Assignment 5

Group Members

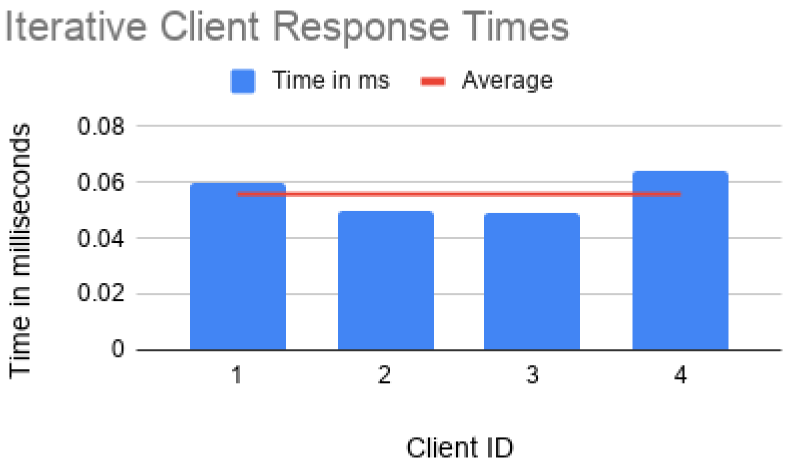
Anjishnu Mukherjee (B05-511017020 / 510517086)
Souparno Bhattacharyya (B05-510417020/ 510517080)
Kaustav Paul (510517006)

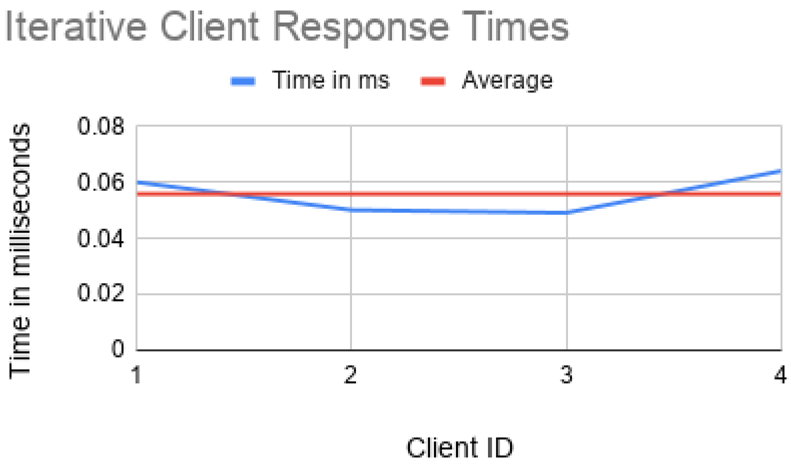
We generate 100 random integers between -100 and 100, both inclusive, from the random integer generator here,because it generates randomness based off atmospheric noise, which gives more randomness than the pseduo-random integers genrated in C++ or Python random number generation engines. We will be sampling from this set 5 numbers at a time to provide as client input for the first problem.

Problem 1

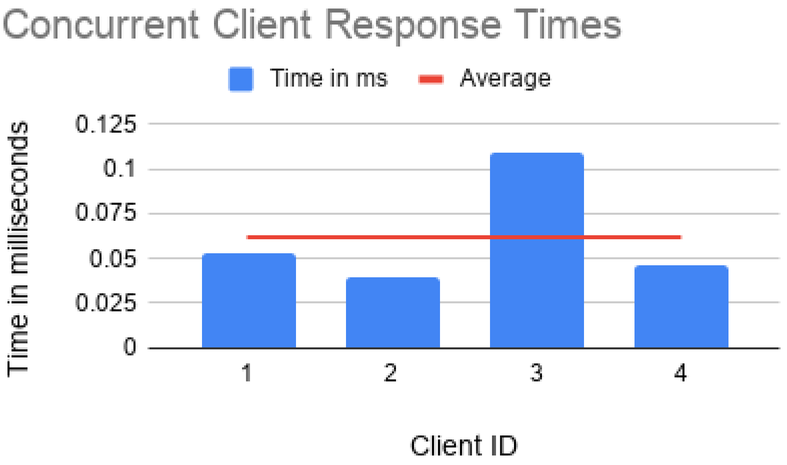
We will be connecting 4 clients to a server. First, consider the case of the iterative server. The CPU usage on the server side is printed in the format of (us/sy/id) as printed in the information displayed by iostat. The time on the client side is printed in milliseconds. Each row corresponds to one client.

