University of Asia Pacific

Name : Md. Azim Islam

ID : 19201026

Course : CSE 208

Problem : Binary Search on a sorted array of two digit numeric ID`s.

Date : 15 - 07 - 2021

Submitted To,

Dr. Nasima Begum,

Assistant Professor, University of Asia Pacific

Problem: Binary Search on a sorted array of two digit numeric ID`s.

Introduction:

The Sample Inputs are: **11, 13, 15, 17, 21, 23, 24, 26, 28, 33, 36, 39, 41, 43, 46, 51, 55, 57, 67, 70.**

Searching element: **26**

Implementation:

Pseudo code of Iterative Binary Search:

```
def binSearch(array, element):
    """
        Iterative implementation of Binary Search.
    """
    i = 0
    j = len(array)

    mid = (i+j)//2 #Integer division
    while i < j:
         if array[mid] == element:
            print(f"{element} was found on {mid}th index")
            break

        if array[mid] < element:
            i = mid + 1

        elif array[mid] > element:
            j = mid - 1

        mid = (i+j)//2
```

Pseudo code of Recursive Binary Search:

```
    def binSearchRec(array, i, j, mid, element):
        """
            Recursive implementation of Binary Search.
        """
        if array[mid] < element:
            return binSearchRec(array, mid, j, (i+j)//2, element)

        elif array[mid] > element:
            return binSearchRec(array, i, mid, (i+j)//2, element)

        elif array[mid] == element:
            print(f"{element} was found on {mid}th index")

        if not i<j:
            print(f"{element} was not found on.")
```

Simulation:

Sorted Constructed Array

11	13	15	17	21	23	24	26	28	33	36	39	41	43	46	51	55	57	67	70

Sorted Constructed Array - Iteration 1

LOW:= 0
HIGH:= 19
MID:= (integer)(LOW+HIGH)/2 == 10

11	13	15	17	21	23	24	26	28	33	36	39	41	43	46	51	55	57	67	70
0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19

Sorted Constructed Array - Iteration 2

LOW:= 0
HIGH:= 9
MID:= (integer)(LOW+HIGH)/2 == 4

11	13	15	17	21	23	24	26	28	33	36	39	41	43	46	51	55	57	67	70
0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19

Sorted Constructed Array - Iteration 3

LOW:= 5
HIGH:= 9
MID:= (integer)(LOW+HIGH)/2 = 7

11	13	15	17	21	23	24	26	28	33	36	39	41	43	46	51	55	57	67	70
0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19

Output:

```
26 was found on 7th index
```