Practical exercises. Sorting and searching algorithms for one-dimensional array

Linear selection sort

```
#include<stdio.h>
#include <conio.h>
int main ( )
{
  int A[50], i, n, k, min, minind;
  clrscr( );
  printf("  Enter number of elements :  ");
  scanf("%d", &n);
  printf("  Enter elements of array:\n");
  for(i=0;i<n;i++)
  {
    scanf("%d", &A[i]);
  }
    for(i=0; i<n-1; i++)
    {
      min=A[i];
      minind=i;
      for( k=i+1; k<n; k++)
          {
            if (A[k]<min)
               {
                    min=A[k];
                    minind=k;
               }
           }
     A[minind]=A[i];
     A[i]=min;
    }
  puts("\n  Result of linear selection sort");
  printf("  Sorted array:\n);
  for (i=0;i<n;i++)
  {
    printf("   %d\n", A[i]);
  }
  getch( );
  return 0;
 }
```

Selection and change sort

```
#include<stdio.h>
#include <conio.h>
int main ( )
{
  int A[50], i, n, k, t;
  clrscr( );
  printf("  Enter number of elements:  ");
  scanf("%d", &n);
  printf("  Enter elements of array:\n");
  for(i=0;i<n;i++)
  {
    scanf("%d", &A[i]);
  }
    for(i=0; i<n-1; i++)
    {

       for( k=i+1; k<n; k++)
          {
            if (A[k]<A[i])
               {
                    t=A[k];
                    A[k]=A[i];
                    A[i]=t;
               }
          }

    }

puts("\n Result of selection & change sort");
  printf("  Sorted array:\n");
  for (i=0;i<n;i++)
  {
    printf("    %d\n", A[i]);
  }
  getch( );
  return 0;
 }
```

Bubble sort

```
#include<stdio.h>
#include <conio.h>
int main ( )
{
  int A[50], n, i, k, t;
  clrscr( );
  printf("  Enter number of elements:  ");
  scanf("%d", &n);
  printf("  Enter elements of array:\n");
  for(i=0;i<n;i++)
  {
    scanf("%d", &A[i]);
  }
   for(i=0; i<n-1; i++)
    {
     for( k=0; k<n-1-i; k++)
          {
            if (A[k]>A[k+1])
               {
                    t=A[k];
                    A[k]=A[k+1];
                    A[k+1]=t;
               }
          }
     }
  puts("\n  Result of bubble sort");
  printf("  Sorted array:\n");
  for (i=0;i<n;i++)
  {
    printf("  %d\n", A[i]);
  }
  getch( );
  return 0;
 }
```

Sequential search

```
#include<stdio.h>
#include <conio.h>
int main ( )
{
  int A[50], n, i, ind, key;
  clrscr( );
  printf("  Enter number of elements:  ");
  scanf("%d", &n);
  printf("  Enter elements of array:\n");
  for(i=0;i<n;i++)
  {
    scanf("%d", &A[i]);
  }
printf("  Enter key of searching element:  ");
  scanf("%d", &key);
  ind= -1;
  for(i=0; i<n; i++)
    {
      if (A[i]==key)
         {
            ind= i; break;
         }
     }
  puts("\n Result of sequantial search");
  if (ind >=0)
{
printf("Position of element is:%d\n",ind+1);
}
  else
{
printf("  Element was not found\n");
 }
 getch( );
 return 0;
 }
```

Binary search **(only for sorted arrays)**

Corresponding piece of code: (to be substituted in the program for sequential search)

```
int left, right, m;
 left=0; right=n-1;
    while (left<=right)
{
  m=(left+right)/2;
  if(key<A[m]) {right=m-1;}
  else { if(key>A[m]) {left=m+1;}
         else { ind=m; break;} }
 }
puts("\n Result of binary search");
```