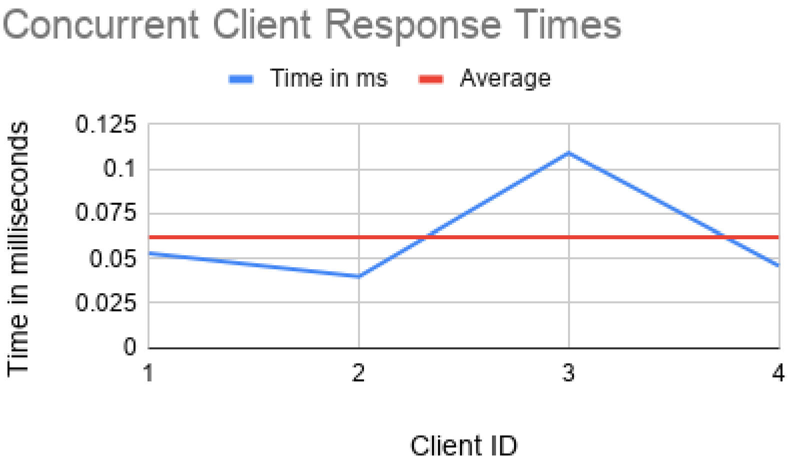
Iterative Server	Client
1/1/97	0.06
1/1/97	0.05
1/1/97	0.049
1/1/97	0.064





Concurrent Server	Client
1/1/97	0.053
1/1/97	0.040
1/1/97	0.109
1/1/97	0.046





Problem 2

The CPU usage on the server side is printed in the format of (us/sy/id) as printed in the information displayed by iostat remains (1/1/97) across all experiments.

Dictionary

Word	Antonym
above	below
accept	rejec
easy	hard
enter	exit
healthy	sick
hot	cold

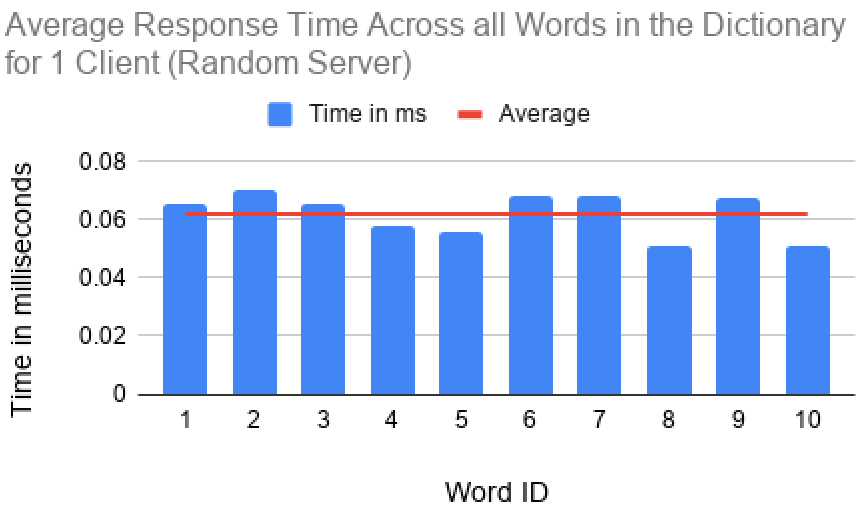
left	right
success	failur
summer	winter
up	down

