1. Given the following code for binary search, binarySearch()and the content of the list below**,** fill *Table 1* below with the values of *first*, *last*, *mid* and *list*[*mid*] when calling the function binarySearch(52) i.e. when searching for 52 in the list,

**int** binarySearch **(int** item**)** **{**

**int** *first* **=** 0**; int** *last* **=** length **–** 1**; int** *mid***;**

**bool** found **=** false**;**

**while(**first **<=** last **&& !**found**)** **{**

mid **= (**first **+** last**) /** 2**;**

**if(**list**[**mid**] ==** item**)**

found **=** true**;**

**else**

**if(**list**[**mid**] >** item**)**

last **=** mid **-** 1**;**

**else**

first **=** mid **+** 1**;**

**}**

**if(found)**

**return** mid**;**

**else**

**return** –1**;**

**}**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | ***0*** | ***1*** | ***2*** | ***3*** | ***4*** | ***5*** | ***6*** | ***7*** | ***8*** | ***9*** | ***10*** | ***11*** | ***12*** | ***13*** | ***14*** | ***15*** | ***16*** | ***17*** | ***18*** | ***19*** |
| *List=* | *2* | *5* | *7* | *15* | *21* | *28* | *29* | *37* | *45* | *51* | *57* | *61* | *72* | *78* | *81* | *87* | *91* | *96* | *97* | *101* |

*Answer:*

*Table 1*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| *Iteration* | *first* | *last* | *mid* | *List[mid]* |
| *1* | *0* | *19* | *9* | *51* |
| *2* | *10* | *19* | *14* | *81* |
| *3* | *10* | *14* | *11* | *61* |
| *4* | *10* | *10* | *10* | *57* |
| *5* |  |  |  |  |
| *6* |  |  |  |  |