

Multicore Processors: Architecture & Programming

Homework Assignment 3

[Total 40 points]

1. [15] State three reasons that can make the execution time of a sequential program better than the multithreaded version.
2. For each one of the following statements, state a reason/scenario to justify the statement. Assume all the programs run sequentially and on the same machine.
 - a) [5] One program with higher instruction count may be faster than another program with lower instruction count.
 - b) [5] A machine with higher MIPS may be slower in reality than another machine with lower MIPS.
 - c) [5] One program with lower CPI may be faster than another program with higher CPI.
3. For the following instructions, that are calculating a, b, and c:

```
x++ ;  
a = x + 2;  
b = a + 3;  
c++;
```

- a. [3] Without changing the code, How many threads could be used to parallelize the computation above. Explain clearly which instruction(s) will go to which thread.
- b. [7] If you are allowed to change the code, can you modify it to make it more parallelizable? If so, write the new version and state how many threads can be used.