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1/19/12
CS 141b
HW # 1

Homework 1 Write-Up.

We used a simple theoretical model to estimate the average hungry time given average thinking and eating times:

$$Hungry\ time_{avg} = (Num\ of\ clients - 1) * (Eating\ time_{avg}) - (Thinking\ time_{avg}).$$

We expect a linear relationship between the average hungry time and the average eating and thinking times because as each client is added, each client in the new system is expected to wait the eating time of the new client before it itself can start eating. Each client waits for all the other clients to eat.

For 1 server, 25 clients, and each client running 20 times each, we measured the following average times:

Thinking = 199.4 ms
Hungry = 271.8 ms
Eating = 19.53 ms.

It appears that these measurements are reasonable because they match expected results: for 25 clients, an average thinking time of about 200 ms, and an average eating time of about 20 ms, we estimate the average hungry time to be

$$Hungry\ time_{avg} = 24 * 19.53\ ms - 199.4\ ms = 269.32\ ms.$$

This, in fact, is very close to the measured average hungry time of 271.8 ms.

With 10 clients, and a think time which is a uniform random variable between 195 and 205 milliseconds, and an eating time which is a uniform random variable between 15 and 25 milliseconds, the average time spent waiting (the hungry time) is 7.396 ms. When there is only 1 client, the average hungry time is 0.09802 ms, and when there are 20 clients, the average hungry time is 172.5 ms. The results are reasonable because for 1 client, it is the only one requesting the token and so the hungry time is essentially the amount of time it takes the token to travel from the server to the client. For 20 clients, the measured hungry time of 172.5 ms agrees with our theoretical prediction:

$$Hungry\ time_{avg}(20\ clients) = 19 * 19.53\ ms - \ 199.4\ ms = 171.67\ ms.$$

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