Complexity

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Good Algorithm vs Bad Algorithm

- Computation time
- Memory or Space

Big “O”

```
Def Sum(inp_arr):
    Sum = 0              ---------------------- b
    For i in inp_arr:
        Sum += i         ---------------------- a
    Return Sum           ---------------------- c
```

Big “O”

```
Def Sum(inp_arr):
    Sum = 0
    For i in inp_arr:
        Sum += i
    Return Sum
```

$T(n) = an + b + c = O(n)$

Linear time

Big “O”

```
Def FirstItemPlusOne(inp_arr):
        F = inp_arr[0] +1      ---------------------- c
        Return F               ---------------------- b
```

T(n) = b + c = O(1)

Big “O”

```
Def FindDuplicate(inp_arr):
    For i in (0,n-1):                    ---------- n times
        For j in (0,n-1):                ---------- n times
            If i!=j and inp_arr[i] == inp_arr[j]:
                Return True
    Return False
```

$T(n) = n \times n \times c = O(n^2)$

Big “O”

```
Def FindDuplicateAndSum(inp_arr):
        Dup, Sum = False, 0
        For i in (0,n-1):                          ------------------------- n times
                For j in (0,n-1):                  ------------------------- n times
                        If i!=j and inp_arr[i] == inp_arr[j]:
                                Dup = True
        For i in (0,n-1):
                Sum += inp_arr[i]
        Return Dup, Sum
```

$T(n) = n \times n \times c + bn = O(n^2)$

Thank You