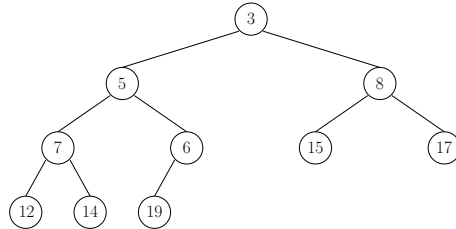


## CSCI2100/ESTR2102: Quiz 2

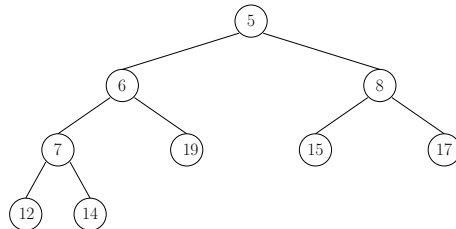
Hand-write all your solutions on paper. Take a picture of the paper **together with** your CUHK student ID. Upload the picture to Blackboard or email it to the instructor at [taoyf@cse.cuhk.edu.hk](mailto:taoyf@cse.cuhk.edu.hk). You must do so within **20 minutes** after the quiz has started.

**Note:** For the following problems, it suffices to give the final result; no intermediate steps are necessary.

**Problem 1 (20 marks).** Consider the binary heap below. Give the new binary heap after performing a delete-min operation.

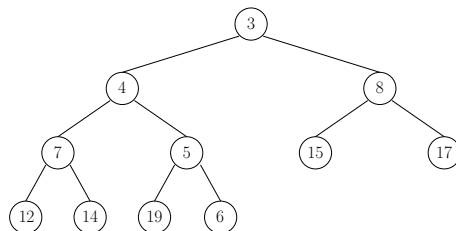


**Solution.**

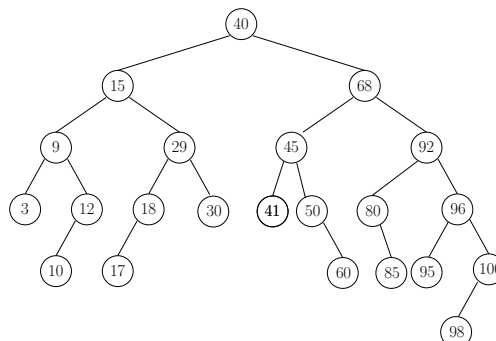


**Problem 2 (20 marks).** Give the new binary heap after inserting the number 4 into the binary heap in Problem 1 (just the heap shown, not the one after the delete-min).

**Solution.**



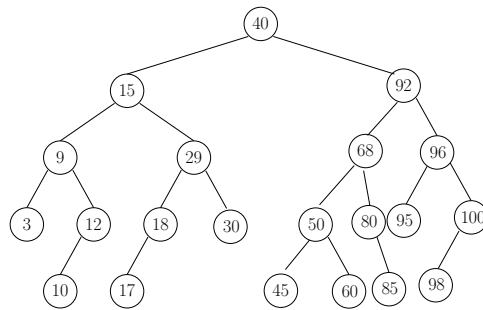
**Problem 3 (10 marks).** Consider the following AVL-tree. Give the sequence of nodes visited by a query that finds the predecessor of 55.



**Solution.** Nodes 40, 68, 45, 50, 60.

**Problem 4 (30 marks).** Consider the AVL-tree in Problem 3 again. Give the resulting AVL-tree after deleting 41.

**Solution.**



**Problem 5 (20 marks).** Consider the AVL-tree in Problem 3. Give the resulting AVL-tree after inserting 99.

**Solution.**

