

BINARY SEARCH

Aim

Write a C program to Implement Binary Search.

1 Binary Search Algorithm

1.1 Algorithm

```
Step 1: Set low=0, high=n-1, flag=0
Step 2: while(low<=high) do
    mid = (low+high)/2
    if a[mid] = x
        flag =1
        break
    else if a[mid]>x
        high = mid-1
    else
        low = mid+1
Step 3: if flag=0
    print "x not found"
    else
    print "x found at mid"
```

1.2 Program

```
#include <stdio.h>
void main()
{
    int A[20];
    int c=0;
    int i=0;
    int a,N,s,l,m;
    printf("Enter N\n");
```

1.2 Program

```
scanf("%d",&N);
if(N!=0){
printf("Enter sorted list\n");
while(i<N)
{
    scanf("%d",&A[i]);
    i++;
}

printf("Input element to be searched\n");
scanf("%d",&a);

s=0;
l=N-1;

while(l>=s)
{
    m=(l+s)/2;

    if(A[m]==a)
    {
        printf("Element found at index: %d \n",m);
        c=1;
        break;
    }

    if(A[m] > a)
        l=m-1;

    if(A[m] < a)
        s=m+1;
}

if(c==0)
printf("\nNot found");
printf("\n");}
else
    printf("Empty\n");
}
```

1.3 Sample Input and Output

```
Enter N
5
Enter sorted list
2
5
6
8
9
Input element to be searched
6
Element found at index: 2
```

Figure 1: Output

1.4 Result

Successfully implemented Binary search algorithm.