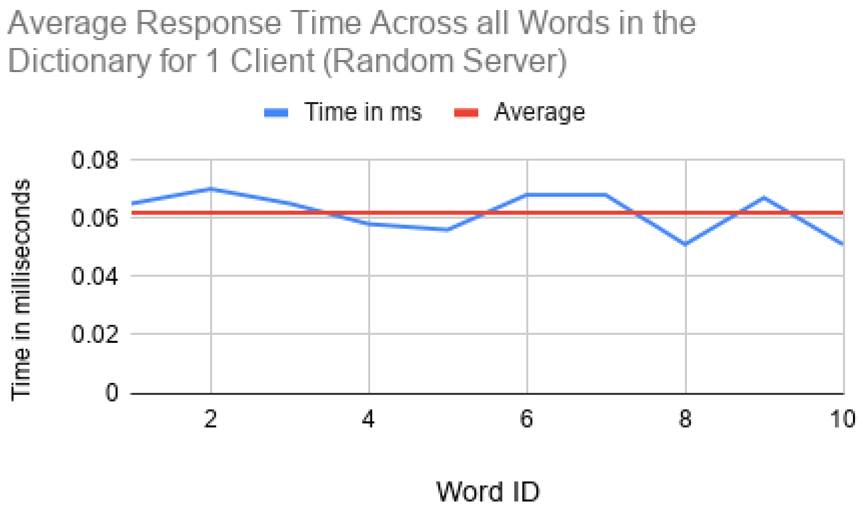
Experiment 1

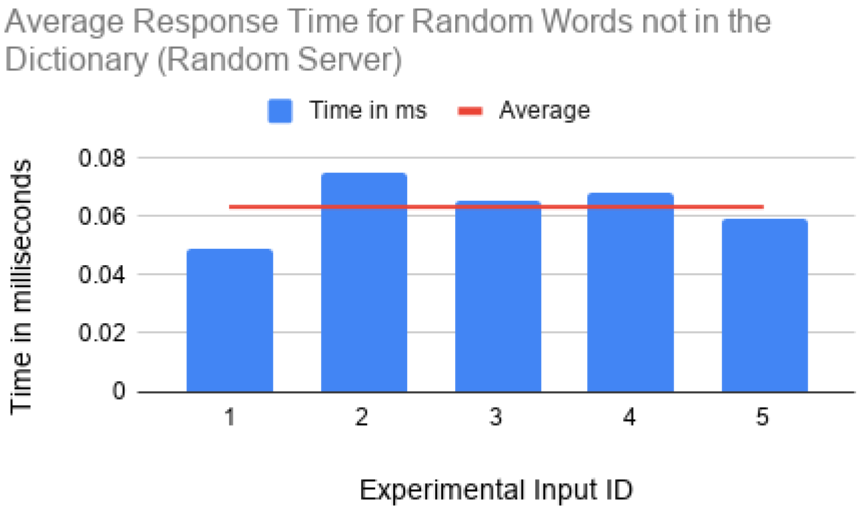
We will run one client on the server multiple times. For each run, we will test for the words in the dictionary and we will also run for 5 times for words not in the dictionary. So, there will be a total of 15 runs for this experiment. The response time noted on the client side are listed below, with the first ten denoting words in the dictionary and the next 5 denoting words not in dictionary. The times are noted in milliseconds.

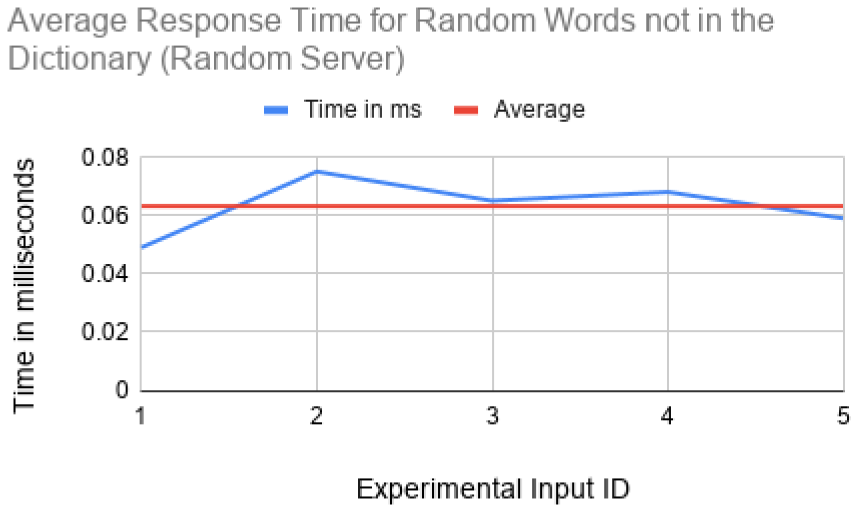
The row of results below are for the random server.

