THAPAR INSTITUTE OF ENGINEERING AND TECHNOLOGY

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ASSIGNMENT -1

Q1.

```
#include <stdio.h>
#include <conio.h>
using namespace std;

void create(int k)
{
   int arr[k];
   for (int i = 0; i < k; i++)
   {
      printf("Enter element at %d index: ", i);
      scanf("%d", &arr[i]);
   }
   printf("\n");
   printf("Array created: ");
   for (int i = 0; i < k; i++)
   {
      printf("%d ", arr[i]);
   }
}
void insertarr(int arr[], int num, int index, int n)
{
   for (int i = n - 1; i >= index; i--)
   {
      arr[i + 1] = arr[i];
   }
   arr[index] = num;
   n++;
   printf("Array create: ");
   for (int i = 0; i < n; i++)
   {
      printf("%d ", arr[i]);
   }
}
```

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```
void display(int *arr)
{
   for (int i = 0; arr[i] != '\0'; i++)
   {
      printf("%d ", arr[i]);
   }
}
void deletearr(int *arr, int n, int index)
{
   for (int i = index; i < n; i++)
   {
      arr[i] = arr[i + 1];
   }
   printf("\n");
   n--;
   for (int i = 0; i < n ; i++)
   {
      printf("%d ", arr[i]);
   }
}
int search(int arr[], int no, int n)
{
   int count = 0;
   for (int i = 0; i < n; i++)
   {
      if (arr[i] == no)
      {
         printf("Element found\n");
         count++;
         break;
      }
   }
   return count;
}

//create display insert delete search exit
```

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```
int main()
{
   int arr[100] = {1, 4, 7, 8, 9};
   int n = 5;
   printf("Size of array: %d", n);
   while (1)
   {
      printf("\nSelect one operation: \n 1.create\n 2.display\n 3.insert\n 4.delete\n 5.search\n 6.exit\n");
      int select;
      printf("Your selection: ");
      scanf("%d", &select);
      switch (select)
      {
      case 1:
         int k;
         printf("Enter size of array: ");
         scanf("%d", &k);
         create(k);
         break;
      case 2:
         display(arr);
         break;
      case 3:
         int num, ind;
         printf("Enter element to be inserted: ");
         scanf("%d", &num);
         printf("index: ");
         scanf("%d", &ind);
         insertarr(arr, num, ind, n);
         break;
      case 4:
         int index;
         display(arr);
         printf("\nEnter index: ");
         scanf("%d", &index);
         deletearr(arr, n, index);
```

```
            break;
        case 5:
            int ele;
            printf("Enter element to search: ");
            scanf("%d", &ele);
            int found;
            found = search(arr, ele, n);
            if (!found)
            {
                printf("Element not found\n");
            }
            break;
        case 6:
            printf("You entered 6, so terminated\n");
            break;
        default:
            printf("Enter no. between 1 to 6");
        }
        if (select == 6)
        {
            break;
        }
    }
    return 0;
}
```

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```
C:\Users\91981\OneDrive\Desktop\DS\1\1_array.exe
Size of array: 5
Select one operation:
 1.create
 2.display
 3.insert
 4.delete
 5.search
 6.exit
Your selection: 2
1 4 7 8 9
Select one operation:
 1.create
 2.display
 3.insert
 4.delete
 5.search
 6.exit
Your selection: 3
Enter element to be inserted: 3
index: 2
Array create: 1 4 3 7 8 9
Select one operation:
 1.create
 2.display
 3.insert
 4.delete
 5.search
 6.exit
Your selection: 6
You entered 6, so terminated
```

Q2.

