

### Assignment 3 : Calculating the time o perform various function calls

Name: Chuxuan Zhang

Student ID: 301267261

According to the requirements of the assignment, there are three big parts of the assignments: calculating the cost of minimal function call; calculating the cost of a minimal system call and calculating the cost of a read/write system call. For all these three part, the main idea for measuring is use “`clock_gettime()`” function to get the starting time and ending time, then subtract them. Because we want to get the average time, so I use “`test_time`” to control the testing times. Calculate all the time of these times’ testing and then divide the times.

First, I define the begining and ending time for each of the part. For example, I write “`struct timespec func_start, func_end;`” for measuring the cost of a minimal function call.

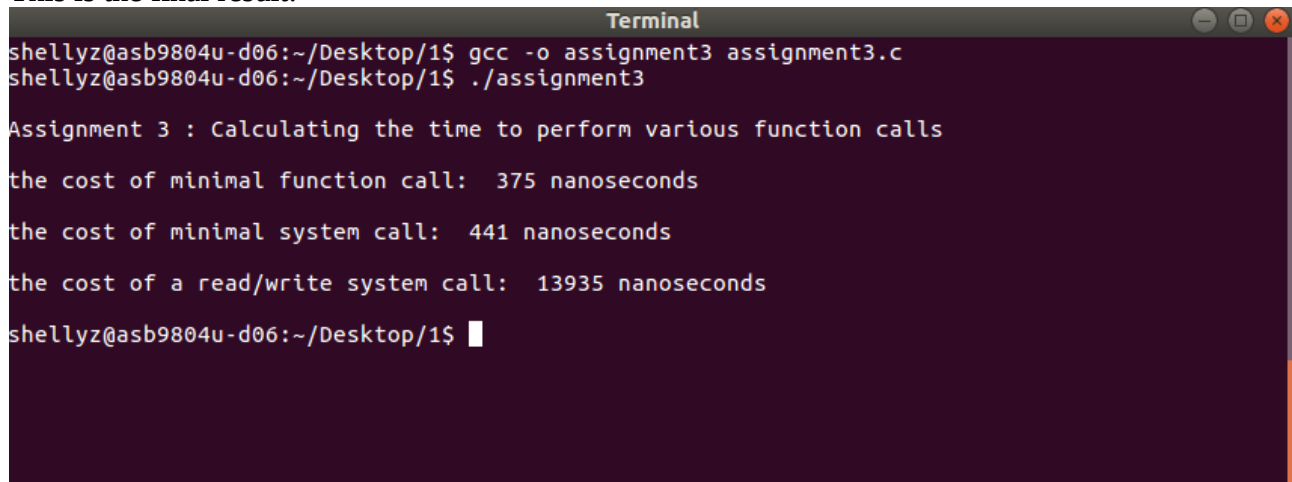
Because the cost time is too small, I use nanoseconds as unit, so I create a function called “`convert_time(struct timespec* t)`” to calculate nanoseconds time.

Part I: use “`func_call()`” to call a empty function

Part II: use “`getpid()`” to get a system call

Part III: set up a pipe with parent and child process; fork a child process “`pid = fork`” and transfer one byte between parents and child (in parent process, write only parent process “`write(pipe_process[1], &a, sizeof(a));`”; in child process, read from parent “`read(pipe_process[0], &a, sizeof(a));`”).

This is the final result:

A terminal window titled "Terminal" with a dark background and light text. It shows the execution of a C program named "assignment3.c". The user runs "gcc -o assignment3 assignment3.c" and then "./assignment3". The program outputs the results of three timing tests in nanoseconds. The output is as follows:

```
shellyz@asb9804u-d06:~/Desktop/1$ gcc -o assignment3 assignment3.c
shellyz@asb9804u-d06:~/Desktop/1$ ./assignment3
Assignment 3 : Calculating the time to perform various function calls
the cost of minimal function call:  375 nanoseconds
the cost of minimal system call:    441 nanoseconds
the cost of a read/write system call: 13935 nanoseconds
shellyz@asb9804u-d06:~/Desktop/1$
```