Exercise 05: BST::Delete

This week, you will implement the last remaining main operation of the `BST ADT` - the `delete` function.

Tasks

For this exercise, you are going to implement the following BST functions:

1. `BST_NODE* minimum(BST_NODE *)`

2. `BST_NODE* descendantSuccessor(BST_NODE *)`

3. `void delete(BST*, int)`

There are two types of successor, an ancestor type and a descendant type. The latter is what we need for deletion. Specifically, when we are deleting a node with two children, we replace the value of the node to be deleted with the value of its descendant type of successor. Then, we remove the node containing the descendant type of successor.

Consequently, removing the descendant type of successor will fall to the other case when deleting a node, i.e. when the node to be deleted has only one child or no children at all. In such cases, we simply replace the node to be deleted with its only child or NULL, respectively.

To simplify your task for this exercise and to focus your efforts on implementing a working delete function, instead of implementing the complete successor function (described in the BST handout), you will only need to implement a successor function that will return a descendant type of successor, i.e the `descendantSuccessor` function. It should simply return the minimum of the right subtree of a given node. That's why you also need to implement the `minimum` function, which is also described in the main BST handout and in `BST.h`.

Pre-Lab and In-Lab Exercises

1. For the Pre-Lab exercise, you are only required to implement the `minimum` and `descendantSuccessor` function.

2. You will be required to implement the `delete` function as your `In-Lab` exercise. Study the lecture slides and some additional notes in the comments of the template codes to learn more about the `delete` function.

Submission

Submit two separate compressed (.zip) folders to our Lab Google Classroom, one each for the Pre-Lab and the In-lab exercise.

For the Pre-lab exercise, name your compressed folder as `<CompleteLabSection><Surname>Ex05PreLab.zip` (e.g.U1-1LDelaCruzEx05PreLab.zip).

Correspondingly, for the In-lab exercise, name your compressed folder as `<CompleteLabSection><Surname>Ex05InLab.zip` (e.g.U1-1LDelaCruzEx05InLab.zip).

Each compressed folder should contain the following files respective to their template codes:

1. `BST.h` and `BST.c`
2. `main.c`
3. `program.cs`
4. `Makefile`

Questions?

If you have any questions, contact your lab instructor.