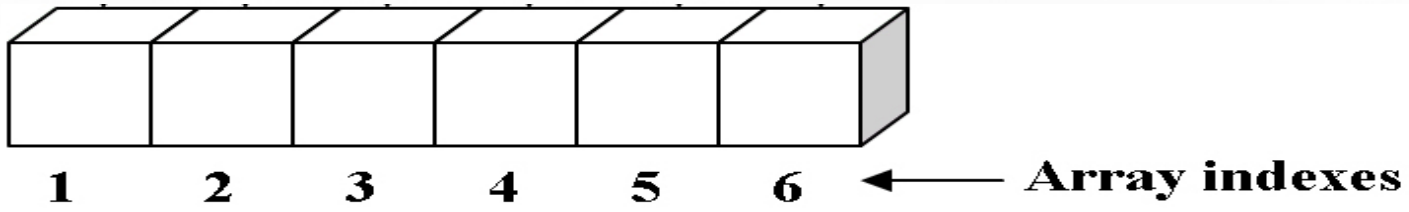
Udemy

Algorithms and Data Structures in Java

Lecture: Binary Search Algorithm



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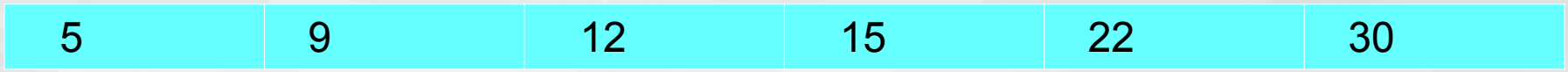
Nikos Katsilidis
Christos Topalidis

Binary Search Algorithm



initialize Array :

int [] a ={5,9,12,15,22,30};

OR

initialize Array :

Int [] a = new int[6] ;

a[0] = 5;

a[1] = 9;

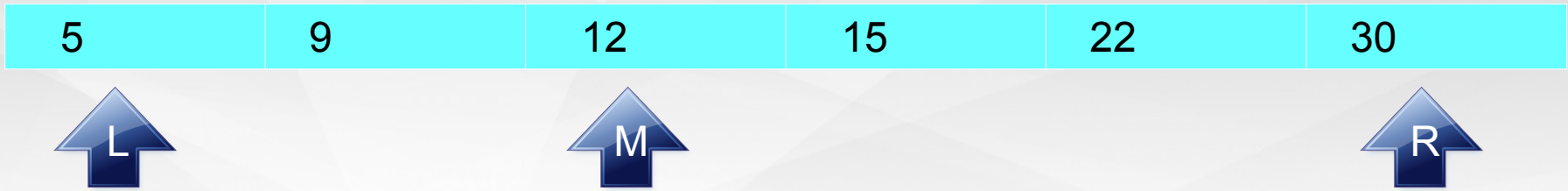
a[2] = 12;

a[3] = 15;

a[4] = 22;

a[5] = 30;

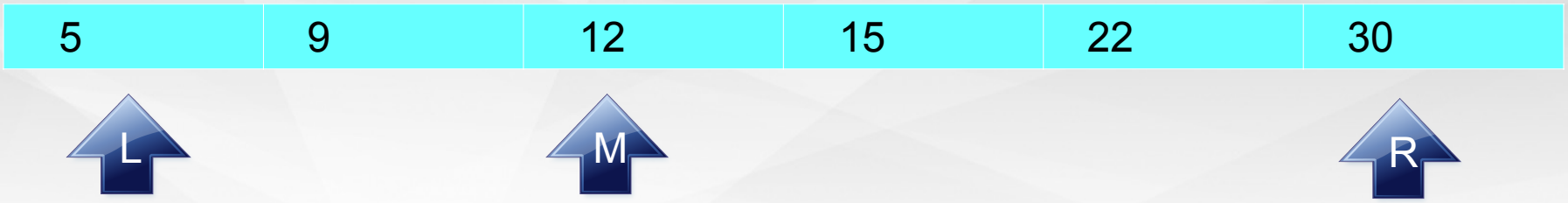
Binary Search Algorithm Code



left = 0 ; M = (left+right)/2; = 2 right = 5;

```
while(left<right){
    M=(left+right)/2;
    if(a[M]==number){
    System.out.println("Was Found");
    left = right +1; }
    else if(a[M]>number){ right=M-1; }
    else { left=M+1; }
}
```