0.065, 0.07, 0.065, 0.058, 0.056, 0.068, 0.068, 0.051, 0.067, 0.051, 0.049, 0.075, 0.065, 0.068, 0.059



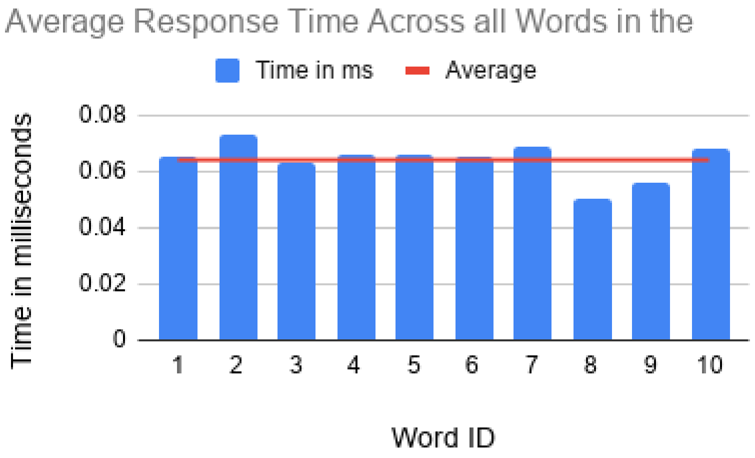


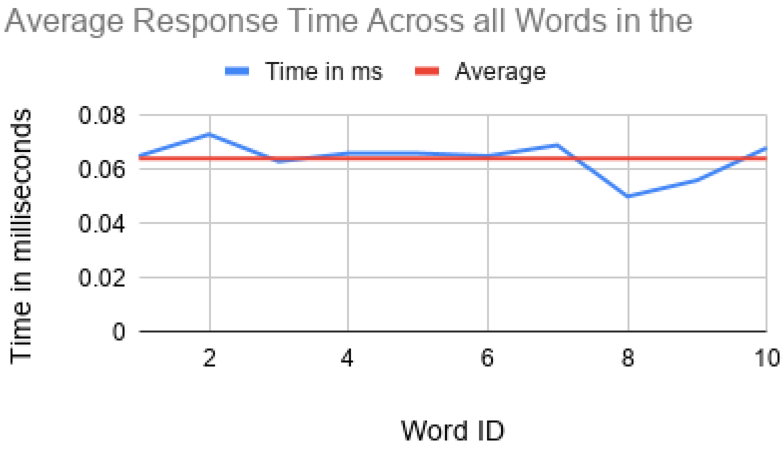


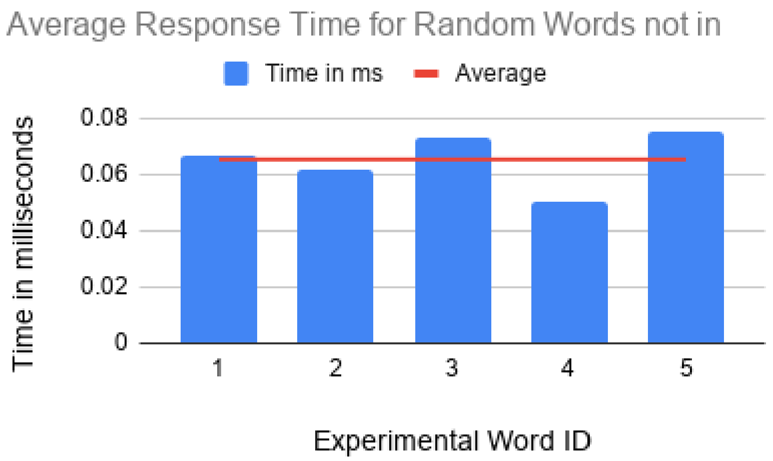


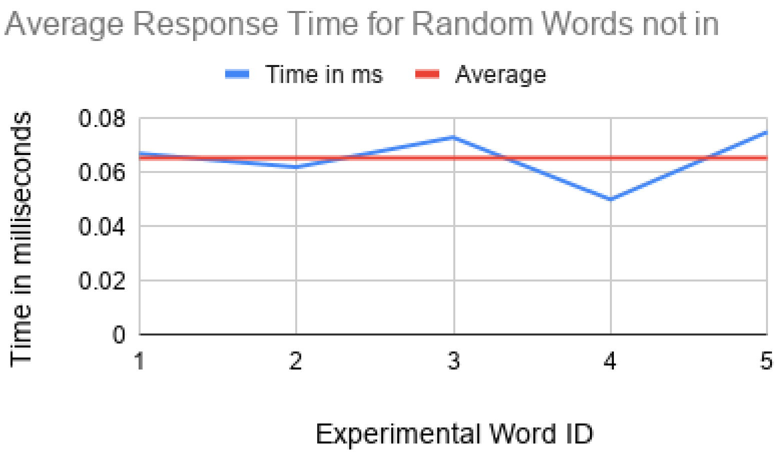
The row of results below are for the sorted server.

0.065, 0.073, 0.063, 0.066, 0.066, 0.065, 0.069, 0.050, 0.056, 0.068, 0.067, 0.062, 0.073, 0.050, 0.075


Average Response Time Across all Words in the
🟦 Time in ms
🟥 Average
Time in milliseconds
0.08
0.06
0.04
0.02
0
1
2
3
4
5
6
7
8
9
10
Word ID


Average Response Time Across all Words in the
Time in ms
Average
Time in milliseconds
0.08
0.06
0.04
0.02
0
2
4
6
8
10
Word ID

