### **Binary Search**

 The condition for binary search is that the list of elements must be sorted

## Example:

Α	4	8	10	15	18	21	24	27	29	33	34	37	39	41	43
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14

- The binary search will always search the element in the middle of the list and split it into 2 parts
- For performing binary search we need 3 index that is lower, higher, middle value

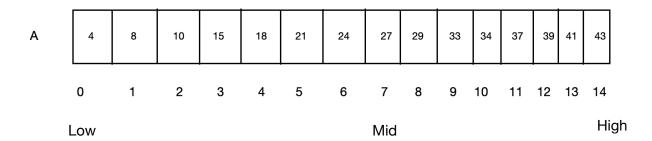
$$mid = [l + h/2]$$

- Low will point at initial value that is index 0
- high will point at the end of the list
- Mid will point the the centre most value in a list

 If the number we are searching is greater than key element it will search the value o left hand side and if the value is lower than the key it will check in right hand side

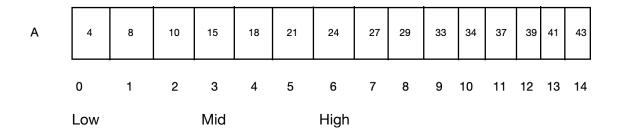
#### Example 1:

Size = 
$$15$$
  
Length =  $15$ 

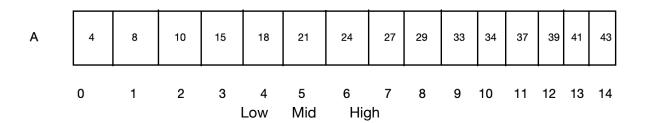


## Suppose key = 18

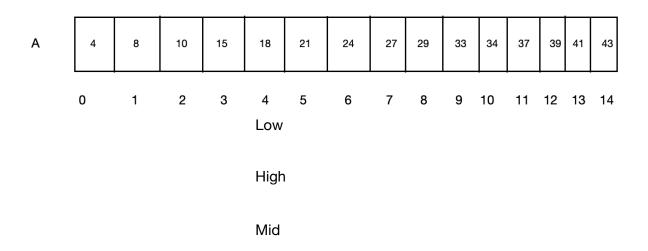
 Once the value we want is know the list is divides again to check the element in that half



• Once again the same procedure is repeated



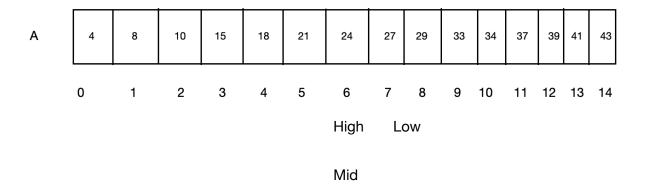
- The list value is getting reduced and every time it is getting divided by 2
- When the same steps is performed again all the values (low, high, mid) will point to the same number which will be the search value.



· Hence the search is successful

# Example 2:

Key = 25



Key = 25

L	Н	mid
0	14	7
0	6	3
4	6	5
6	6	6
7	6	Х

• When low became greater than high we stop the process it indicated that the element is not present in the list thus the search is unsuccessful