CDA3100 Chapter 1 Exercises

Consider two machines with two different instruction sets. Each machine has a 2Ghz clock and the following measurements are recorded upon execution of a program.

Machine A	Instruction Class		
	Arithmetic	Load/Store	Branch
Instruction Count (millions)	6	4	2
CPI	1	2	4

Machine B	Instruction Class		
	Arithmetic	Load/Store	Branch
Instruction Count (millions)	10	5	1
CPI	2	2	4

1 – (4 points) For Machine A, what is the average CPI and execution time?
2 – (4 points) For Machine B, what is the average CPI and execution time?

For Machine A only, consider that the program is parallized to run on 1, 2, and 4 processors. Assume that as the program is parallelized to run over multiple cores, the number of instructions are evenly divided between processors.

3 – (6 points) What is the total execution time for this program on 1, 2, and 4 processors? Also, what is the speedup relative to the single processor result?

Now assume that as the program is parallelized to run over multiple cores, the number of instructions per processor are divided by 0.5p, where p is the number of processors.

4 – (6 points) What is the total execution time for this program on 1, 2, and 4 processors? Also, what is the speedup relative to the single processor result?

I suggest using a table similar to the following to help answer questions 3 and 4.

Processors	Arithmetic	Load/Store	Branch	Execution Time
1				
2				
4				