Dr B R AMBEDKAR NATIONAL INSTITUTE OF TECHNOLOGY, JALANDHAR

B. Tech – 3ᵗʰ Semester

CSMI0201 DATA STRUCTURES AND ALGORITHMS

Assignment No 1

Date of Assignment - 04/09/2024   Date of Submission – 11/09/2024

Q1: Implement a function to rotate an array to the right by k positions. Analyze the time complexity for different values of k.

Q2: What is the time complexity of this function?

```
int findMax(int arr[], int n) {

    int max = arr[0];

    for (int i = 1; i < n; i++) {

            if (arr[i] > max) {

            max = arr[i];

    }

    }

    return max;

    }
```

Q3: What is the worst-case time complexity of this function?

```
void bubbleSort(int arr[], int n) {

    for (int i = 0; i < n-1; i++) {

        for (int j = 0; j < n-i-1; j++) {

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

                int temp = arr[j];

                arr[j] = arr[j+1];

                arr[j+1] = temp;
```

```
        }
      }
    }
}
```

Q4: What is the time complexity of this function?

```
void mergeArrays(int arr1[], int arr2[], int n1, int n2, int arr3[]) {

  int i = 0, j = 0, k = 0;

  while (i < n1 && j < n2) {

    if (arr1[i] < arr2[j]) {

      arr3[k++] = arr1[i++];

    } else {

      arr3[k++] = arr2[j++];

    }

  }

  while (i < n1) {

    arr3[k++] = arr1[i++];

  }

  while (j < n2) {

    arr3[k++] = arr2[j++];

  }

}
```

Q5: Consider an array of size n. What is the time complexity of inserting an element at the beginning of the array?

Q6: What is the time complexity of sorting an array using the C++ std::sort() function?

Q7: What is the time complexity of resizing an array when adding an element, given that the array's current capacity is full?

Q8: Given two sorted arrays of size m and n, what is the time complexity of merging them into a single sorted array?

Q9: What is the time complexity of inserting an element at the end of an array of size n?

Q10: Consider an array of size n. What is the time complexity of inserting an element at the beginning of the array?