36 Lecture - CS301

Important Subjective

1. **What is running time analysis?**
   Answer: Running time analysis is the process of evaluating the efficiency of an algorithm by determining the time it takes to execute as a function of its input size.

2. **What is the difference between best-case and worst-case time complexity?**
   Answer: Best-case time complexity refers to the minimum time required by an algorithm to complete its task on a given input, whereas worst-case time complexity refers to the maximum time required by an algorithm to complete its task on a given input.

3. **What is the purpose of asymptotic notation in running time analysis?**
   Answer: Asymptotic notation, such as big O notation, provides an upper bound on the growth rate of an algorithm's running time. It is used to describe how the running time of an algorithm increases as the size of its input increases.

4. **What is the time complexity of an algorithm that takes constant time to execute?**
   Answer: An algorithm that takes constant time to execute has a time complexity of O(1).

5. **What is the time complexity of an algorithm that executes a loop n times, where n is the size of the input?**
   Answer: An algorithm that executes a loop n times, where n is the size of the input, has a time complexity of O(n).

6. **What is the difference between logarithmic and linear time complexity?**
   Answer: Logarithmic time complexity refers to an algorithm whose running time increases logarithmically with the size of its input, while linear time complexity refers to an algorithm whose running time increases linearly with the size of its input.

7. **What is the difference between average-case and worst-case time complexity?**
   Answer: Average-case time complexity refers to the expected time required by an algorithm to complete its task on a given input, while worst-case time complexity refers to the maximum time required by an algorithm to complete its task on a given input.

8. **What is the purpose of analyzing the running time of an algorithm?**
   Answer: The purpose of analyzing the running time of an algorithm is to identify the most efficient algorithm to solve a problem, taking into account the size of the input.

9. **What is the time complexity of an algorithm that executes a loop within a loop, where both loops iterate n times?**
   Answer: An algorithm that executes a loop within a loop, where both loops iterate n times, has a time complexity of O(n^2).

10. **Can the running time of an algorithm be measured in seconds?**
    Answer: The running time of an algorithm can be measured in seconds, but it is not a useful metric for comparing the efficiency of algorithms, as it depends on the hardware configuration of the computer on which the algorithm is executed. Asymptotic notation is a more useful metric for

comparing the efficiency of algorithms.