```
#include <stdio.h>

int main()
{
        int i, j, k, Size;

        printf("Enter Number of elements in an array  :  ");
        scanf("%d", &Size);
        int arr[Size];
        printf("Enter elements of an Array \n");
        for (i = 0; i < Size; i++)
        {
        scanf("%d", &arr[i]);
        }

for (i = 0; i < Size; i++)
{
        for(j = i + 1; j < Size; j++)
        {
        if(arr[i] == arr[j])
        {
                for(k = j; k < Size; k++)
                {
                        arr[k] = arr[k + 1];
                        }

                        Size--;
```

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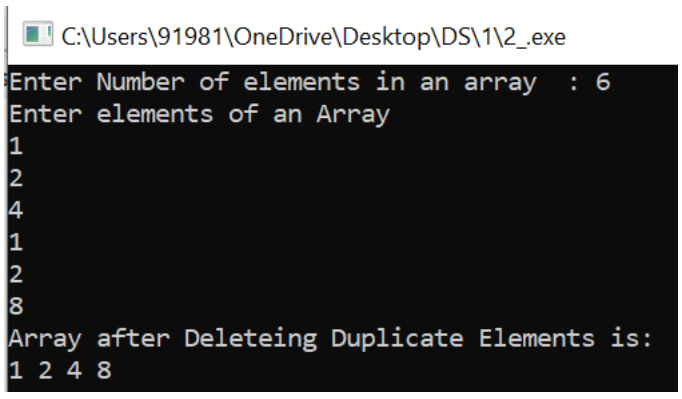
```
                        }
                }
        }


        printf("Array after Deleteing Duplicate Elements is:\n");
        for (i = 0; i < Size; i++)
        {
                printf("%d ", arr[i]);
        }
        return 0;
}
```

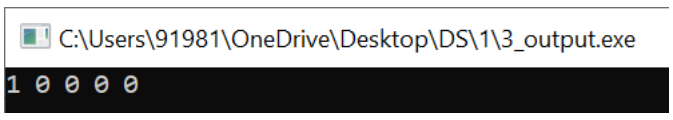


Q3

```
#include<iostream>
using namespace std;

int main(){
   int arr[5]={1};
   for (int i = 0; i < 5; i++)
   {
      cout<<arr[i]<<" ";
   }

   return 0;
}
```



Q4 (a)

```
#include<stdio.h>

void reverse(int *arr,int n){
   int i;
   for(i=n-1;i>=0;i--){
      printf("%d ",arr[i]);
   }

}
int main(){
```

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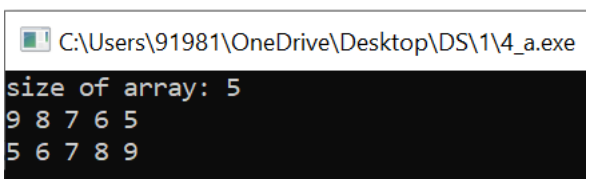
```
        int i;
    int arr[] = {9,8,7,6,5};


    int n = sizeof(arr)/sizeof(arr[0]);
    printf("size of array: %d\n",n);
    for(i=0;i<n;i++){
        printf("%d ",arr[i]);
    }
    printf("\n");
    reverse(arr,n);


    return 0;
}
```



(b)

```
#include <iostream>
using namespace std;

int main()
{
    int res[2][3],sum=0;
    int ar1[2][3] = {
        {0, 1, 2},
        {4, 1, 0}};
    int ar2[3][2] = {
        {2, 1},
        {2, 0},
        {1, 3}};
    printf("ar1: \n");
for (int i = 0; i < 2; i++)
{
    for (int j = 0; j < 3; j++)
    {
        printf("%d ", ar1[i][j]);
    }
    printf("\n");
}
printf("ar2: \n");
for (int i = 0; i < 3; i++)
{

    for (int j = 0; j < 2; j++)
    {
```

```
        printf("%d ", ar2[i][j]);
    }
    printf("\n");

}

  //multiply
  for (int i = 0; i < 2; i++)
  {
     for (int j = 0; j < 2; j++)
     {
        for (int k = 0; k < 3; k++)
        {
           sum += ar1[i][k] * ar2[k][j];
        }
           res[i][j] = sum;
           sum =0;
       }
    }

    printf("Multiply: \n");
    for (int i = 0; i < 2; i++)
    {
       for (int j = 0; j < 2; j++)
       {
          printf("%d ",res[i][j]);
       }
       printf("\n");
    }
    return 0;
}
```

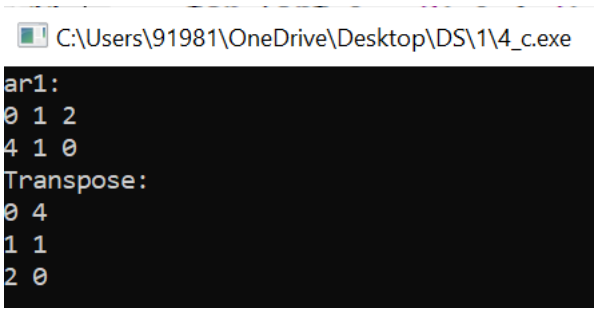
(c)

