

## AP COMPUTER SCIENCE A – BINARY SEARCH CLASSWORK

The file BinarySearchStub.java is shown below.

```
import IO.ConsoleInput;
import IO.FileInput;
/**/
public class BinarySearch {
    /**/
    public static void main ( String [] arg ) {
        /**/
        int num, index;
        int [] list;
        ConsoleInput ci;
        FileInput fi;
        String iFile;
        /**/
        System.out.println();
        ci=new ConsoleInput();
        iFile=ci.readString("input file = ? ");
        num=ci.readInt("    integer = ? ");
        ci.close();
        /**/
        fi=new FileInput(iFile);
        list=fi.loadFileAsIntArray();
        fi.close();
        /**/
        index=indexOf(list,num);
        System.out.println();
        if ( index < 0 ) System.out.println( "\"list\" does not contain " + num );
        else             System.out.println( "\"list\" contains " + num + " at index = " + index );
        /**/
        return;
    }
    /**/
    private static int indexOf ( int [] list, int num ) {
        /**/
        int b, m, e, listM;
        /**/
        b=0;
        e=list.length-1;
        /*
        *   (1) if list[b] > num or list[e] < num return -1
        */
        while ( true ) {
            /**/
            m=(b+e)/2;
            listM=list[m];
            /*
            *   (2) if listM = num return m --
            *       num has been found in the list.
            *
            *   (3) if b = m or m = e return -1 --
            *       this will eventually happen if num is not in the list.
            *
            *   (4) redefine b or e according to if listM is greater than
            *       or less than num.
            */
        }
    }
}
```

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Starting with `BinarySearchStub.java`, make a program `BinarySearch` by adding the needed code to method `indexOf`. When you run the code, the console should look like, *e.g.*,

```
input file = ? sort_list.txt  
integer = ? 425
```

```
"list" contains 425 at index = 47
```

or

```
input file = ? sort_list.txt  
integer = ? 618
```

```
"list" does not contain 618
```

where the bold print is user input.