**DSA**

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**TIME COMPLEXITY & SPACE COMPLEXITY**

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**TIME COMPLEXITY**

---RATE AT WHICH TIME TAKEN INCREASES WITH RESPECT TO INPUT SIZE

---REMEMBER TC DOESN’T MEAN TIME IN SECONDS (TC NOT TAKEN IN SECONDS )

---BIG-O NOTATION ---O( )—IN PARENTHESIS TIME TAKEN VALUE IS WRITTEN

---TC COMPUTED ON WORST CASE SCENARIO

---AVOID CONSTANTS

---AVOID LOWER VALUES

THERE ARE 3 SCENARIOS

1. **BEST CASE**
2. **AVERAGE CASE**
3. **WORST CASE**

* BEST CASE

-----WHEN PROGRAM TAKES LEAST AMOUNT OF TIME

LOOK WHEN WE CREATE SYSTEM WE DON’T FOR 1MILLION PERSON NOT FOR 1 PERSON BECOZ WE WANT TO DEVELOP ON LARGE SCALE

----THAT’S THE WORST CASE SCENARIO

EX….

for(int i=0;i<n;i++){

for(int j=0;j<I;j++){

}

}

(1+2+3+…+n)---sum of natural numbers

=O(N\*N+1/2) = O(N^2/2+N/2) = O(N^2/2) ~ O(n^2) ---------(it neglect small value N/2)

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**SPACE COMPLEXITY**

------MEMORY SPACE

----🡪 BIG-O NOTATION

AUXILIARY SPACE + INPUT SPACE

SPACE THAT YOU TAKE TO SOLVE PROBLEM SPACE THAT TAKE YOU TO STORE INPUT PROBLEM