

Binary Search Algorithm – part 2

1. The Python code is given for the *binary search* algorithm.

Show the progression of the algorithm as it searches for the name specified above each table.

Complete each table below by writing the S for start, M for mid, and E for end under the column corresponding to the index value that each is set to for each iteration of the loop as the algorithm progresses.

You might not require all rows. With 10 items in the list, the maximum iterations of the loop is:

$$\lceil \log_2 10 \rceil = 4$$

```

1 def binary_search(arr, target)
2     start = 0
3     end = len(arr) - 1
4     while start <= end:
5         mid = (start + end) // 2
6         if arr[mid] == target:
7             return mid
8         if arr[mid] < target:
9             start = mid + 1
10        else:
11            end = mid - 1
12    return -1
    
```

Searching for: **Bob**

	0	1	2	3	4	5	6	7	8	9
	Adam	Amy	Ben	Betty	Bill	Bob	Brian	Chloe	Chris	Zoe
1	S				M					E
2						S		M		E
3						S,M	E			
4										

return value:

Searching for: **Bart**

	0	1	2	3	4	5	6	7	8	9
	Adam	Amy	Ben	Betty	Bill	Bob	Brian	Chloe	Chris	Zoe
1	S				M					E
2	S	M		E						
3			S,M	E						
4		E	S							

return value:

Searching for: **Bill**

	0	1	2	3	4	5	6	7	8	9
	Adam	Amy	Ben	Betty	Bill	Bob	Brian	Chloe	Chris	Zoe
1	S				M					E

return value: