Roll No: BSEF18M002
Name: Muhammad Hanan Raza Bhatti
Quiz/Assignment Title: Online Quiz 1

Challenge-A:

Part A:

Time = O(N) where N is length of string.
Space = O(N) where N is length of string.

Part B:

Index **S**et**: [**i**][**j**][**k**]**

```
 if(i >= S && i < S+A  && j >= S && j < S+B  && k >= S && k < S+C)
 {
    requiredIndex = (i-S)*B*C + (j-S)*C + (k-S);
 }
 else
 {
    throw exception();

 }
```

Part C:

0				8
1			7	9
2		6		10
3	5			11
4				12

arrr:

0	1	2	3	4	5	6	7	8	9	10	11	12

```
int returnValue(int i,int j,int k)
{
  if(j == 0  || j == N-1  || i + j == N-1)
 {
    int index = i +2*j;
    return arr[index];
 }
 else
 {
    return 0;
 }
}
```

Part D:

value:

a	b	c	b	x	f	r	k	o	p	y	s	t	y	z	g	h	t	n	m	e

Column_Index:

0	2	3	4	7	1	2	3	4	5	1	0	4	2	6	7	0	3	4	7	1

Row_Pointer:

0	5	10	11	13	16	-1	20

Challenge-B:

```c
int returnIndexOfFirstOccurenceOfKey(int arr[], int n, int key)
{
	int low = 0, high = n - 1, mid;
	if (arr[low] == key)
		return 0;
	while (low <= high)
	{
		if (arr[low] > key || arr[high] < key)
			return -1;
		mid = high - (high - low) / 2;
		if (arr[mid] == key && arr[mid - 1] != key)
			return mid;
		else if (arr[mid] < key)
			low = mid + 1;
		else
			high = mid - 1;
	}
	return -1;
}
```