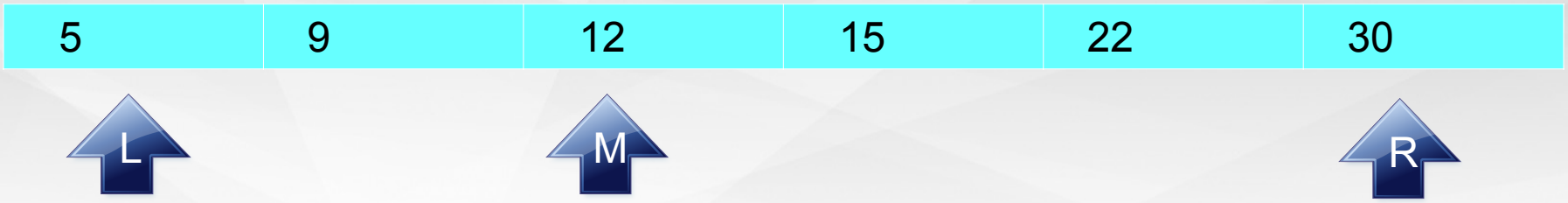
Binary Search Algorithm



Number = 15;

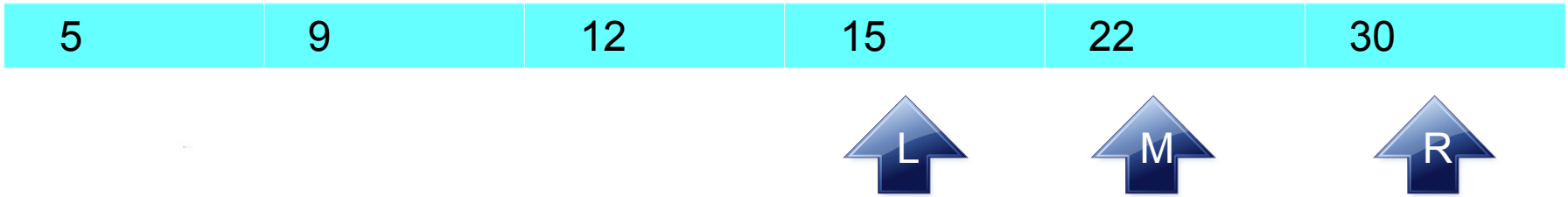
Number != M;

Binary Search Algorithm



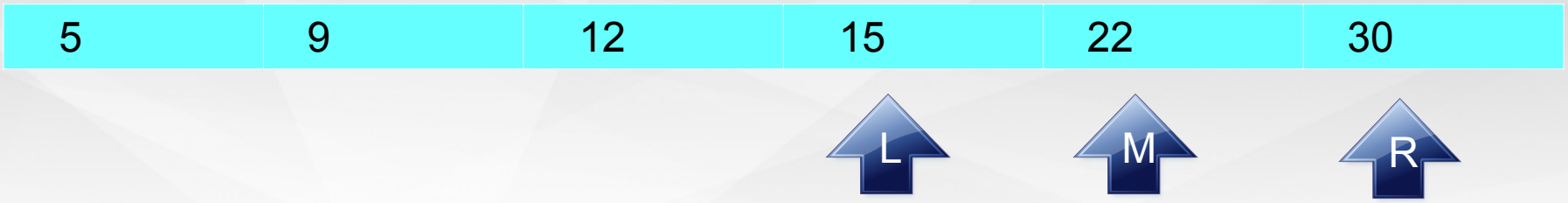
Number = 15;

Number != M;



left = M+1; =3 M = (left+right)/2; =4 right = 5;

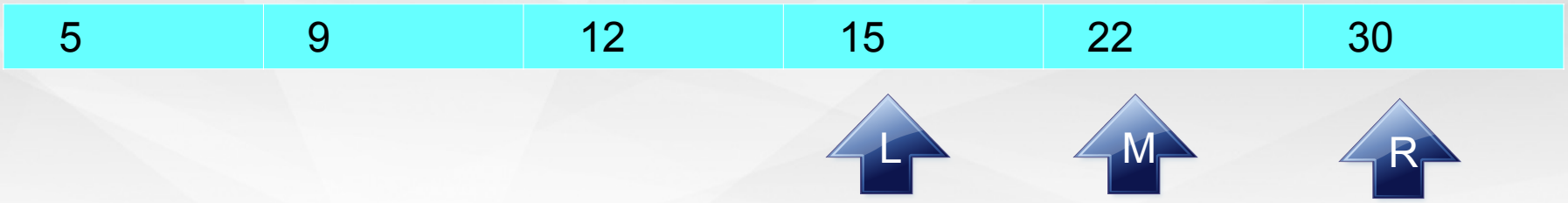
Binary Search Algorithm



Number = 15;

Number != M;

Binary Search Algorithm



Number = 15;

Number != M;

right= M-1; =3 M = (left+right)/2; = 3 left = 3;

Binary Search Algorithm

5	9	12	15	22	30

Number = 15;

Number = M;

