Computer Engineering Department, S.V.N.I.T.
Surat. B Tech (CO) –**II^nd Year semester-III** Course:
Data Structures
Assignment-I

1.) Write a C program to find maximum element in Array.

Code:

```c
//Question 1 : Write a C program to find maximum element in array
#include<stdio.h>
int main()
{
    int arr[100];
    int n;
    printf("Enter Number of Elements in Array(<100) :\n");
    scanf("%d", &n);
    if (n<1)
    {
        printf("Maximum Cant be Found\n");
        return 0;
    }
    printf("Enter Elements in Array :\n");
    for (int i=0;i<n;i++)
    {
        scanf("%d", &arr[i]);
    }
    int max = arr[0];
    if (n==1)
    {
        printf("The Maximum Element in Array : %d\n", max);
        return 0;
    }
    for (int i=1;i<n;i++)
    {
        if (arr[i]>max)
            max = arr[i];
    }
    printf("The Maximum Element in Array : %d\n", max);
    return 0;
}
```

Sample Test Cases:

```
Enter Number of Elements in Array(<100) :
10
Enter Elements in Array :
1 4 5 67 890 -12 1456 900 11 18
The Maximum Element in Array : 1456
```

```
Enter Number of Elements in Array(<100) :
1
Enter Elements in Array :
12
The Maximum Element in Array : 12
```

```
Enter Number of Elements in Array(<100) :
0
Maximum Cant be Found
```

2.) Write a C program to find minimum element in Array.

Code:

```c
// Question 2 : Write a C program to find minimum element in array.

#include<stdio.h>

int main()
{
    int arr[100];
    int n;

    printf("Enter Number of Elements in Array(<100) :\n");
    scanf("%d", &n);

    if (n<1)
    {
        printf("Minimum Cant be Found\n");
        return 0;
    }

    printf("Enter Elements in Array :\n");

    for (int i=0;i<n;i++)
```

```
    {
        scanf("%d", &arr[i]);
    }

    int min = arr[0];

    if (n==1)
    {
        printf("The Minimum Element in Array : %d\n", min);
        return 0;
    }

    for (int i=1;i<n;i++)
    {
        if (arr[i]<min)
            min = arr[i];
    }

    printf("The Minimum Element in Array : %d\n", min);

    return 0;
}
```

Sample Test Cases:

```
5
Enter Elements in Array :
-10 12 0 -121 1200
The Minimum Element in Array : -121
```

```
Enter Number of Elements in Array(<100) :
1
Enter Elements in Array :
45
The Minimum Element in Array : 45
```

```
Enter Number of Elements in Array(<100) :
0
Minimum Cant be Found
```

3.) Write a C program to find second maximum element in array.

Code:

```c
// Question 3 : Write a C program to find second maximum element in array.

#include<stdio.h>
#include <limits.h> // For INT_MIN

int main()
{
    int arr[100];
    int n;

    printf("Enter Number of Elements in Array(<100) :\n");
    scanf("%d", &n);

    if (n<2)
    {
        printf("Second Maximum Cant be Found\n");
        return 0;
    }

    printf("Enter Elements in Array :\n");

    for (int i=0;i<n;i++)
    {
        scanf("%d", &arr[i]);
    }

    int mxn1 = INT_MIN; // maximum in array
    int mxn2 = INT_MIN; // second maximum in array

    for (int i=0;i<n;i++)
    {
        if (arr[i] > mxn1)
        {
            mxn2 = mxn1; // Store the second max
            mxn1 = arr[i];
        }
        else
        {
            // ele > mxn2 && ele < mxn1
            if ((arr[i] > mxn2) && (arr[i] < mxn1))
            {
                mxn2 = arr[i];
            }
        }
    }

    printf("The Second Maximum Element in Array : %d\n", mxn2);
```

```
    return 0;
}
```

Sample Test Cases:

```
Enter Number of Elements in Array(<100) :
5
Enter Elements in Array :
12 34 -12 90 49
The Second Maximum Element in Array : 49
```

```
Enter Number of Elements in Array(<100) :
6
Enter Elements in Array :
-120 -12 0 12 345 199
The Second Maximum Element in Array : 199
```

```
Enter Number of Elements in Array(<100) :
1
Second Maximum Cant be Found
```

4.) Write a C program to find second minimum element in array.

