Question:
Develop a program to demonstrate concept of recursion (Factorial / Binary Search / Towers of Hanoi)

Aim:
To implement binary search using recursion

Algorithm:

- Average the low and high value to obtain the midpoint
- Check if the value at the index of the midpoint is equal to the key
- If the midpoint is equal to the key then return mid
- If the midpoint is lesser than the key then return the same function but with low as mid+1
- If the midpoint is greater than the key then return the same function but with high as mid -1
- If the low and high values are the same then return 0 and print that the key is not in the array.

Program

```
#include<stdio.h>

int binsearch(int arr[],int key,int lo, int hi){ //recursive method to
implement binary search function
    int mid=(lo+hi)/2;
        if(arr[mid]==key)
            return mid;
        else if(hi==lo){
            printf("key not found ");
            return -1;
            }
        else if(arr[mid] > key)
            return binsearch(arr,key, lo, hi-1);
        else
            return binsearch(arr,key, lo+1, hi);
}

int main(){
    int arr[]={1,2,4,5,6};
    printf("%d ",binsearch(arr,3,0,5));
    }
```

Output

```
PS E:\code\DS-LAB> cd "e:\code\DS-LAB\" ; if ($?) { gcc binarysearch.c -o binarysearch } ; if ($?) { .\binarysearch }
key not found -1
PS E:\code\DS-LAB> cd "e:\code\DS-LAB\" ; if ($?) { gcc binarysearch.c -o binarysearch } ; if ($?) { .\binarysearch }
key not found -1
```