

Question - 1

SCORE: 5 points

Question 1

How many inversions does the sequence E F J K Y T O R Z W contain?

- ☐ 5
- ☐ 6
- ☒ 7
- ☐ 8

Question - 2

SCORE: 5 points

Question 2

Given an array with reversed order elements, which sort has better Time complexity ?

- ☐ Insertion
- ☐ Selection
- ☒ They both have more or less the same time complexity

Question - 3

SCORE: 5 points

Question 3

Select the appropriate code that performs selection sort.

a)

```
int min;
for(int j=0; j<arr.length-1; j++)
{
    min = j;
    for(int k=j+1; k<=arr.length-1;
k++)
    {
        if(arr[k] < arr[min])
            min = k;
    }
    int temp = arr[min];
    arr[min] = arr[j];
    arr[j] = temp;
}
```

b)

```
int min;
for(int j=0; j<arr.length-1; j++)
{
    min = j;
    for(int k=j+1; k<=arr.length;
```

```

k++)
    {
        if(arr[k] < arr[min])
            min = k;
    }
    int temp = arr[min];
    arr[min] = arr[j];
    arr[j] = temp;
}

```

c)

```

int min;
for(int j=0; j<arr.length-1; j++)
{
    min = j;
    for(int k=j+1; k<=arr.length-1;
k++)
    {
        if(arr[k] > arr[min])
            min = k;
    }
    int temp = arr[min];
    arr[min] = arr[j];
    arr[j] = temp;
}

```

d)

```

int min;
for(int j=0; j<arr.length-1; j++)
{
    min = j;
    for(int k=j+1; k<=arr.length;
k++)
    {
        if(arr[k] > arr[min])
            min = k;
    }
    int temp = arr[min];
    arr[min] = arr[j];
    arr[j] = temp;
}

```

- ☒ a
- ☐ b
- ☐ c
- ☐ d

Question - 4

Question 4

SCORE: 5 points

Regarding Shell sort: given the following list of numbers: [5, 16, 20, 12, 3, 8, 9, 17, 19, 7], which answer illustrates the contents of the list after all swapping is complete for a gap size of 3?

- ☐ [3, 7, 5, 8, 9, 12, 19, 16, 20, 17]
- ☒ [5, 3, 8, 7, 16, 19, 9, 17, 20, 12]
- ☐ [5, 16, 20, 3, 8, 12, 9, 17, 20, 7]



Question - 5

Sorting

SCORE: 30 points

Your task is to implement a student ranking system using insertion sort. Your `sort()` method should sort students from highest to lowest GPA. You must also implement the `higher()` method used to compare the students' GPAs.

To Implement the `higher()` function use the `Student` class's `compareTo()` method

Student1 : name="Tina" , id = 1, gpa = 3.0

Student2 : name="Jim" , id =2 , gpa = 3.5

Then **`higher(Student1,Student2)` should return false**

and **`higher(Student2,Student1)` should return true**

Both methods to be implemented are in the `StudentRank` class. There is also a `Student` class that you should not modify.