Code:

```c
// Question 4 : Write a C program to find second minimum element in array.

#include<stdio.h>
#include <limits.h> // For INT_MAX1

int main()
{
    int arr[100];
    int n;
    printf("Enter Number of Elements in Array(<100) :\n");
    scanf("%d", &n);

    if (n<2)
    {
        printf("Second Minimum Cant be Found\n");
        return 0;
    }

    printf("Enter Elements in Array :\n");
```

```c
    for (int i=0;i<n;i++)
    {
        scanf("%d", &arr[i]);
    }

    int min1 = INT_MAX; // minimum in array
    int min2 = INT_MAX; // second minimum in array

    for (int i=0;i<n;i++)
    {
        if (arr[i] < min1)
        {
            min2 = min1; // Store the second min
            min1 = arr[i];
        }
        else
        {
            // ele > min1 && ele < min2
            if ((arr[i] > min1) && (arr[i] < min2))
            {
                min2 = arr[i];
            }
        }
    }

    printf("The Second Minimum Element in Array : %d\n", min2);

    return 0;
}
```

Sample Test Cases:

```
Enter Number of Elements in Array(<100) :
6
Enter Elements in Array :
1 34 23 57 99 77
The Second Minimum Element in Array : 23
```

```
Enter Number of Elements in Array(<100) :
6
Enter Elements in Array :
-12 -34 -120 0 21 1
The Second Minimum Element in Array : -34
```

```
Enter Number of Elements in Array(<100) :
1
Second Minimum Cant be Found
```

5.) Write a C Program to copy an array to another Array in reverse.

Code:

```c
// Question 5 : Write a C Program to copy an array to another array in reverse.

#include<stdio.h>

int main()
{
    int arr[100];
    int n;
    printf("Enter Number of Elements in Array(<100) :\n");
    scanf("%d", &n);

    if (n<1)
    {
        printf("Reverse Not Possible\n");
        return 0;
    }

    printf("Enter Elements in Array :\n");

    for (int i=0;i<n;i++)
    {
        scanf("%d", &arr[i]);
    }

    int copy[100];

    printf("Reverse Array is :\n");

    for (int i=0;i<n;i++)
    {
        copy[i] = arr[n-i-1];
        printf("%d ", copy[i]);
    }
    printf("\n");

    return 0;
}
```

Sample Test Cases:

```
Enter Number of Elements in Array(<100) :
10
Enter Elements in Array :
1 3 5 7 9 11 21 90 122 312
Reverse Array is :
312 122 90 21 11 9 7 5 3 1
```

6.) Write a C Program to concatenate arrays.

Code:

```c
// Question 6 : Write a C Program to concatenate arrays.

#include<stdio.h>

int main()
{
    int arr[100];
    int n;

    printf("Enter Number of Elements in Array(<100) :\n");
    scanf("%d", &n);

    printf("Enter Elements in Array :\n");

    for (int i=0;i<n;i++)
    {
        scanf("%d", &arr[i]);
    }

    int arr2[100];
    int m;

    printf("Enter Number of Elements in Array 2 (<100) :\n");
    scanf("%d", &m);

    printf("Enter Elements in Array 2 :\n");

    for (int i=0;i<m;i++)
    {
        scanf("%d", &arr2[i]);
    }

    int arr3[200];
    for (int i=0;i<n;i++)
    {
        arr3[i] = arr[i];
    }
```

```c
    for (int i=0;i<m;i++)
    {
        arr3[i+n] = arr2[i];
    }

    printf("The Concatenate Array is :\n");

    for (int i=0;i<(n+m);i++)
    {
        printf("%d ", arr3[i]);
    }
    printf("\n");

    return 0;
}
```

Sample Test Cases:

```
Enter Number of Elements in Array(<100) :
4
Enter Elements in Array :
1 8 97 -12
Enter Number of Elements in Array 2 (<100) :
6
Enter Elements in Array 2 :
45 87 90 112 -123 99
The Concatenate Array is :
1 8 97 -12 45 87 90 112 -123 99
```

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