VIGNAN'S NIRULA
INSTITUTE OF TECHNOLOGY & SCIENCE FOR WOMEN
(Approved by AICTE, New Delhi & Affiliated to JNTU Kakinada)
Vignan Avenue, Peda Palakaluru, Guntur - 522009

Department of Information Technology

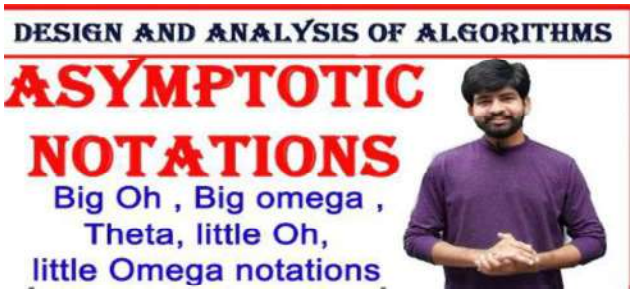
# Innovative Practice

**Faculty Name** : Dr. K.V.S.S.Rama Krishna , Dr.K.Venkateswara Rao
**Course Name** : Design and Analysis of Algorithms
**Class** : III B.Tech I Semester
**Academic Year** : 2023-2024
**Title of the Topic** : Asymptotic Notations
**Activity Name** : Flipped Classroom

**Objective of the Activity:**
The objective of the Flipped Classroom activity is to facilitate a student-centered approach to learning Asymptotic Notations in algorithm analysis.

**Pre-Class Preparation**:

**Video Lecture Links**




https://www.youtube.com/c/NSlectures

**Class Problem-Solving: Group Discussion**

**Objective:** For the topic of Asymptotic Notations, you can divide the group into different sections based on the specific types of asymptotic notations.

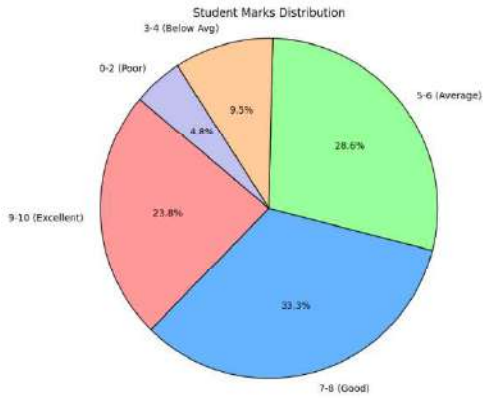
**Group Division:**

**Group A:** Big O Notation (O)
**Group B:** Big Omega Notation (Ω)
**Group C:** Big Theta Notation (Θ)
**Group D:** Little o Notation (o)
**Group E:** Little omega Notation (ω)
**Group F:** Landau's Notation and Other Variants

**Screenshots of the Practice**

**Assessment Analysis**

| Marks Range | Number of Students | Percentage |
|---|---|---|
| 9-10 (Excellent) | 25 | 23.81% |
| 7-8 (Good) | 35 | 33.33% |
| 5-6 (Average) | 30 | 28.57% |
| 3-4 (Below Avg) | 10 | 9.53% |
| 0-2 (Poor) | 5 | 4.63% |
| Total | 105 | 100% |




**Conclusion**

Asymptotic notations are essential for analyzing and comparing the efficiency of algorithms, focusing on their performance as the input size grows. Notations like Big O, Big Omega, and Big Theta help in understanding the upper, lower, and tight bounds of an algorithm's time or space complexity.

**Signature of the Faculty** **Head of the Department**

# Assessment on Asymptotic notations

**Course Name:** Design and Analysis of Algorithms
**Academic Year:** 2023-24
**Marks:** 10 Marks
**Time:** 10 Minutes
**Roll Number:**

**1. Which of the following notations describes the worst-case time complexity of an algorithm?**
a) Big Omega (Ω)
b) Big O (O)
c) Big Theta (Θ)
d) Little o (o)

**2. Which asymptotic notation provides a tight bound on the time complexity of an algorithm?**
a) Big O (O)
b) Big Theta (Θ)
c) Big Omega (Ω)
d) Little o (o)

**3. Which notation represents a lower bound that is not asymptotically tight?**
a) Big O (O)
b) Little o (o)
c) Big Omega (Ω)
d) Little omega (ω)

**4. What does Big O notation represent in algorithm analysis?**
a) Lower bound
b) Upper bound
c) Exact bound
d) Best case scenario

**5. Which of the following notations is used to express that a function grows strictly slower than another function?**
a) Big Theta (Θ)
b) Big O (O)
c) Little o (o)
d) Little omega (ω)

**6. Which notation is primarily used to describe the best-case time complexity of an algorithm?**
a) Big O (O)
b) Big Theta (Θ)
c) Big Omega (Ω)
d) Little o (o)

**7. If an algorithm has a time complexity of $O(n^2)$, what is the growth rate in terms of input size n?**
a) Constant
b) Linear
c) Quadratic
d) Logarithmic

**8. Which of the following is the correct definition of Big Omega notation (Ω)?**
a) Describes an upper bound of an algorithm's complexity
b) Describes a lower bound of an algorithm's complexity
c) Represents the exact growth rate of an algorithm
d) Represents a growth rate slower than another function

**9. What is the primary purpose of using asymptotic notations in algorithm analysis?**
a) To describe the memory usage of an algorithm
b) To evaluate the runtime efficiency of an algorithm
c) To determine the output of an algorithm
d) To analyze the implementation of an algorithm

**10. If an algorithm's complexity is expressed as Θ(n log n), which of the following best describes its growth rate?**
a) Linear
b) Quadratic
c) Linearithmic
d) Exponential

**Answers:**

1. b) Big O (O)
2. b) Big Theta (Θ)
3. d) Little omega (ω)
4. b) Upper bound
5. c) Little o (o)
6. c) Big Omega (Ω)
7. c) Quadratic
8. b) Describes a lower bound of an algorithm's complexity
9. b) To evaluate the runtime efficiency of an algorithm
10. c) Linearithmic