Binary Search Algorithm

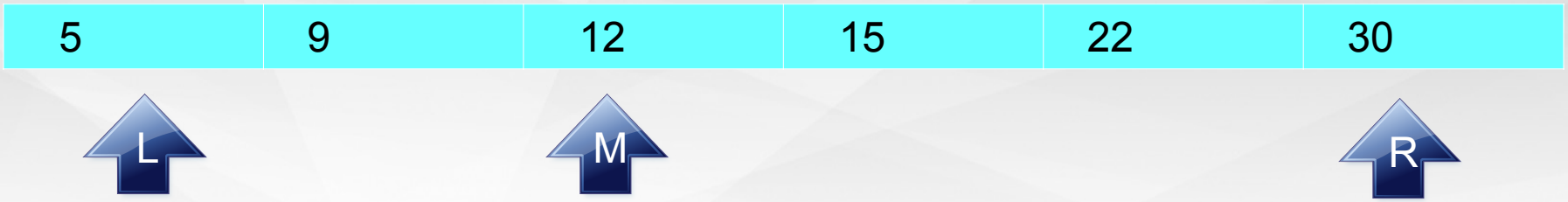
5	9	12	15	22	30

Number = 15;

Number = M;

Step = 3!

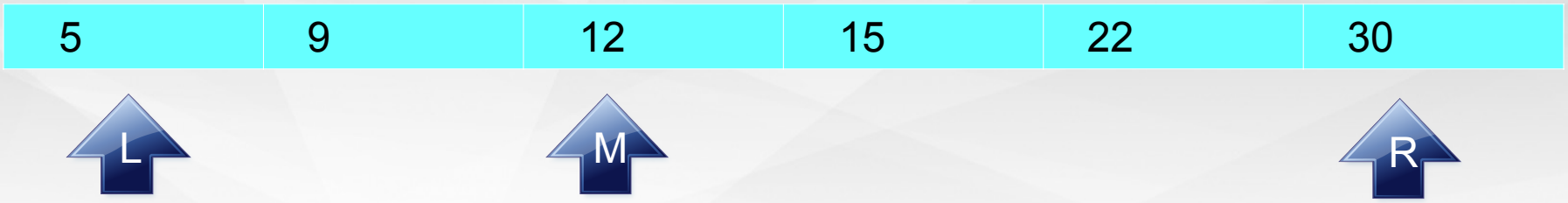
Binary Search Algorithm
Worst case



Number = 31;

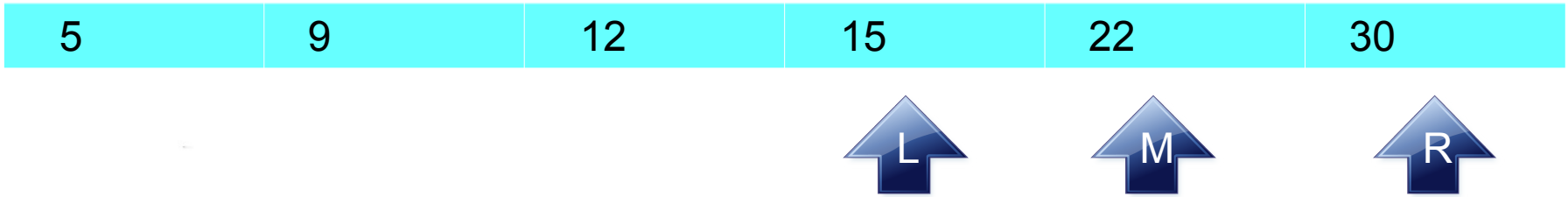
Number != M;

Binary Search Algorithm
Worst case



Number = 31;

Number != M;



left = M+1; =3 M = (left+right)/2; =4 right = 5;

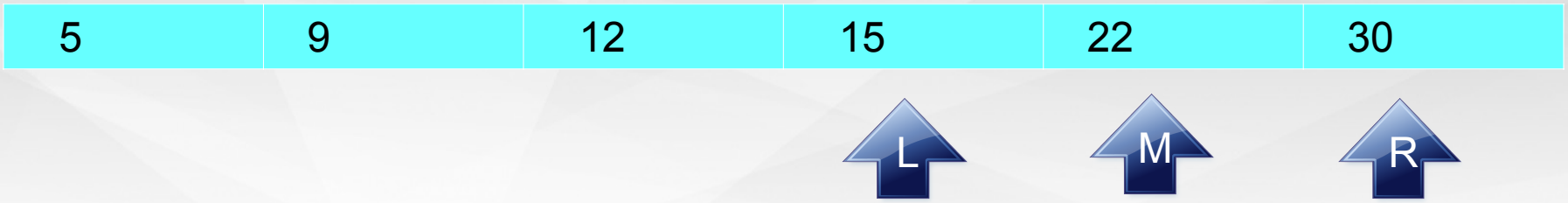
Binary Search Algorithm
Worst case

5	9	12	15	22	30

Number = 31;

