

0分, 共0分

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Question 4 - 1 (1.9.1)

7分, 共7分

Section 1.7

Assume for arithmetic, load/store, and branch instructions, a processor has CPIs of 1, 12, and 5, respectively. Also assume that on a single processor a program requires the execution of $2.56E+9$ arithmetic instructions, $1.28E+9$ load/store instructions, and 256 million branch instructions. Assume that each processor has a 2 GHz clock frequency. Assume that, as the program is parallelized to run over multiple cores, the number of arithmetic and load/store instructions per processor is divided by $0.7 \times p$ (where p is the number of processors) but the number of branch instructions per processor remains the same. Find the total execution time for this program on 1, 2, 4, and 8 processors, and show the relative speedup of the 2, 4, and 8 processor result relative to the single processor result.

Find the total execution time for this program on 1, 2, 4, and 8 processors, and show the relative speedup of the 2, 4, and 8 processor result relative to the single processor result.

p	# arith inst.	# L/S inst.	# branch inst.	cycles	ex. time	speedup
1	A	1.28E+09	2.56E+08	1.92E+10	9.60	1.00
2	1.83E+09	B	2.56E+08	1.41E+10	7.04	E
4	9.14E+08	4.57E+08	C	D	3.84	F
8	4.57E+08	2.29E+08	2.56E+08	4.48E+09	2.24	G

✓ What is the A value? (Round off to the 2nd decimal place)

1/1

- 2.56E+9 ✓
- 3.56E+9
- 4.56E+9

✓ What is the B value? (Round off to the 2nd decimal place)

1/1

- 7.14E+8
- 8.14E+8
- 9.14E+8 ✓

✓ What is the C value? (Round off to the 2nd decimal place)

1/1

- 2.56E+7
- 2.56E+8 ✓
- 2.56E+9

✓ What is the D value? (Round off to the 2nd decimal place)

1/1

- 1.63E+9
- 7.68E+9 ✓
- 8.15E+9

✓ What is the E value? (Round off to the 2nd decimal place) *

1/1

1.36 ✓

✓ What is the F value? (Round off to the 2nd decimal place) *

1/1

2.5 ✓

✓ What is the G value? (Round off to the 2nd decimal place) *

1/1

4.29 ✓