

CSE 312: Foundations of Computing II

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**Lecture Topics:** 4.3 The Normal RV

[Tags: PSet3 Q4ab, The Normal RV]

1. Suppose the time that Java takes to sort a 1,000,000 length array is approximately

$J \sim \mathcal{N}(\mu = 46, \sigma^2 = 6^2)$  milliseconds (ms), since it uses the (randomized) QuickSort Algorithm.

- a. Python initially implements a (deterministic) MergeSort Algorithm, and it always finishes in  $P = 49$  ms. What is the probability that Java sorts a single 1,000,000 length array faster than Python does? Show your work and give your answer rounded to 4 decimal places.
- b. Python attempts to implement QuickSort as well, but did it less efficiently. Its runtime is approximately  $P \sim \mathcal{N}(\mu = 55, \sigma^2 = 8^2)$ . What is the probability that Java sorts a single 1,000,000 length array faster than Python does? Show your work and give your answer rounded to 4 decimal places.
- c. The remaining parts are left for you 😊.