Examples about searching

Ex: Linear search

```
#include <iostream>
#include <string>
using namespace std;

int main()
{
//Takes size of array from user
   int size;
cout<<"Enter the size of array "<<endl;
cin>>size;



int arr[size],key,i;
//Takes elements of array from user
for(int a=0; a<size; a++)
{
   cout<<"Enter elemen "<<a<< " of the array"<<endl;
   cin>>arr[a];
}

//display array
for(int b=0;b<size;b++)
{
```

```
    cout<<"arr["<<b<<"]=";
    cout<<arr[b]<<endl;
}

cout<<"Enter your target element "<<endl;
//takes target from user
cin>>key;

for(i=0; i<size; i++)
{
    if(key==arr[i])
    {
        cout<<"Key found at the index number: "<<i<<endl;
break;
    }
}


  if(i!=size)
{
    cout<<"key found";
}
else
    {
```

```
      cout<<"key not found in array "<<endl;
   }
return 0;
}
```

Ex: Binary search

```
#include <iostream>
#include <string>
using namespace std;

int main()
{
//takes size of array from user
   int size;
   cout<<"enter size of the array: "<<endl;
   cin>>size;

//takes inputs from user
  int arr[size], i, num, first, last, middle;
            for (i=0; i<size; i++)
            {
            cout<<"Enter the element "<<i<<" of the array: ";
             cin>>arr[i];
            }
```

```
//takes target element from user
        cout<<"Enter the number that you want to search:";
    cin>>num;


        first = 0;
        last = size-1;
        middle = (first+last)/2;
        while (first <= last)
        {
          if(arr[middle] < num)
          {
                first = middle + 1;


          }
          else if(arr[middle] == num)
          {
                cout<<num<<" found in the array at the location "<<middle+1<<"\n";
         break;
      }
      else {
         last = middle - 1;
      }
      middle = (first + last)/2;
    }
    if(first > last)
```

```
        {
          cout<<num<<" not found in the array";
        }
        return 0;
}
```

Ex: binary search (recursive)

```
#include <iostream>
using namespace std;

int binarySearch(int arr[],int key, int first, int last)
{
  if (last >= first)
    {
      int middle = (first + last) / 2;

      if (key == arr[middle])
        return middle;
      else if (key < arr[middle])
        return binarySearch(arr, key, first, middle - 1);
      else
        return binarySearch(arr, key, middle + 1, last);
    }
  else
    return -1;
}
```

```
int main()
{
  int arr[] = {1, 3, 5, 7, 9, 11, 13, 15, 17, 19};
  int myfirst = 0;
  int mylast = 10;
  int target;

  cout << "Please enter a number to find: " << endl;
  cin >> target;

  int resultloc = binarySearch(arr, target, myfirst, mylast);
  if ( resultloc == -1 )
    {
      cout << "number not found" <<endl;
    }
  else
    {
      cout <<" number is found in position " << resultloc + 1 << endl;
    }

  return 0;
}
```