Started on	Tuesday, 28 January 2020, 10:10 PM
State	Finished
Completed on	Tuesday, 28 January 2020, 10:12 PM
Time taken	1 min 56 secs
Marks	15.00/15.00
Grade	**100.00** out of 100.00

Question 1

Correct

Mark 1.00 out of 1.00

Which of the following is not a reason why autotuning codes are desirable?

Select one:

- a. autotuners are the only way to achieve lower bounds for problems like Matrix Multiply ✓
- b. lots of code variations to try including block sizes,unrolling etc
- c. code performance is dependent on platform
- d. compiler behavior is hard to predict

The correct answer is: autotuners are the only way to achieve lower bounds for problems like Matrix Multiply

Question 2

Correct

Mark 1.00 out of 1.00

The main reason why we prefer to express problems in term of BLAS3 operations rather than BLAS2 operations when this is possible is because:

Select one:

- a. BLAS3 operations are easier to code
- b. BLAS2 operations only use the 2nd level cache on processors
- c. BLAS3 operations run a higher fraction of peak of the machine ✓
- d. BLAS3 operations require writing less code

The correct answer is: BLAS3 operations run a higher fraction of peak of the machine

Question 3

Correct

Mark 1.00 out of 1.00

Which of the following is not a potential benefit of using copy optimizations?

Select one:

- a. asymptotically reducing the amount of data to be copied ✓
- b. reducing cache conflicts
- c. getting constant array offsets for fixed size blocks
- d. exposing page-level locality

The correct answer is: asymptotically reducing the amount of data to be copied

Question 4

Correct

Mark 1.00 out of 1.00

For Matrix Multiply the Hong/Kung theorem on lower bounds tells us that any algorithm must move at least this many words from slow memory to fast memory

Select one:

- a. n^3 / M
- b. n^3 / M^(1/2) ✓
- c. n^3
- d. n^3 / M^(3/2)

The correct answer is: n^3 / M^(1/2)

Question 5

Correct

Mark 1.00 out of 1.00

Strassen's Matrix multiply manages to multiply two 2x2 matrices using how many multiplications?

Select one:

- a. 5
- b. 6
- c. 8
- d. 7 ✓

The correct answer is: 7

Question 6

Correct

Mark 1.00 out of 1.00

If we define r to be the third parameter of the Recursive Matrix Multiplication algorithm that defines the size of the current matrices that we're looking to multiply and if we start with an initial problem of size N and a fast memory of size M then when would we stop the recursion in order to get good performance?

Select one:

- a. 3 * r^2 <= M
- b. r = 1
- c. r = N/2
- d. 3 * r <= M ✓

The correct answer is: 3 * r <= M

Question 7

Correct

Mark 1.00 out of 1.00

An example of a BLAS2 operation is

Select one:

- a. computing a Dot product
- b. Matrix-Matrix Multiplication
- c. Saxpy (y = alpha *x + y)
- d. Matrix-Vector Multiplication ✓

The correct answer is: Matrix-Vector Multiplication

Question 8

Correct

Mark 1.00 out of 1.00

Vector processors don't have which of the following properties

Select one:

- a. they can execute divergent code (code that branches differently on reaching instructions like ifs, switchs etc.) efficiently ✓
- b. they contain parallel registers in which data can be loaded
- c. they can allow parallel instructions for larger sizes than the available hardware
- d. they have multiple functional units all for same operations

The correct answer is: they can execute divergent code (code that branches differently on reaching instructions like ifs, switchs etc.) efficiently

Question 9

Correct

Mark 1.00 out of 1.00

In a shared memory model a thread communicates by

Select one:

- a. writing local stack variables
- b. writing shared variables ✓
- c. via sending data messages to other threads
- d. via issuing explicit concurency commands

The correct answer is: writing shared variables

Question 10

Correct

Mark 1.00 out of 1.00

In a distributed-memory machine, is it possible to access any data from another processor?

Select one:

- a. No all data is private to each processor ✓
- b. Yes but only if you know the variables names
- c. Yes but only if the data is part of the same shared array
- d. Yes all data can be accessed but the model suggest using messages

The correct answer is: No all data is private to each processor

Question 11

Correct

Mark 1.00 out of 1.00

A SIMD system is different from a distributed-memory machine in which way?

Select one:

- a. SIMD cores don't have local memory for each node just registers
- b. it has a single cache that is shared between SIMD processors
- c. it has a single control processor that issues instructions ✓
- d. there are no network interfaces between the processors and the network interconnect

The correct answer is: it has a single control processor that issues instructions

Question 12

Correct

Mark 1.00 out of 1.00

Data Parallel is a different model of computation vs previously presented ones because

Select one:

- a. all parallel programs have to execute same instruction stream just on different data ✓
- b. it's the only model where communication is implicit
- c. all problems can be easily described in this model
- d. communication costs are very low in this model

The correct answer is: all parallel programs have to execute same instruction stream just on different data

Question 13

Correct

Mark 1.00 out of 1.00

Broadcasting one value to all n processors takes at best a time the size of

Select one:

- a. O(n)
- b. O(1)
- c. O(log^2 n)
- d. O(log n) ✓

The correct answer is: O(log n)

Question 14

Correct

Mark 1.00 out of 1.00

The property of a binary operation required for a log N time reduction on n inputs is

Select one:

- a. commutativity
- b. distributivity
- c. associativity ✓
- d. existence of an identity value

The correct answer is: associativity

Question 15

Correct

Mark 1.00 out of 1.00

A parallel prefix consists of doing how many tree traversals?

Select one:

- a. n passes
- b. 1 step
- c. 2 passes ✓
- d. log n passes

The correct answer is: 2 passes

◄ Lecture Video: Optimizing Matrix Multiply (cont), Introduction to Data Parallelism

Jump to...

Problem Description ►