Week 2 Assignment 2

Due on 2020-09-30, 19:30 EST.

1. Consider a matrix-vector multiplication with zero matrix. What is the maximum number of concurrent tasks to which it can be decomposed without any task dependency?
   a. n
   b. m
   c. n*m
   d. None of the above

2. Consider the task dependency graph. Which one is the critical path?

   a. \( a \to b \to c \)
   b. \( b \to e \to f \)
   c. \( a \to b \to e \to f \)
   d. \( a \to c \to d \)

3. Consider the task dependency graph in question 2. Find the maximum degree of concurrency and average concurrency.
   a. maximum: 2, average: 2
   b. maximum: 4, average: 0.5
   c. maximum: 4, average: 2
   d. None of the above

4. Which of these factors may not be considered for mapping of tasks in processes in design of parallel implementation?
   a. Load balancing
   b. Interaction between the tasks
   c. Data locality
   d. Accuracy of the solution

5. Two of the decompositions, A & B, show the same degree of maximum concurrency and average concurrency. However, it gives better parallel performance over large number of processors. This might be due to the reason:
   a. Task A has less communication among the processes
   b. Task A may have some tasks which are not in linear dependency of data
   c. Different processes in Task B write to some memory locations, but this does not happen in Task A
   d. None of the above

6. Cost of communication in parallel computing is always greater than the sequential cost.
   a. True
   b. False

7. A parallel job takes a speed up of 6 on 8 processors. If the sequential computing takes 35 sec, the parallel execution:
   a. 5 sec
   b. 17.5 sec
   c. 21.5 sec
   d. None of the above

8. A parallel job takes a speed up of 6 on 8 processors. The same job gives a speed up of 12 when scaled using 16 processors.
   a. True
   b. False

   a. True
   b. False

10. A parallel algorithm has 15% sequential component. Find its maximum efficiency with 12 processors.
    a. 0.35
    b. 0.775
    c. 0.677
    d. 0.225