Started on	Saturday, 8 February 2020, 4:44 PM
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Time taken	2 mins 55 secs
Marks	10.00/10.00
Grade	**100.00** out of 100.00

Question 1

Correct

Mark 1.00 out of 1.00

Explicit Methods are generally used to solve

Select one:

- a. all PDE problems
- b. Elliptic problems
- c. Hyperbolic problems ✓
- d. Parabolic problems

The correct answer is: Hyperbolic problems

Question 2

Correct

Mark 1.00 out of 1.00

The matrix for 1D problems with 2's down the diagonal and -1 in the first super and sub offdiagonals is called

Select one:

- a. the Cholesky factorization
- b. the Eigenvector
- c. the determinant
- d. the Laplacian ✓

The correct answer is: the Laplacian

Question 3

Correct

Mark 1.00 out of 1.00

Explicit methods aren't very effective for parabolic systems because

Select one:

- a. they cannot solve the equations
- b. they require very small timestep for stability ✓
- c. they always blow up numerically after a number of timesteps
- d. they require small discretizations of the domain for stability

The correct answer is: they require very small timestep for stability

Question 4

Correct

Mark 1.00 out of 1.00

2D or 3D Poisson's Equation is a/an

Select one:

- a. Hyperbolic problem
- b. Parabolic problem
- c. ODE
- d. Elliptic problem ✓

The correct answer is: Elliptic problem

Question 5

Correct

Mark 1.00 out of 1.00

The reason why Mflop/s isn't always the best metric for choosing an algorithm is

Select one:

- a. it doesn't include the communication time of the algorithm
- b. it varies too widely between multiple runs of the algorithm on the same machine
- c. the number of flops for different algorithms that solve the same problem can vary widely ✓
- d. it doesn't well represent how fast an algotithm's instruction / instruction stream can be executed with given hardware resources

The correct answer is: the number of flops for different algorithms that solve the same problem can vary widely

Question 6

Correct

Mark 1.00 out of 1.00

PRAM is a model for designing parallel algorithm where

Select one:

- a. computation and communication on 1 value have equal non-zero cost
- b. communication has no cost ✓
- c. computation has no cost
- d. both computation and communication have no cost

The correct answer is: communication has no cost

Question 7

Correct

Mark 1.00 out of 1.00

The number of FLOPs required to solve Poisson's Equation for N variables using an FFT is

Select one:

- a. O(N^2)
- b. O(N^3)
- c. O(N * log N) ✓
- d. O(N)

The correct answer is: O(N * log N)

Question 8

Correct

Mark 1.00 out of 1.00

In the matrix of a composite mesh made out of pieces of 2D stuctured grids in natural ordering the most distant off-diagonal elements represent

Select one:

- a. connections between different 2D stuctured grids ✓
- b. fill-in values due to Gaussian Ellimination
- c. other pieces of 2D stuctured gris of the composite mesh
- d. disconnected pieces of the mesh

The correct answer is: connections between different 2D stuctured grids

Question 9

Correct

Mark 1.00 out of 1.00

Which of the following is not a goal of reordering a connectivity matrix

Select one:

- a. reducing fill-in when applying Gaussian elimination
- b. improving parallelism by lowering communication
- c. modifying the resolution of the grids used ✓
- d. improving caching and memory use

The correct answer is: modifying the resolution of the grids used

Question 10

Correct

Mark 1.00 out of 1.00

Adaptive mesh refinement is used

Select one:

- a. to increase parallelism in a problem
- b. to increase resolution in key areas without having to increase complexity everywhere on the grid ✓
- c. to regularize ghost cell layout in a mesh for communication
- d. to reorganize the elements of a matrix to avoid fill-in

The correct answer is: to increase resolution in key areas without having to increase complexity everywhere on the grid

◄ Lecture Video: Sources of Parallelism and Locality in Simulation (Part 2)

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