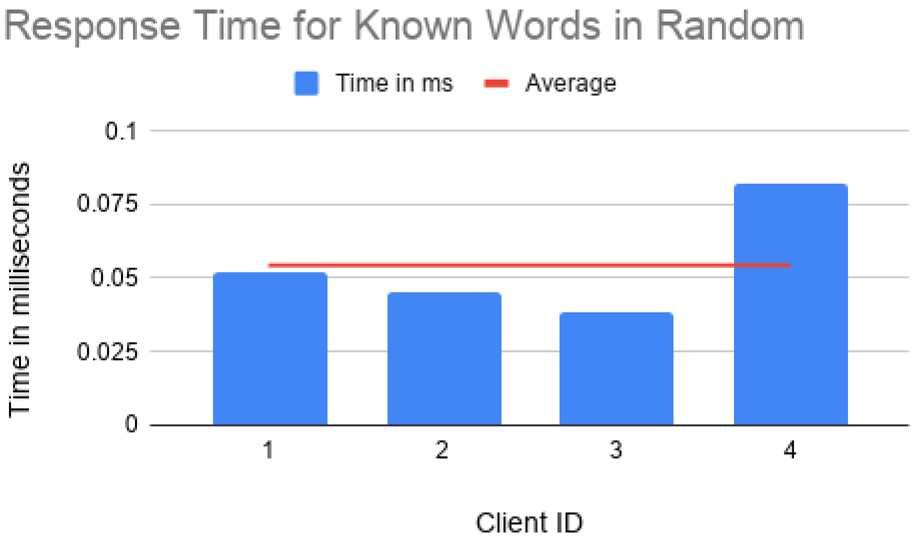


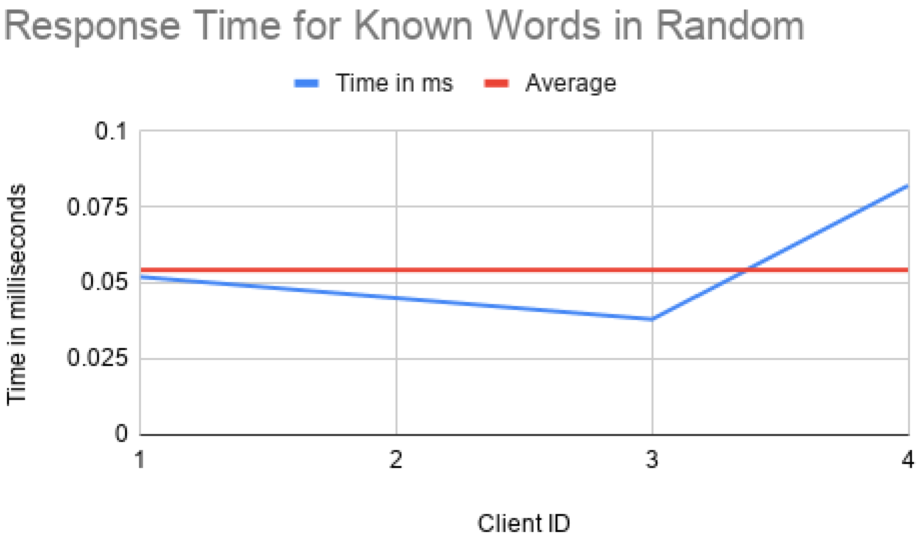


Experiment 2

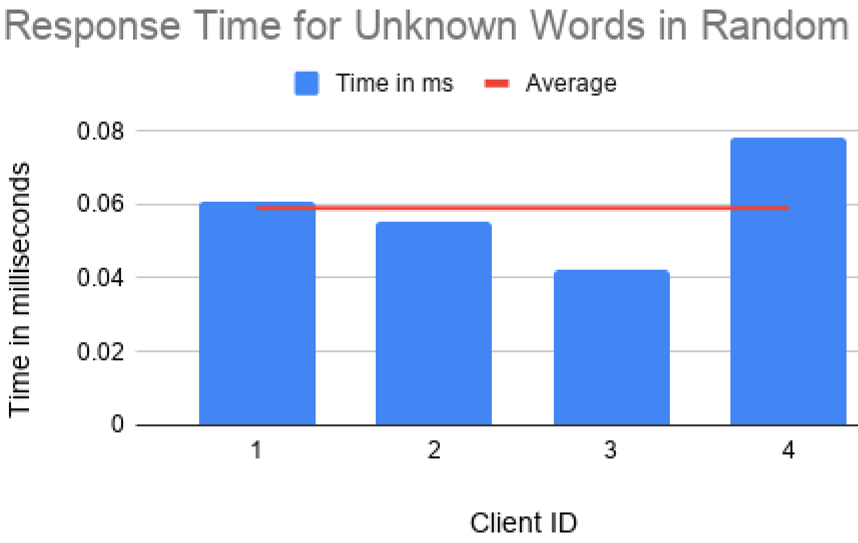
We run 4 clients simulataneously and measure the time taken for 2 cases. One, for a word in the dictionary(known word) and two, for a word not in the dictionary (unknown word).