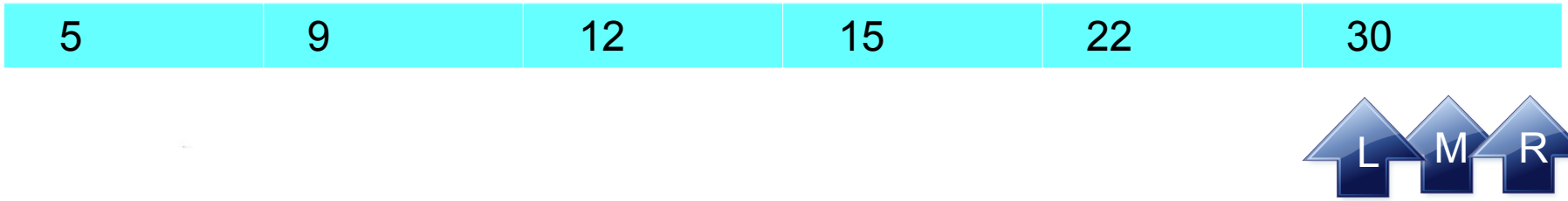
Number != M;

Binary Search Algorithm
Worst case



Number = 31;

Number != M;



left = M+1; = 5 M = (left+right)/2; = 5 right =5 ;

Binary Search Algorithm
Worst case

5	9	12	15	22	30

Number = 31;

Number != M;

Binary Search Algorithm
Worst case

5	9	12	15	22	30

Number = 31;

Number != M;

5	9	12	15	22	30

left = M+1; = 6 M = (left+right)/2; =5 right = 5;

Binary Search Algorithm
Worst case

5	9	12	15	22	30

Number = 31;

Number != M;

5	9	12	15	22	30

left = M+1; = 6 M = (left+right)/2; =5 right = 5;

left>right !

Binary Search Algorithm
Worst case

5	9	12	15	22	30

Number = 31;

Number != M;

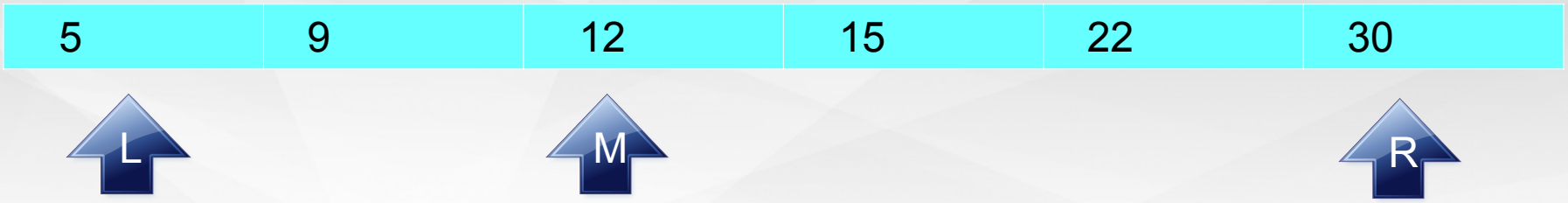
5	9	12	15	22	30

left = M+1; = 6 M = (left+right)/2; =5 right = 5;

left>right !

Step = 3

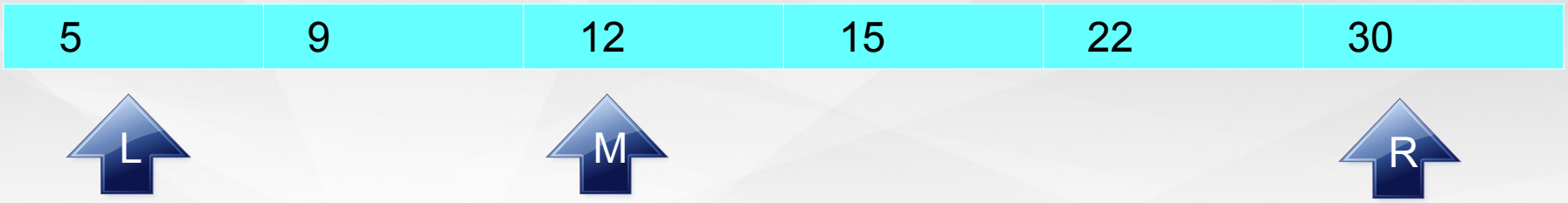
Binary Search Algorithm



Number = 12;

Number = M;

Binary Search Algorithm



Number = 12;

Number = M;

Step = 1