Project 1

1. IPC = 1.6803
2. IPC = 0.7767,

(1.6803-0.7767)/1.6803 = 53.78%

It lost by 53.78%; that is because the out of order procedure does not require the previous process to complete first and then the next process can start. If there is no dependency, there is no need for the next instruction to wait.

* 1. 300M/(3.0GHz \* IPC) = 300000000/(3,000,000,000 \* 1.6803) = 0.05951s
  2. 165650508651/(3.0GHz \* IPC) = 165650508651/ (3,000,000,000 \* 1.6803) = 32.8613s

As it is expected, the faster the CPU speed the faster the program can finish.

* 1. With the doubling the values of fetch, decode, issue, and commit, the CPI is 1.8584. It improves by 10.60% comparing to the result without doubling those factors. Doubling them tells us that it is possible to increase the speed of the CPU by doubling the CPU factors.

(1.8584-1.6803)/1.6803 = 10.60%

* 1. There are many different factors in the CPU other than the fetch or decode mentioned above. However, the register update unit (RUU) size would have the most improvement impact on the CPU when doubling the fetch, decode, issue, and commit.

**Note: Look at the ReadMe about how to read the reference.**