**Link: https://www.mygreatlearning.com/blog/data-structures-using-java/**

**DataStructure:** Organize data so we can process that data easily.

**Types of Data Structures:**

Linear: Arrays, Linked List, Stack, Queue (Elements are stored sequentially and easly accessible because is is the Single level)

Non Linear: Tree, Graph (Elements are stored in the multilevel so data accessible is time consuming as compared to to linear and difficult to implement)

**Algorithm:** Algorithm is the set of instruction that we need to perform to solve the problem.

**Analysis of the Algoritham:** find the best approach for the problem that take the less time and **Space Complexity:** amount of memory space required t store the data for the given problem.

**Asymptotic Analysis:** help to evaluating performance of the the input size and its performance.

What time and space require when the input size is increased.

Asymptotic Notation: mathematical tool to check the complexity

Asymptotic Notation use to determine the

Best case

Average case

Wrost case

**Types of Asymptotic Notation:**

OMega Notation(Best Case): return the lower bound of the algorithm. Return the best amount of time taken.

Example: Algorithm run min 100 sec not less that that but possible more than 100 sec.

100 sec is the Lower bound.

Big O Notation(Worst Case): return the uper bound of the algorithm.

Example: Algorithm run less than 100 sec but not more that 100 sec.

100 sec is the Uper bound.

Theata Notation(Average Case): returns the upper and lower bound both. Return the average amount of time.

Example: 100 sec for first run, 120 sec for second run, 110 sec for the third run.