Module 4 Reinforcement Exercises

5.7.6)

Worst case scenario for insertion sort would be on an array in descending order (or in the exact reverse order you are trying to sort). The first iteration would need to compare and swap n elements and each iteration after would need to do the same for n - 1 elements which would give you $\Omega(n^2)$

5.7.14)

Replacing 5 with an 18 in the given tree can be treated in a similar manner to a deletion of a node. 18 will be inserted in place of the 5 and since 18 is greater than the 5 its replacing we can simply compare the child elements and perform swaps with the min of the children until the min heap property is restored.

Steps:

1. Traverse tree until 5 is found

2. Replace 5 with 18.

3. Since 18 is greater than 5 check the left and right child and swap the min of those two which is 9 in this case.

4. Check the left and right child of 18 again and swap 18 with 12 since it's the min of the children

5. Check the left and right children one more time and now 18 is a leaf node (null children) and there is nothing left to check and the min heap property is restored.

Bad drawing of final heap below