**CS 515 Exercise D06: Binary Search Tree operations**

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**Lecture Section: 02**

**[20 pts. each]** Fill in each of the partial trees below with the key values that would appear at each node, given the naïve algorithm described in class. (Some nodes will be empty, and feel free to add a node if you need to.)

1. 5, 7, 16, 2, 9, 1, 8, 3, 4

5

16

9

8

7

3

1

2

4

1. 25, 36, 49, 64, 16, 9, 4, 1

25

49

64

36

9

16

4

1

1. 25, 49, 36, 64, 9, 16, 4, 1

25

64

36

49

16

4

9

1

*More on the back…*

**[10 pts. each]** For each of the trees below, indicate how the deletion of the indicated item should occur with the naïve algorithm. Cross out any nodes that would be deleted, and indicate where moving nodes would move to using an arrow. Mark the order that each operation would occur using numbers (1 for first step, 2 for second, etc.).

1. Remove the node with key 13

10

19

17

15

6

2

5

8

1

3

1. Remove the node with key 6

10

19

13

17

15

8

2

5

1

3

Set right child of 5 to 8

Delete 6

1. Remove the node with key 15

10

19

13

20

12

14

17

7

2

5

6

8

1

3

Set 15 to 17   
delete 17

1. Remove the node with key 10

13

19

14

17

20

15

7

2

5

6

1

3

Set 10 to 13

Set 13 to 14

Delete 14