

## 25. SWITCH CASE STATEMENT

**TO EXAMINE SWITCH CASE IS JUST LIKE  
IF AND ELSE:**

*a = 1, b = 2, c = 3*

```
switch(a){  
    case 1: — — — — — — — —→ O(1)  
        print(Monday);  
        break;  
    case 2: — — — — — — — —→ O(1)  
        print(Tuesday);  
        break;  
    case 3: — — — — — — — —→ O(1)  
        print(Wednesday);  
        break;  
    default: — — — — — — — —→ O(1)  
        print("Not Found");  
        break;  
}
```

**NOTE:** every case runs a constant and returns  $O(1)$  complexity.

### Differentiation between Switch Case and If-else.

*As switch takes  $a = 1$ , hence case A runs i. e.  $c_1$*

*Which it creates differentiation between if else statement. As it takes a key in switch then it jumps to the key = case and run the case statement.*

*Or if case is not found i. e. key doesnot get matched with any cases of switch block then default statement is executed.*

***Single case run time is usually  $O(1)$ .***

But there are some exceptions.

**1. Switch run  $O(n)$  times which case  $O(1)$  times:**

```
for (int i = 1; i ≤ n ; i ++){  
    switch(i){  
        case 1:  
            print("hello");
```

```

    break;
case 2:
    print("hello");
    break;
default:
    print("Not Found");
    break;
}

```

## **ANSWER**

*Here switch case take n no. inputs which cases takes 1 unit of time give switch case time complexity :  
 $cn = O(n)$  if case is found or default runs it runs `n` times .*

## **2. Switch run `O(n)` times which case O(n) times:**

```

int n = 5;
int sum = 0;
for (int i = 1; i ≤ n ; i ++){
    switch (i) {
        case 1:
            for (int j = 1; j ≤ n; j ++){
                sum = sum + j;
            }
    }
}

```

```

        break;
    case 2:
        for (int j = 1; j <= n; j++) {
            sum = sum + j;
        }
        break;
    // more cases here...
}

default:
    print("Execution Finished");
    break;
}
}

```

## **ANSWER**

Here switch case take n no. inputs and cases takes n unit of time give switch case time complexity ( $n \times n$ ) :

$$cn^2 = O(n^2)$$

And total complexity of for loop is  $n \times n^2 = O(n^3)$ .

3. Switch run  $O(n)$  times which case  $O(\log n)$  times:

```
int n = 5;
int sum = 0;
for (int i = 1; i ≤ n ; i ++){
    switch (i) {
        case 1:
            for (int j = 1; j ≤ n; j = j * 2) {
                sum = sum + j;
            }
            break;
        case 2:
            for (int j = 1; j ≤ n; j = j * 2) {
                sum = sum + j;
            }
            break;
            // more cases here...
    }

    default:
        print("Execution Finished");
        break;
    }
}
```

**ANSWER**

*Here switch case take n no. inputs and cases takes log n*

unit of time give switch case time complexity ( $n \log n$ ) :

$$c(n \log n) = O(n \log n)$$

*And total complexity of for loop is  $n \times n \log n$   
 $= O(n^2 \log n)$ .*