LAB 7 (08 QUESTIONS)

Ex1: implement function **int countDiv3(int arr[], int size)** of which inputs are an array and its size.

This function will return the number of elements which is divisible by 3.

Initialize your array in **main**() (scanf is not required) and call **countDiv3**() to get your result

Sample run

```
arr[] = {1, 3, 5, 7, 9}

there are 2 elements divisible by 3
```

Ex2: implement function **int isAscending(int arr[], int size)** to check if elements in an array are in ascending order.

This function returns 1 if elements are in ascending order; otherwise returns 0.

Initialize your array in **main**() (scanf is not required) and call **isAscending**() to get your result

Sample run 1:

```
arr[] = {1, 3, 7, 0, 9}

Elements are NOT in ascending order
```

Sample run 2:

```
arr[] = {1, 3, 7, 8, 9}

Elements are in ascending order
```

Ex3: implement function **int greatestSum(int arr[], int size)** to find the greatest sum of 2 elements in an array

This function returns the greatest sum of 2 elements in an array

Initialize your array in **main**() (scanf is not required) and call **greatestSum**() to get your result

Sample run 1:

```
arr[] = {1, 3}

the greatest sum is 4
```

Sample run 2:

```
arr[] = {1, 3, 7, 0, 9}

the greatest sum is 16
```

Sample run 3:

```
arr[] = {37, 13, 37, 10, 9}

the greatest sum is 74
```

Ex4: implement function **int sumLast3(int arr[], int size)** to compute the sum of the last 3 elements in an array

Initialize your array in **main**() (scanf is not required) and call **sumLast3**() to get your result

Sample run

arr[]	**sumLast3(arr, size)**
{ }	0
{5}	5
{12, -3}	9
{20, 12, 25, 8, 36, 9}	53
{-1, 2, -3, 4, -5, 6, -7, 8, 9, 10}	27

Ex5: Initialize your 2D array in **main**() (scanf is not required) and find the minimum elements of the array

Sample run 1:

```
arr[] = { {1, 2}, {-2, 3} }

min = -2
```

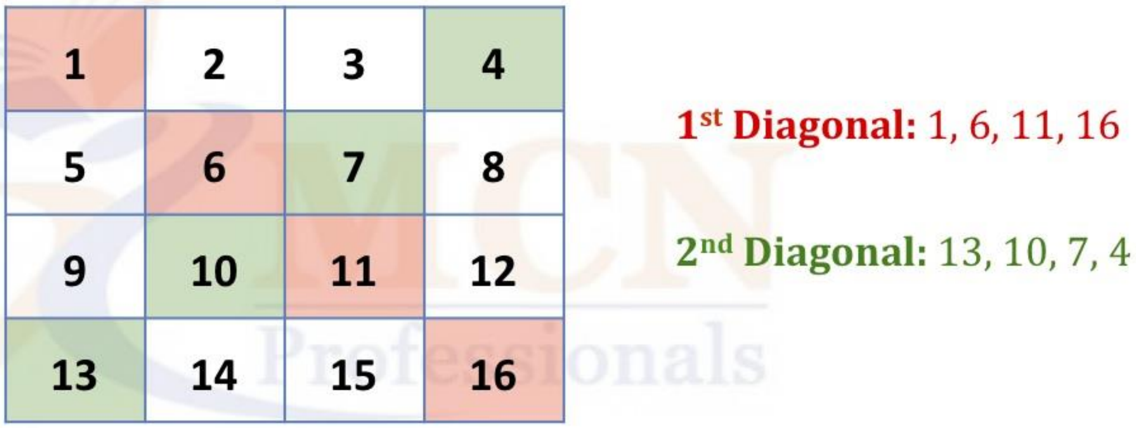
Sample run 2:

```
arr[] = { {1, 2, 4, -2}, {-2, -3, -1, 0} }

min = -3
```

Ex6: A square array is an array that has the number of rows equals the number of columns e.g. arr[2][2], arr[3][3]…

In a square array, there are 2 diagonals (see the picture)



Initialize a square array in **main**() and find 2 products of elements in 2 diagonal lines

Sample run

```
arr[4][4] = {

{1, 2, 3, 4},

{5, 6, 7, 8},

{9, 10, 11, 12},

{13, 14, 15, 16}

}

First product is 1056, second product is 3640
```

Ex7:

a) Implement function **int isPartOf(int x, int arr[], int size)** to check whether arr contains x or not.
This function returns 1 if arr contains x, otherwise returns 0.
Initialize your array in **main**() (scanf is not required) and call **isPartOf**() to get your result

Sample run 1:

```
arr[] = {37, 13, 37, 10, 9}

x = 10

10 is a part of arr
```

Sample run 2:

```
arr[] = {37, 13, 37, 10, 9}

x = 11

11 is NOT a part of arr
```

b) Implement function **int isSubset(int arrA[], int sizeA, int arrB[], int sizeB)** to check whether arrA is a subset of arrB.
U is a subset of V if and only if all elements in U belongs to V (i.e. V contains all elements of U)
The function returns 1 if arrA is a subset of arrB, otherwise returns 0.
Initialize your array in **main**() (scanf is not required) and call **isSubset**() to get your result
*Hint: use **isPartOf**() in **isSubset**()*

Sample run 1:

```
arrA[] = {37, 13, 37, 10, 9}

arrB[] = {37, 0, 13, 37, 3, 10, 9}

arrA is a subset of arrB
```

Sample run 2:

```
arrA[] = {37, 13, 37, 10, 9, 11}

arrB[] = {37, 0, 13, 37, 3, 10, 9}

arrA is NOT a subset of arrB
```

Ex8:

a) Initialize your array **arr**[] and number **pivot** in **main**(), print out all elements in arr that are less than or equal pivot and all elements that are greater than pivot

   Sample run

```
arr[] = {37, 13, 37, 10, 9}

pivot = 11

Less than or equal 11: 10, 9

Greater than 11: 37, 13, 37
```

b) Implement function **void partition(int arr[], int size, int pivot)** which does the following
   i. Move all elements less than or equal pivot to the left of array
   ii. Move all elements greater than pivot to the right of array

   Initialize your array and pivot in **main**() (scanf is not required) and call **partition**() to *modify your array* according to the above requirements.

   Sample run

```
arr[] = {37, 13, 37, 10, 9}

pivot = 11

arr[] = {10, 9, 37, 13, 37} //arr is modified after calling partition()
```