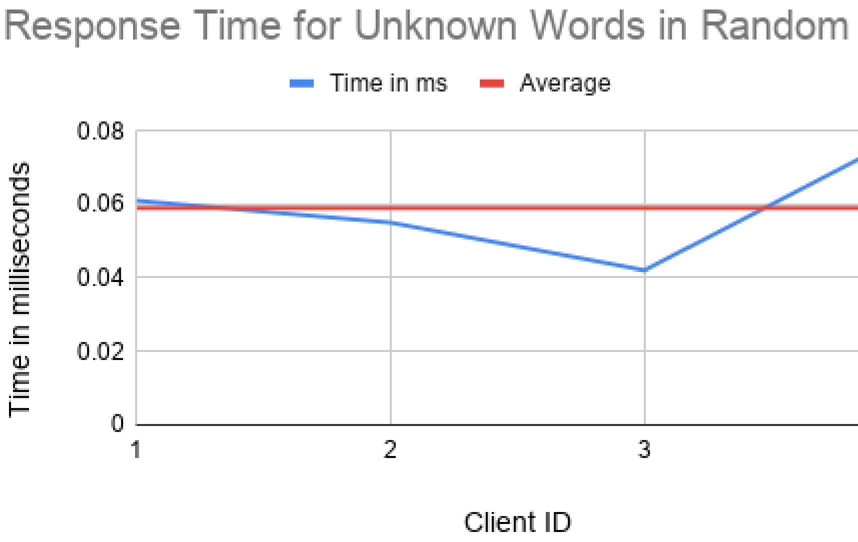
Random server, known word : 0.052, 0.045, 0.038, 0.082



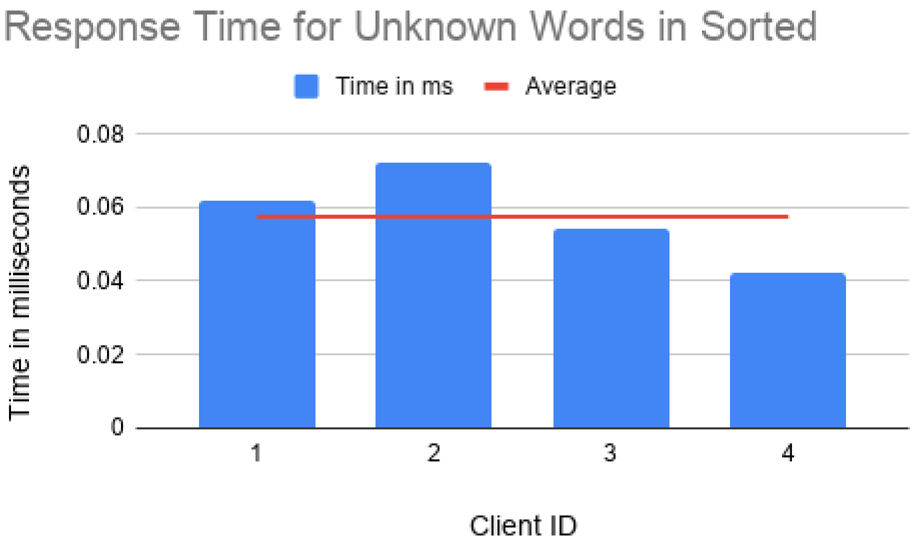


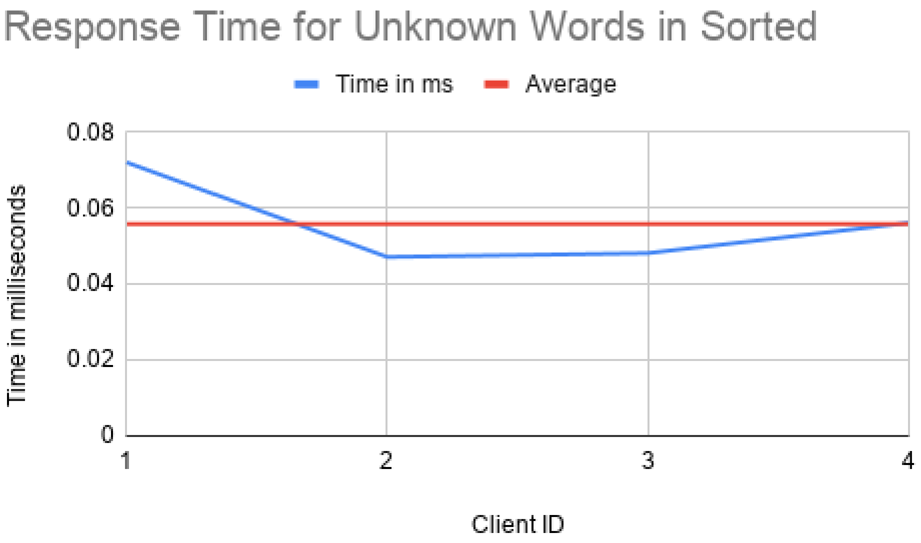
Random server, unknown word : 0.061, 0.055, 0.042, 0.078



