Lecture #22: Applications —
Analysis of Algorithms
Questions for Review

1. Consider a **deterministic algorithm**.

   (a) The **worst-case running time** of this algorithm bounds the number of steps used by this algorithm, as a function of the size of its input. *Why might we wish to consider something else, instead?*

   (b) What is the **expected running time** of this algorithm? What "sample space" is considered when this is defined? What assumptions does this depend on?

   (c) What can be said if the assumptions that were made, when performing an "average-case analysis of an algorithm" are *not* satisfied?

2. Consider a **randomized algorithm**.

   (a) What is the **expected running time** of this algorithm on a given input? What "sample space" is considered when this is defined? Whaat assumptions does this depend on?

   (b) What is the **worst-case expected running time** of a randomized algorithm?

   (c) What happens when randomized algorithms are implemented using programming languages like Python, Java, or C++? What does this imply about the information provided by the kind of algorithm analysis that is now being considered?

3. Now consider **randomized algorithms for decision problems**.

   (a) What is a **Las Vegas algorithm**?

   (b) What is a **Monte Carlo algorithm**?