```
#include <iostream>
using namespace std;

int main()
{
   int ar1[2][3] = {
```

```
    {0, 1, 2},
    {4, 1, 0}};
          printf("ar1: \n");
  for (int i = 0; i < 2; i++)
  {
    for (int j = 0; j < 3; j++)
    {
       printf("%d ", ar1[i][j]);
    }
    printf("\n");
  }

  printf("Transpose:\n");
  for (int i = 0; i < 3; i++)
  {
    for (int j = 0; j < 2; j++)
    {
       printf("%d ", ar1[j][i]);
    }
    printf("\n");
  }
  return 0;
}
```



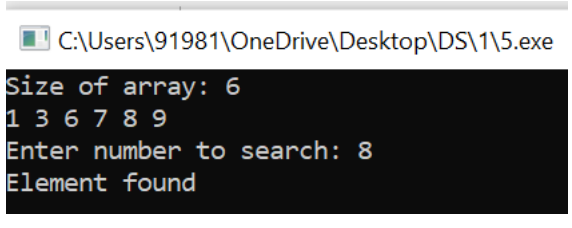
Q5

```
#include<iostream>
#include<algorithm>
using namespace std;

int main(){
   int arr[] ={1,8,3,7,6,9};
   int n = sizeof(arr)/sizeof(arr[0]);

   cout<<"Size of array: "<<n<<endl;
   sort(arr,arr+n);
   for(int i=0;i<n;i++){
      cout<<arr[i]<<" ";
   }
   cout<<endl;
   int num;
```

```
    cout<<"Enter number to search: ";
    cin>>num;
    if(binary_search(arr,arr+n,num)){
        cout<<"Element found";
    }
    else
        cout<<"Element not found";
    return 0;
}
```



Q6

```
#include <stdio.h>
void swap(int *xp, int *yp)
{
        int temp = *xp;
        *xp = *yp;
        *yp = temp;
}
void bubbleSort(int arr[], int n)
{
int i, j;
for (i = 0; i < n-1; i++)
        for (j = 0; j < n-i-1; j++)
                if (arr[j] > arr[j+1])
                        swap(&arr[j], &arr[j+1]); //call by reference
}

void printArray(int arr[], int size)
{
        int i;
        for (i=0; i < size; i++)
                printf("%d ", arr[i]);
        printf("\n");
}

// Driver program to test above functions
int main()
{
        int arr[] = {64, 34, 25, 12, 22, 11, 90};
        int n = sizeof(arr)/sizeof(arr[0]);
        bubbleSort(arr, n);
        printf("Sorted array: \n");
```

```
        printArray(arr, n);
        return 0;
}
```

```
C:\Users\91981\OneDrive\Desktop\DS\1\6.exe
Sorted array:
11 12 22 25 34 64 90
```

Q7

```
#include <iostream>

using namespace std;
int main()
{
   int arr[] = {1, 2, 3, 5,6};
   int n = sizeof(arr)/sizeof(arr[0]);
   cout<<"Size of array: "<<n<<endl;
   int sum;
   sum = ((n+1)*(n+2))/2;  //one no. is missing so n+1 total size of array
   printf("Sum of first %d natural no.= %d\n",n,sum);

   for(int i=0;i<n;i++){
      sum -= arr[i];  //subtracting sum of elements in given array from sum of first n natural no.
   }
   printf("missing no=%d",sum);

   return 0;
}
```

```
C:\Users\91981\OneDrive\Desktop\DS\1\7.exe
Size of array: 5
Sum of first 5 natural no.= 21
missing no=4
```