* Basic Analysis on Algorithm :-

Analysis of algorithms is the determination of the amount of time and space resources to execute it.

The analysis of algorithm is to compare the various algorithms to solve a same problem.

This is done to analyse which algorithm takes less resources such as time, effort and memory to solve a particular problem.

Types of analysis of algorithm :-

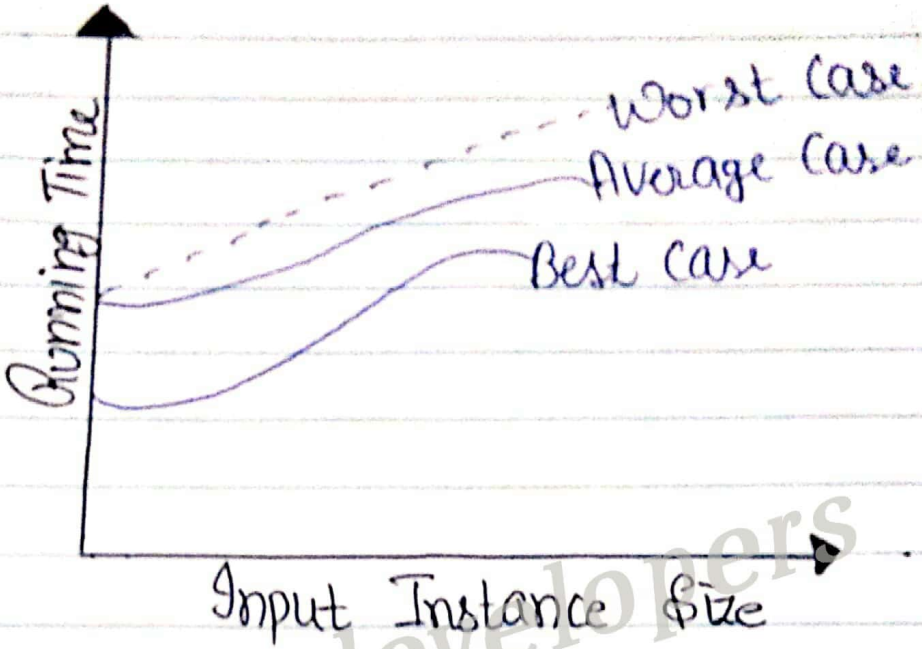
1. Best case

2. Worst Case

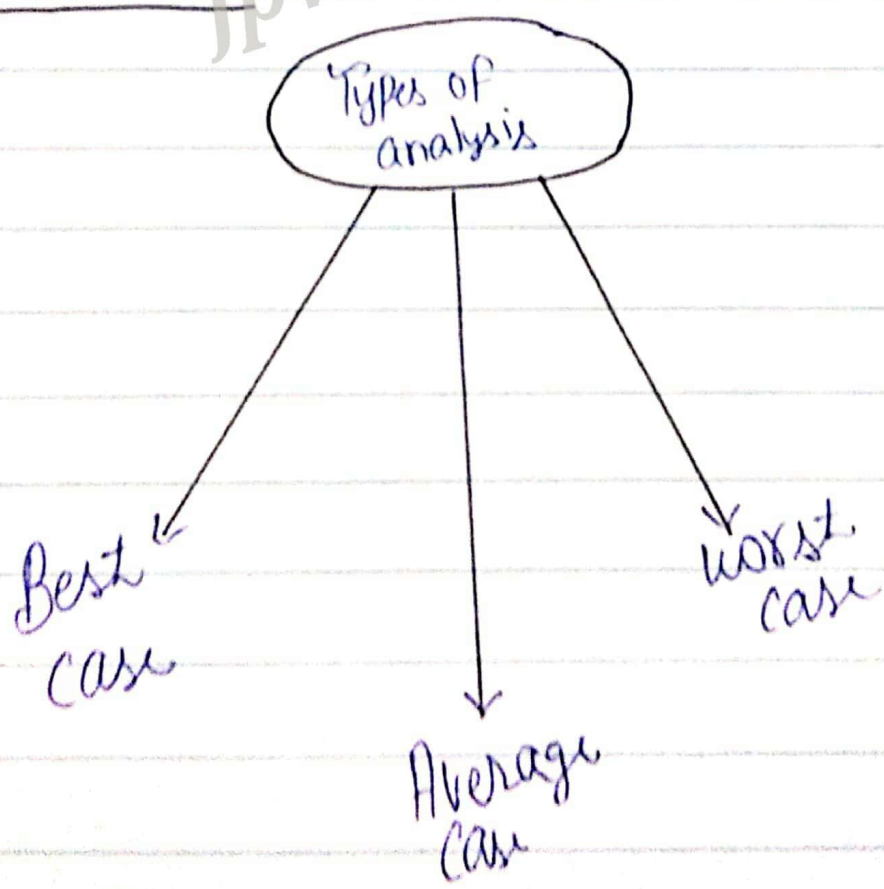
3. Average Case.

To analyze a particular algorithm, we need to understand for which input the algo takes less time or which I/p takes mor

Graph on types of Analysis :-



Three cases:



1. Best case :- It is the shortest running time of an algorithm, It takes less time.

- It uses the less resources.
- It takes minimum number of steps required to reach the result.

2. Worst case :- where we assume the input, for which algorithm takes long time.

- It is the longest running time of an algorithm.
- It takes maximum number of steps.

3. Average Case :- where the input lies in between best and worst case.

- It is oftenly very useful but more difficult to compute.

* Calculate Average Case Complexity :-

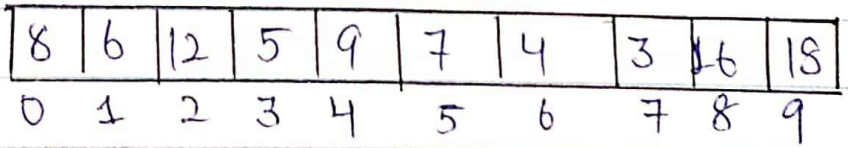
It is calculated by first multiplying the number of steps performed in each case by its probability of occurence and then adding all the terms.

$X_1, X_2, X_3 \ldots X_k$ number of operations.
$P_1, P_2, \ldots P_k$ is probability

$$X_{AVG} = X_1P_1 + X_2P_2 + \ldots + X_kP_k$$

$$X_{AVG} = \sum_{i=1}^{k} x_iP_i$$

example:



Linear Search

Best Case :- Search key element present at first index. Best case time = Constant

Worst Case :- Search key element at last index. worst case time = n

Average Case :- Search a middle or average no.

$$\frac{n(n+1)}{2} \Big/ n$$

$$A(n) = \frac{n+1}{2}$$