CSCI2100: Quiz 3

Name: Student ID:

**Problem 1 (15 marks).** Show the priority queue after a delete-min on the binary heap below:

```
5
\_  \_  \_  \_
7    6   15  17
\_  \_  \_  \
12   14  19  10  21
```

**Solution.**

```
5
\_  \_  \_  \_
6    8   15  17
\_  \_  \_  \
12   14  19  10  21
```

**Problem 2 (15 marks).** Show the priority queue after inserting the number 4 to the binary heap shown in Problem 1 (just the heap shown, not the one after the delete-min).

**Solution.**

```
3
\_  \_  \_  \_
5    6   8   17
\_  \_  \_  \
12   14  19  10  21
```

**Problem 3 (5 marks).** Show the array representation of the binary heap shown in Problem 1.

**Solution.** 3, 5, 8, 7, 6, 15, 17, 12, 14, 19, 10, 21.
**Problem 4 (15 marks).** Consider the following AVL-tree. Give the sequence of nodes visited when we use the tree to find the successor of 31.

![AVL tree diagram]

**Solution.** 40, 15, 29, 30, 32.

**Problem 5 (15 marks).** Consider the following AVL-tree again. Give the sequence of nodes visited when we use the tree to find the predecessor of 16.

![AVL tree diagram]

**Solution.** 40, 15, 29, 18, 17.

**Problem 6 (20 marks).** Consider the AVL-tree in Problem 5. Give the resulting AVL-tree after deleting 41.

**Solution.**
Problem 7 (15 marks). Consider the AVL-tree in Problem 5 (i.e., just the tree shown, not the one after deleting node 41). Give the resulting AVL-tree after inserting 11.

Solution.