

# DSA through C++

## Searching



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# Agenda

- ① Linear Search
- ② Binary Search

# Linear Search

	0	1	2	3	4	5	6	7	8	9
Array →	34	41	29	62	87	91	43	18	27	5
Item →	25									

```
for (i = 0; i < N; i++)  
    if (A[i] == Item)  
        return i;  
  
return -1;
```

Time Complexity of Linear Search

$O(n)$

# Binary Search

0	1	2	3	4	5	6	7	8	9
35	40	29	18	90	87	62	53	61	59

Sort	0	1	2	3	4	5	6	7	8	9
	18	29	35	40	53	59	61	62	87	90

$$m = \frac{l + u}{2}$$

```
if (A[m] == Item)
    return m;
```

```
if (Item < A[m])
```

```
    binary_search(A, l, m-1)
```

```
else
```

```
    binary_search(A, m+1, u)
```

$O(\log_2 n)$