7)Implementation of insertion sort

```
#include<stdio.h>


void main()
{
   int i, j, k, n, temp, a[20], p=0;
   printf("Enter total elements: ");
   scanf("%d",&n);
   printf("Enter array elements: ");
   for(i=0; i<n; i++)
   scanf("%d", &a[i]);
   for(i=1; i<n; i++)
   {
      temp = a[i];
      j = i - 1;
      while((temp<a[j]) && (j>=0))
      {
         a[j+1] = a[j];
         j = j - 1;
      }
      a[j+1] = temp;
      p++;
      printf("\n After Pass %d: ", p);
      for(k=0; k<n; k++)
      printf(" %d", a[k]);
   }
   printf("\n Sorted List : ");
   for(i=0; i<n; i++)
```

```
    printf(" %d", a[i]);
}
```

Output

```
Enter total elements: 5
Enter array elements: 18 28 4672 3891 7382
After Pass 1:  18 28 4672 3891 7382
 After Pass 2:  18 28 4672 3891 7382
 After Pass 3:  18 28 3891 4672 7382
 After Pass 4:  18 28 3891 4672 7382
 Sorted List :  18 28 3891 4672 7382
```

8a)Implement Linear search algorithm to search an element in a given array.

```
#include <stdio.h>


int main() {
   int a[50], i, n, val, found;


   printf("Enter number of elements: ");
   scanf("%d", &n);


   printf("Enter Array Elements:\n");
   for (i = 0; i < n; i++)
      scanf("%d", &a[i]);


   while (1) {
      printf("Enter element to locate: ");
      scanf("%d", &val);


      found = 0;


      for (i = 0; i < n; i++) {
         if (a[i] == val) {
            printf("Element found at position %d\n", i + 1);
            found = 1;
            break;
         }
      }
```

```
    if (found == 0) {
        printf("Element not found\n");
        printf("Do you want to enter another element? (1 for Yes, 0 for No): ");
        int choice;
        scanf("%d", &choice);

        if (choice == 0) {
            break;
        }
    } else {
        break;
    }
  }

  return 0;
}
```

Output

```
Enter number of elements: 5
Enter Array Elements:
18 26 37 45 32
Enter element to locate: 19
Element not found
Do you want to enter another element? (1 for Yes, 0 for No): 1
Enter element to locate: 37
Element found at position 3
```

8b)Implement Binary search algorithm to search an element in a given array.

```
#include <stdio.h>


int main() {
   int a[50], i, n, val, found, att;


   printf("Enter array size : ");
   scanf("%d", &n);


   for (i = 0; i < n; i++)
      a[i] = 2 * i;


   printf("\n Elements in Unsorted Order \n");
   for (i = 0; i < n; i++)
      printf("%4d", a[i]);


   do {
      printf("\n Enter element to locate : ");
      scanf("%d", &val);


      found = 0;
      att = 0;


      for (i = 0; i < n; i++) {
         att++;
         if (a[i] == val) {
```

```
            printf("Found at index %d in %d attempts\n", i, att);
            found = 1;
            break;
        }
    }

    if (!found) {
        printf("Element not found\n");
        printf("Do you want to enter another element? (1 for Yes, 0 for No): ");
        int choice;
        scanf("%d", &choice);

        if (choice == 0) {
            break;
        }
    }
  } while (!found);
   return 0;
}
```

Output

```
Enter array size : 4
Elements in Unsorted Order
  0   2  4   6
 Enter element to locate : 8
 Element not found
Do you want to enter another element? (1 for Yes, 0 for No): 1
Enter element to locate : 4
Found at index 2 in 3 attempts
```