
1
Magical Tree (Pre-order): [Diamond, 50] [Ruby, 30] [Opal, 10] [Jade, 5] [Zircon, 20] [Pearl, 40] [Garnet, 60]

Select an option:
1. Display the magical tree.
2. Search for a gem by specifying its power.
3. Find the gem with the highest magical power.
4. Pluck a gem from the tree
3
Max power gem: [Garnet, 60]

Select an option:
1. Display the magical tree.
2. Search for a gem by specifying its power.
3. Find the gem with the highest magical power.
4. Pluck a gem from the tree
4
Magical Tree (In-order): [Jade, 5] [Opal, 10] [Zircon, 20] [Ruby, 30] [Pearl, 40] [Diamond, 50] [Garnet, 60]
Which gem to pluck? Enter the power:
30
You plucked: [Ruby, 30]
Power in bag: 100
You won! Now take your bag and run from the forest
```