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DATA STRUCTURE AND ALGORITHMS

ITWB2043

ASSIGNMENT 1

Section 2

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**ASSIGNMENT**

**QUESTION I**

Write and explain with a suitable example the pseudo code for bubble sort, selection sort and insertion sort techniques.

**Pseudocode**:

Selection Sort:

void selectionSort(int[] ar){

int i, j, temp;

for (i = 0; i ‹ ar.length; i++){

for (j = i+1; j ‹ ar.length; j++){

if (ar[i] ‹ ar[j]);{

temp = ar[i];

ar[i] = ar[j];

ar[j] = temp;

} } } }

Insertion Sort:

void insertionSort(int[] ar){

int i, j, temp;

for (i=0; i ‹ ar.length; i++){

for (j=i - 1; j >= ar.length/\*orMaxLength\*/; j--){

if(arr[i] > arr[j+1]){

temp = ar[i];

ar[i] = ar[j+1];

ar[j+1] = temp;

} } } }

Bubble Sort:

void bubbleSort(int ar[]){

int i, j, temp;

for (i = (ar.length - 1); i >= 0; i--){

for (j = 1; j ≤ i; j++){

if (ar[j-1] > ar[j]){

temp = ar[j-1];

ar[j-1] = ar[j];

ar[j] = temp;

} } } }

**Explanation**

Selection Sort

The Select Sort works by taking the value of the element in a cell(or of index value = x) and then comparing it with the other values and swapping them around if they’re bigger than the value compared to.

Eg: 3 1 5

3 is compared to 1, 3 is bigger therefore 1 is swapped with 3

1 is compared to 5 and 1 is smaller therefore no change

1 3 5 is how it looks currently

3 is compared to 5, 3 is smaller therefore no change.

And thus, final value will be 1 3 5 which will be the output.

Insertion Sort

Here the Sort works by comparing a value to the next and then taking both these values and comparing it to the one after and switching accordingly.

Eg: 3, 5, 2, 1, 6

3 and 5 are compared and no Change

3, 5, 2, 1, 6

3, 5 and 2 are compared, 2 is smaller than 5 and is also smaller than 3, there fore it is moved in front

2, 3, 5, 1, 6

2, 3, 5 are compared with 1 which is smaller than 2, 3, 5 and therefore is moved in front

1, 2, 3, 5, 6

1, 2, 3, 5 is compared with 6 which is bigger therefore it remains.

Bubble Sort

Bubble Sort Algorithm sorts the algorithm by taking the nth index value of an array and comparing its value with the (nth + 1) value of the array and then continuing with comparing the (nth + 1) with the (nth + 2) and until the final two values are compared, and this whole process is then repeated till it is sorted.

Eg: 3, 9, 5, 1

3 and 9 are compared, 3 is smaller therefore no change.

3, 9, 5, 1

9 and 5 are compared, 9 is bigger therefore 9 and 5 are swapped.

3, 5, 9 ,1

9 and 1 are compared, 9 is bigger therefore 9 and 1 are swapped.

3, 5, 1, 9

3 and 5 are compared, 3 is smaller therefore no change.

3, 5, 1, 9

5 and 1 are compared, 5 is bigger therefore 5 and 1 are swapped

3, 1, 5, 9

5 and 9 are compared, 5 is smaller therefore no change

3, 1, 5, 9

3 and 1 are compared, 3 is bigger therefore 3 and 1 are swapped

1, 3, 5, 9

3 is compared to 5, 3 is smaller therefore no change

5 is compared to 9, 5 is smaller therefore no change.

Final Output = 1, 3, 5, 9