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Quiz 6

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Time taken	3 mins 25 secs
Marks	15.00/15.00
Grade	**100.00** out of 100.00

Question 1

Correct

Mark 1.00 out of 1.00

An example of a field that can use all 4 categories of simulation is:

Select one:
- a. circuits ✔
- b. finance
- c. *Game of Life*
- d. PDEs

The correct answer is: circuits

Question 2

Correct

Mark 1.00 out of 1.00

An asynchronous (event driven) simulation is needed for some Discrete Event Systems because

Select one:
- a. synchronous simulations can only use two copies of the grid
- b. some systems don't change or need to communicate often between components ✔
- c. some systems are too large for synchronous simulations
- d. event driven simulations are always faster than synchronous simulations

The correct answer is: some systems don't change or need to communicate often between components

Question 3

Correct

Mark 1.00 out of 1.00

A "Surface to volume" ratio in Domain Decomposition refers to

Select one:

○ a. the ratio between the minimum and maximum amount of work assigned to each processor

○ b. the communication needed to be done by a processor divided by to the total amount of communication in a simulation

◉ c. the communication needed to be done by a processor divided by the amount of arithmetic it can do independently ✓

○ d. the arithmetic needed to be done by a processor divided by the total ammount of arithmetic

The correct answer is: the communication needed to be done by a processor divided by the amount of arithmetic it can do independently

Question 4

Correct

Mark 1.00 out of 1.00

A 'barrier' is an instruction that

Select one:

○ a. communicates data between all available processors

○ b. ends the execution of a thread/program when its instructions are done

◉ c. stops a thread/processor until all threads/processors within the group have reached the same point ✓

○ d. requests incoming data from connected processors in a grid layout

The correct answer is: stops a thread/processor until all threads/processors within the group have reached the same point

Question 5

Correct

Mark 1.00 out of 1.00

Graph partitioning is a very hard problem to solve optimally but we are still happy with using this problem for load balancing and minimizing communication because

Select one:

- ⦿ a. algorithms exist that approximate the optimal partition that are easy to implement and for certain graphs answers are easy and known ✓

- ⦿ b. there exists a library that has implemented fast algorithms to find the optimal partition and we can just use their results

- ⦿ c. the problem can always be presented so that the size of the graph we are partitioning is small

- ⦿ d. regardless of the partitioning cost the optimal partition always helps reduce the time of the program much more

The correct answer is: algorithms exist that approximate the optimal partition that are easy to implement and for certain graphs answers are easy and known

Question 6

Correct

Mark 1.00 out of 1.00

A deadlock can happen in an asynchronous conservative simulation if

Select one:

- ⦿ a. two or more events arrive at the same time from different components

- ⦿ b. there is a cycle between some components connected by events and no inputs are received ✓

- ⦿ c. you simulated past the minimum timestep of all input events

- ⦿ d. a component isn't connected to the rest of the graph

The correct answer is: there is a cycle between some components connected by events and no inputs are received

Question 7

Correct

Mark 1.00 out of
1.00

Lumped System simulations

Select one:

⊙ a. compute continuous values dependent on a single continuous parameter per system ✓

○ b. compute values that are not continuous but that are dependent on a continuous parameter

○ c. usually form systems of PDEs

○ d. can only form systems of ODEs

The correct answer is: compute continuous values dependent on a single continuous parameter per system

Question 8

Correct

Mark 1.00 out of
1.00

Lumped systems generally involve the representation of the connectivity between values by a

Select one:

○ a. quad/oct tree data structure

○ b. tree data structure

○ c. full graph / dense matrix

⊙ d. sparse graph / sparse matrix ✓

The correct answer is: sparse graph / sparse matrix

Question 9

Correct

Mark 1.00 out of
1.00

Which of the following statements about Explicit Methods for solving ODEs is false

Select one:

○ a. it needs to be recomputed regularly to maintain balance

○ b. they require small timesteps for correctness

⊙ c. they approximate derivatives with the slope at the next timestep ✓

○ d. they never need to solve systems of equations for next timestep

The correct answer is: they approximate derivatives with the slope at the next timestep

Question 10

Correct

Mark 1.00 out of 1.00

Which of the following statements about Implicit Methods for solving ODEs is false

Select one:

- ● a. they are always faster than explicit methods ✓
- ○ b. they are harder to parallelize than explicit methods
- ○ c. they require solving a system of equations
- ○ d. they can take comparatively large timesteps versus explicit systems

The correct answer is: they are always faster than explicit methods

Question 11

Correct

Mark 1.00 out of 1.00

Direct Methods and Iterative solvers are used for which types of Lumped System problems

Select one:

- ○ a. Implicit Methods for ODEs only
- ○ b. Explicit Methods for ODEs only
- ● c. Implicit Methods for ODES and Eigenvalue problems ✓
- ○ d. Explicit Methods for ODES and Eigenvalue problems

The correct answer is: Implicit Methods for ODES and Eigenvalue problems

Question 12

Correct

Mark 1.00 out of 1.00

CSR format represents a sparse matrix of size n^2 and with m nonzeros by a structure with how much data storage?

Select one:

- ○ a. 2*n + m + 1
- ○ b. n^2 + m
- ○ c. m + n + 1
- ● d. 2*m + n + 1 ✓

The correct answer is: 2*m + n + 1

Question 13

Correct

Mark 1.00 out of 1.00

A parallel SpMV implementation of y=A*x , as presented in the lecture, may require communication of:

Select one:

- ⦿ a. parts of x ✓
- ◯ b. all of y
- ◯ c. parts of y
- ◯ d. parts of A

The correct answer is: parts of x

Question 14

Correct

Mark 1.00 out of 1.00

Which of the following is not a goal of reordering the rows/columns of matrix A for a parallel SpMV?

Select one:

- ◯ a. improving register and cache use
- ◯ b. minimizing communication
- ◯ c. balancing load and storage
- ⦿ d. reducing the number of non-zeros in the matrix ✓

The correct answer is: reducing the number of non-zeros in the matrix

Question 15

Correct

Mark 1.00 out of 1.00

In the discussion of Discrete Systems, Particle Systems and Lumped Systems which of the 13 motifs/dwarfs of parallel computing hasn't been brought up yet?

Select one:

- ⦿ a. unstructured grids ✓
- ◯ b. sparse matrices
- ◯ c. dense matrices
- ◯ d. FFTs

The correct answer is: unstructured grids

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