Week #4 Self-assessments: Jobs & Timing review Results for Maciej Wozniak

Score for this attempt: **12** out of 13
Submitted Sep 17 at 10:48pm
This attempt took 13 minutes.

Question 1

1 / 1 pts

A program was run on a very lightly-loaded machine with 8 cores. Given the following output from `/usr/bin/time`, how long (as perceived by the user) did the program take to run?

```
4.17user 2.74system 0:03.10elapsed 374%CPU (0avgtext+0avgdata 22032maxreside
nt)k
117184inputs+0outputs (0major+6143minor)pagefaults 0swaps
```

- 4.17 seconds
- 0.31 seconds
- 3.10 seconds

Correct!

- 2.74 seconds

Question 2

1 / 1 pts

A program was run on a very lightly-loaded machine with 8 cores. Given the following output from `/usr/bin/time`, how many threads were run on an average?

```
4.17user 2.74system 0:03.10elapsed 374%CPU (0avgtext+0avgdata 22032maxreside
nt)k
117184inputs+0outputs (0major+6143minor)pagefaults 0swaps
```

- 2
- 4 (Correct!)
- 6
- 8

Question 3

1 / 1 pts

Assume the timing (and other runtime characteristics) of a program called `./chatty` has to be measured. However, the program generates a lot of output which is hindering timing analysis. A good solution to measure the timing of the program would be:

- `/usr/bin/time ./chatty`
- `/usr/bin/time ./chatty | /dev/null`
- `/usr/bin/time ./chatty < /dev/null`
- `/usr/bin/time ./chatty > /dev/null` (Correct!)

Question 4

1 / 1 pts

A program was run on a very lightly-loaded machine with 8 cores. Given the following output from `/usr/bin/time`, what was the total time was spent running instructions in userspace?

```
4.17user 2.74system 0:03.10elapsed 374%CPU (0avgtext+0avgdata 22032maxresident)k
117184inputs+0outputs (0major+6143minor)pagefaults 0swaps
```

- 2.74 seconds

Correct!

- 4.17 seconds
- 3.10 seconds
- 374 seconds

Question 5

1 / 1 pts

Assume the timing (and other runtime characteristics) of a program called `./magic` has to be measured, with command-line arguments `5 "test" ~/`. The correct bash shell command is:

- `time 5 "test" ~/ ./magic`
- `time ./magic 5 "test" ~/`
- `/usr/bin/time 5 "test" ~/ ./magic`

Correct!

- `/usr/bin/time ./magic 5 "test" ~/`

Question 6

1 / 1 pts

A program was run on a very lightly-loaded machine with 8 cores. Given the following output from `/usr/bin/time`, what was the total time was spent running instructions as part of system calls?

```
4.17user 2.74system 0:05.10elapsed 374%CPU (0avgtext+0avgdata 22032maxreside
nt)k
117184inputs+0outputs (0major+6143minor)pagefaults 0swaps
```

- 4.17 seconds
- 3.74 seconds
- 3.10 seconds

Correct!

- (selected) 2.74 seconds

Question 7

1 / 1 pts

In the following simple C++ program, which line of code most likely contributes to system time?

```
1: #include <iostream>
2: int main() {
3:     auto sum = 0.0;
4:     for (int i = 0; (i < 1000000); i++) {
5:         sum += std::sin(i);
6:     }
7:     std::cout << sum << std::endl;
8: }
```

- Line 5
- Line 1
- Line 3

Correct!

- (selected) Line 7

Question 8

1 / 1 pts

In the following simple C++ program, which line of code contributes the most to user time?

```
1: #include <iostream>
2: int main() {
3:     auto sum = 0.0;
4:     for (int i = 0; (i < 1000000); i++) {
5:         sum += std::sin(i);
6:     }
7:     std::cout << sum << std::endl;
8: }
```

- Line 1
- Lines 5

Correct!

- Line 4
- Line 7

Question 9

0 / 1 pts

On average, a CPU completes 2.5 instructions in 2 clock cycles. Hence, its CPI is

- 1.25

orrect Answer

- 0.8
- 2

ou Answered

- 2.5

Question 10

1 / 1 pts

A 2 GHz CPU with a CPI of 1.0 is used to run 4 billion instructions. Assuming no context switching (*i.e.*, non-preemptive scheduling), the time taken to complete the program would be:

- 4 seconds
- 8 seconds
- 1 second
- 2 seconds

Correct!

Question 11

1 / 1 pts

A 1 GHz CPU manages to run 2 billion instructions in a second. Assuming no context switching (*i.e.*, non-preemptive scheduling), the CPI of the program is

- 1
- 2
- 4
- 0.5

Correct!

Question 12

1 / 1 pts

A program that is very effectively multithreaded runs in 10 seconds using 1-Core. What is the fastest that the program can run using 4 cores?

- 5 seconds
- 10 seconds

Correct!

- (selected) 2.5 seconds
- 4 seconds

Question 13

1 / 1 pts

A single-threaded program that runs in 10 seconds, is run using a job to which 4 cores have been reserved. The program will complete in

Correct!

- (selected) 10 seconds
- 4 seconds
- 2.5 seconds
- 5 seconds

Quiz Score: **12** out of 13