

(1)

Name = Owais Afridi

ID = 13686

~~~~~

Question = 02 :-

Program to implement insertion  
of elements :-

```
#include <stdio.h>
```

```
main () {
```

```
int LA[] = {1, 3, 5, 7, 8};
```

```
int items = 10, k = 3, n = 5;
```

```
int i = 0, j = n;
```

```
printf("The original array elements  
are: \n");
```

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

```
printf("LA [%d] = %d \n", i,  
LA[i]); n = n + 1;
```

```
while (j >= k)
```

```
{
```

2

```
LA[j+1] = LA[j];
```

```
j = j - 1;
```

```
}
```

```
LA[k] = item;
```

```
printf(" LA The array elements  
after insertion: \n");
```

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

```
printf("LA[%d] = %d \n", i,  
LA[i]);
```

```
}
```

∴ Output :-

The original array elements are:

LA[0] = 1

LA[1] = 3

LA[2] = 5

LA[3] = 7

LA[4] = 8

The array elements after  
insertion:

∴ next page :-

LA[0] = 1

LA[1] = 3

LA[2] = 5

LA[3] = 10

LA[4] = 7

LA[5] = 8

~~~~~

Question = 03

Answer:-

```
#include <iostream>
```

```
using namespace std;
```

```
void linearsearch(int a[], int n)
{
```

```
    int temp = -1;
```

```
    for (int i = 0; i < 7; i++)
    {
```

```
        if (a[i] == n)
```

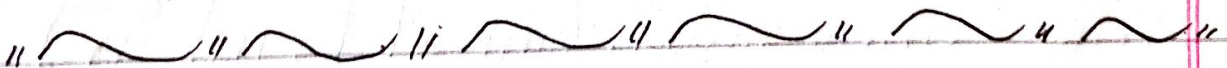
```
            cout << "Element found at location;"
```

```
            << i << endl;
```

:- next page:-

(4)

```
    }  
  }  
}  
int main()  
{  
  int arr [7] = {18, 36, 56, 61, 73, 87, 93};  
  cout << "Please enter an element  
  to search" << endl;  
  int num;  
  cin >> num;  
  
  linearsearch(arr, num);  
  
  return 0;  
}
```



Question = 01

| | | | | | | | | | |
|----|----|----|----|----|----|----|----|----|----|
| 10 | 14 | 19 | 26 | 27 | 31 | 33 | 35 | 42 | 44 |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |

Binary Search :-

Let assume that we need to search the location of value 31 using binary search.

First we shall determine half of the array by using this formula.

$$\text{mid} = \text{low} + (\text{high} - \text{low}) / 2$$

$$\text{Now mid} = 0 + (9 - 0) / 2 \Rightarrow 4.5$$

$$\text{mid} = 4$$

| | | | | | | | | | |
|----|----|----|----|----|----|----|----|----|----|
| 10 | 14 | 19 | 26 | 27 | 31 | 33 | 35 | 42 | 44 |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |

As we know that value at 4 position is smaller than our required value 31 so the required value will be in upper position.

next page :-

Now we change our low to $mid + 1$ and find a new mid value again.

$$low = mid + 1$$

$$mid = mid + 1 + (high - (mid + 1)) / 2$$

$$= 4 + 1 + (9 - (4 + 1)) / 2$$

$$= 5 + (9 - 5) / 2$$

$$= 5 + 2$$

$$mid = 7$$

| | | | | | | | | | |
|----|----|----|----|----|----|----|----|----|----|
| 10 | 14 | 19 | 26 | 27 | 31 | 33 | 35 | 42 | 44 |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |

Now value at location 7 is greater than required value 31 so it will be lower part.

Now calculate the mid again
So we have this time 5.

| | | | | | | | | | |
|----|----|----|----|----|----|----|----|----|----|
| 10 | 14 | 19 | 26 | 27 | 31 | 33 | 35 | 42 | 44 |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |

we conclude that our target value 31 is stored at location 5.

~~~~~