EECE 7204-Assignment1

Sreejith Sreekumar

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1 Coding

1.1 Insertion Sort

```
#include <iostream>

void insertion_sort(int input[], int limit){

  int i, j, temp;
  for (i=0; i< limit; i++){
    for (j=i ;j>=0; j--){
      if(input[j] < input[j-1]){
            temp = input[j];
            input[j] = input[j-1];
            input[j-1] = temp;
      }
    }
  }
  return input;
}

int main(){

  int limit, i;

  std :: cout <<"Enter limit";
  std :: cin>> limit;

  int* input = new int[limit];
  std :: cout <<"Enter array to sort";
  for (i=0; i< limit; i++){
    std :: cin >> input[i];
  }

  insertion_sort(input, limit);
}
```

1.2 Merge Sort

2 Arrangement of Elements during Sorting

2.1 Insertion Sort

```
Input: {10, 5, 7, 9, 8, 3}
Iteration 1: {5, 10, 7, 9, 8, 3}
Iteration 2: {5, 7, 10, 9, 8, 3}
Iteration 3: {5, 7, 9, 10, 8, 3}
Iteration 4: {5, 7, 9, 8, 10, 3}
             {5, 7, 8, 9, 10, 3}
Iteration 5: {5, 7, 8, 9, 3, 10}
             {5, 7, 8, 3, 9, 10}
             {5, 7, 3, 8, 9, 10}
             {5, 3, 7, 8, 9, 10}
             {3, 5, 7, 8, 9, 10}
```

2.2 Quicksort

Input: 10, 5, 7, 9, 8, 3 Iteration 1: 10,

3 True or False

- n + 3 $\in \Omega(n) - False$

- n + 3 $\in \Omega(n^2) - True$
- n + 3 $\in \Theta(n^2) - False$
- $2^{n+1} \in \mathcal{O}(n+1) - False$
- $2^{n+1} \in \Theta(2^n) - True$

4 Master Method