Program 6(Binary Search- Path Testing)

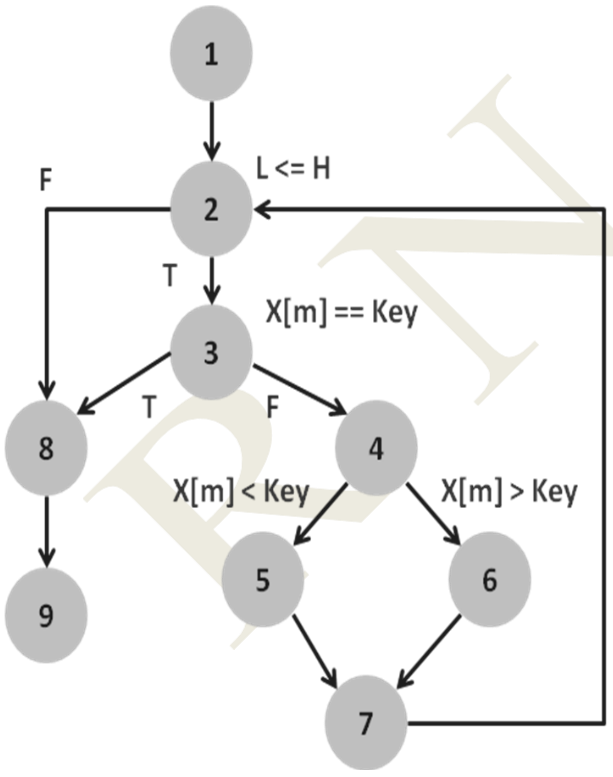
/* Design, develop a code and run the program in any suitable language to implement the binary search algorithm. Determine the basis paths and using them derive different testcases execute these test cases and discuss the test results */

```
#include<stdio.h>
Int binsrc(int x[ ],int low,int high,int key)
{
int mid;
while(low<=high)
{
mid=(low+high)/2;
if(x[mid]==key)
return mid;
if(x[mid]<key)
low=mid+1;
else
high=mid-1;
}
return-1;
}

int main()
{
int a[20],key,i,n,succ;
printf("Enter the n value");
scanf("%d", &n);
if(n>0)
   {
      Printf ("enter the elements in ascending order\n");
      for(i=0;i<n;i++)
      scanf ("%d", &a[i]);

      printf ("enter the key element to be searched\n");
      scanf("%d", &key);

 succ=binsrc(a,0,n-1,key);
if(succ>=0)
     printf ("Element found in position=%d\n",succ+1);
else
     printf ("Element not found\n");
 }
else
    printf ("Number of element should be greater than zero\n");
    return 0;
}
```

Binary Search function with line number

```
Int binsrc( int x[],int low,int high,int key)
{
Int mid;                                   1
while(low<=high)                           2
{
mid=(low+high)/2;
if(x[mid]==key)                            3
 return mid;                               8
if(x[mid]<key)                             4
 low=mid+1;                                5
 else
 high=mid-1;                               6
}                                          7
return-1;                                  8
}                                          9
```

ProgramGraph–forBinarySearch



Independent Paths:

#Edges=11, #Nodes=9, #P=1

V(G)= E-N+2P = 11-9+2 = **4**

P1: 1-**2**-3-8-9

P2: 1-**2**-3-4-5-7-**2**

P3: 1-**2**-3-4-6-7-**2**

P4: 1-**2**-8-9

Pre-Conditions/Issues:

Array has Elements in Ascending order	**T/F**
Key element is in the Array	**T/F**
Array has ODD number of Elements	**T/F**

TestCases–BinarySearch

Paths	Inputs		Expected Output	Remarks
	X[]	Key		
P1: 1-2-3-8-9	{10,20,30,40,50}	30	Success	Key $\in$ X[] and Key==X[mid]
P2: 1-2-3-4-5-7-2	{10,20,30,40,50}	20	Repeat and Success	Key < X[mid] Search 1st Half
P3: 1-2-3-4-6-7-2	{10,20,30,40,50}	40	Repeat and Success	Key > X[mid] Search 2nd Half
P4: 1-2-8-9	{10,20,30,40,50}	60 OR 05	Repeat and Failure	Key $\notin$ X[]
P4: 1-2-8-9	Empty	Any Key	Failure	Empty List