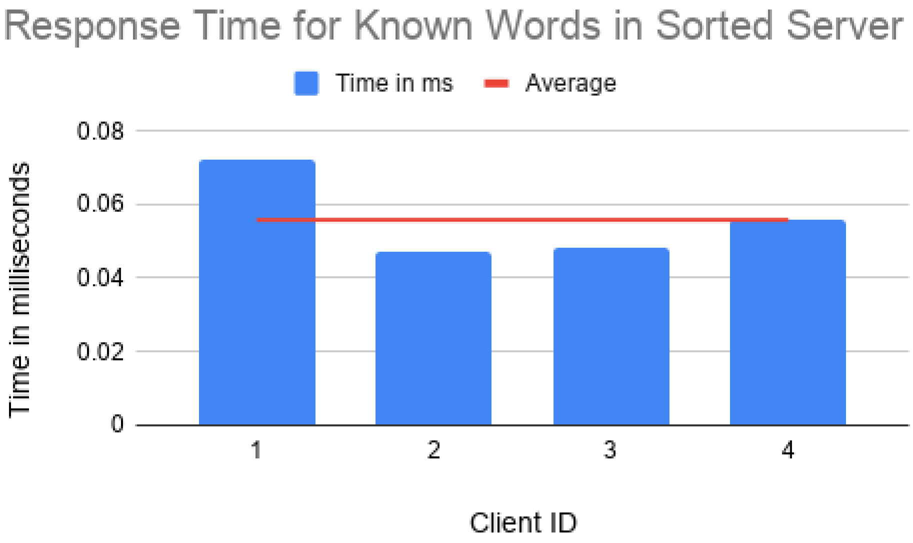


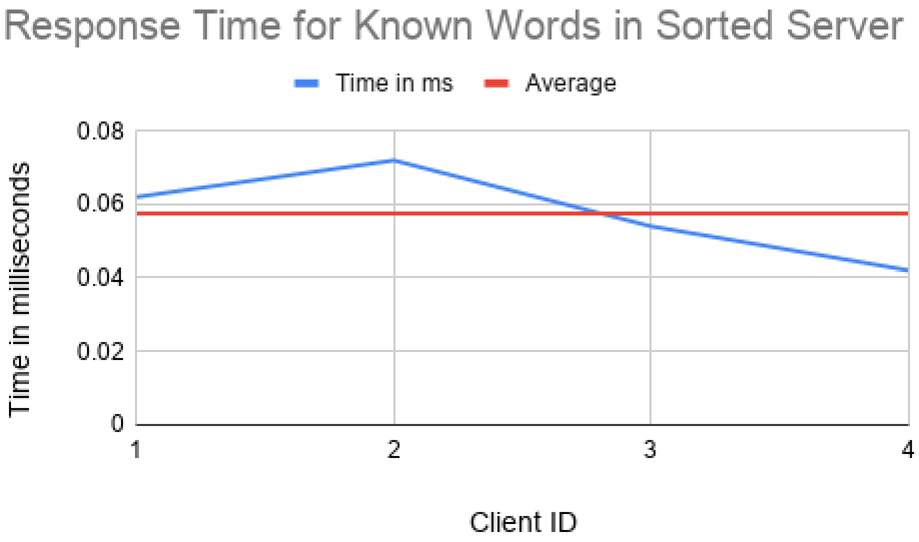
Sorted server, known word : 0.072, 0.047, 0.048, 0.056





Sorted server, unknown word : 0.062, 0.072, 0.054, 0.042





Conclusions

The average response time for client side is nearly 0.06 ms across all experiments, with some minor variations for the different types of servers. The CPU usage also retains a nearly uniformly constant value across all the experiments.