EC504 Homework 1

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1 Problem 5

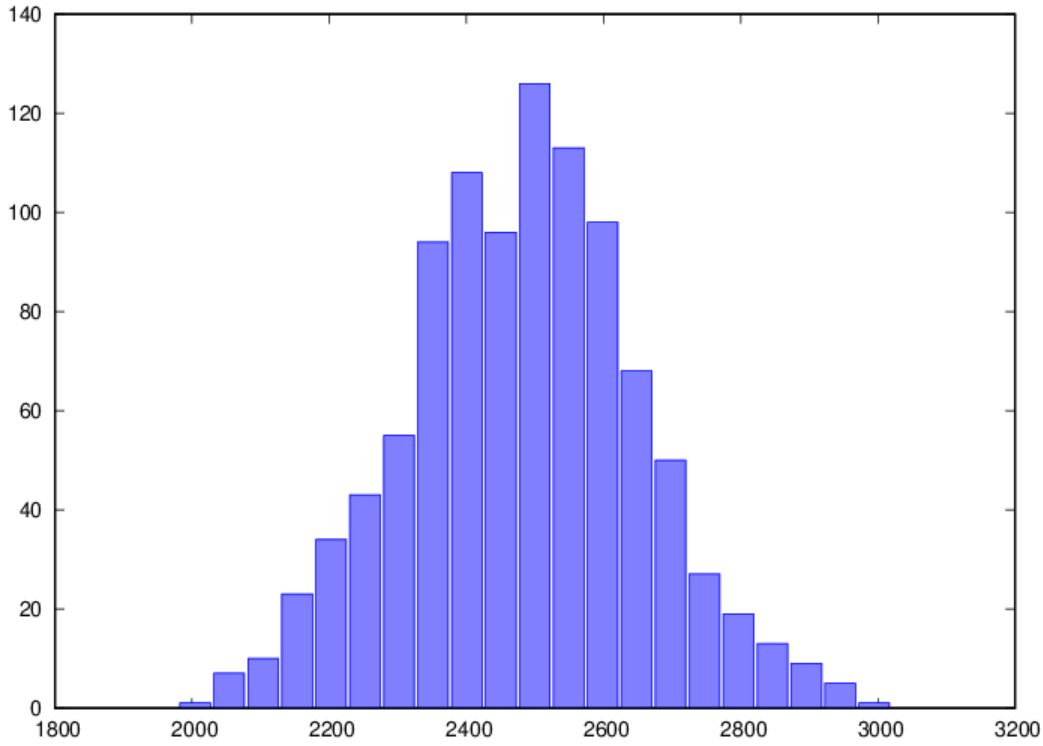

Figure 1: Number of swaps vs Permutation

The average number of swaps for the plotted run was 2481.23.

The theoretical number of swaps for an input array N = 100 is defined as:

$$NumberofSwaps = \frac{N(N-1)}{4} = \frac{100 * 99}{4} = 2475 \tag{1}$$

The numerical approximation had an error of:

$$\%Error = \frac{|2481 - 2475|}{2475} * 100 = 0.242\%$$

1.1 Extra Credit

1.1.1 #1

It is more relevant because the probability of encountering the average performance scenario is greater than the worse. This would give insight of how many operations would the system perform on a task.

1.1.2 #2

Counting operation is more interesting metric than time because an algorithm can run faster or slower depending on the computer running the task. Additionally, there could be other processes running in the background that could have influence on the system.