



This quiz is for marks! Maximum recordable mark is 100%.

PLEASE ANSWER ON A SEPARATE PAGE

MAKE SURE YOUR STUDENT NUMBER IS ON YOUR ANSWER PAGE(s)

TOTAL NUMBER OF QUESTIONS : SEVEN

time(min):

#	Question	Marks
Q1	Computation methods range broadly between the domains of: 1) entirely hardware; 2) reconfigurable computing; and 3) software processor based systems. Explain the difference between reconfigurable computing and more traditional software processor based systems. Highlight two advantages for each of these two approaches.	6
Q2	Answer the questions below: (a) What is an SMP processor? Explain what the acronym stands for and briefly describe in a sentence or two the main characteristics of this sort of processor. [4 marks] (b) Briefly explain automatic parallelism [3 marks]. (c) Mention three drawbacks or challenges that need to be overcome to make automatic parallelism effective [3 marks].	10
Q3	For each question below, select either option A, B or C. (a) Wall clock time is... A. The same as simulation time. B. Commonly used to refer to real-time measurements. C. Always measured at the resolution of discrete minutes elapsed. [2 marks] (b) Consider the following code: void thread (int id) { sum[id]=0; for (int i=id; i<MAX; i+=nthreads) sum[id] += sharedmem[i]; } Assume that sum, nthreads and sharedmem are global arrays accessible by all the threads, and MAX is the size of sharedmem in words. nthreads is >=1 and represents the number of threads that have been created in the program (assume nthreads = 4). Which one of the following shared memory accessing techniques are being employed in the code above if there are more than one thread in use: A. Contiguous B. Interleved C. Interlaced [4 marks] (c) Select the most correct definition for 'parallel overhead' below: A. The additional disk space to store the parallel code implementation. B. The latency caused by the operating system to load and activate a parallel program, compared to the time to load and activate a sequential program. C. Time spent coordinating tasks. [2 marks]	8
Q4	(a) Discuss the difference between the temporal and spatial paradigms of developing programs. Elaborate on benefits and drawbacks of these approaches. [4 marks] (b) What is the meaning of 'golden measure' in terms of developing optimized parallel code? Elaborate on how the golden measure is used as a means to avoid, or to identify, false solutions. [5 marks] (c) Given the statement that "most code doesn't need to be made parallel." Present motivation that supports this statement. [3 marks]	12

Q5	<p>These multiple choice questions relates paper discussed in seminar 1, titled "The Landscape of Parallel Computing Research: A view from Berkeley".</p> <p>(a) Mention two of the 'seven critical questions' discussed in the paper [2 marks].</p> <p>(b) In terms of single chips that have 1000s of cores in them, the discussion of optimizations amis emphasises the need to optimize which of the following ratios? You can select more than one options for this question. [2 marks]</p> <p>A. Maximize MIPS/watt, B. Maximize MIPS/area C. Maximize MIPS/\$ D. Minimize MIPS/°C</p> <p>(c) Briefly express what is meant by the term "Conventional Wisdom" CW). Name two old CWs and respectively how each one of these have been replaced by a new CW (if indeed the new CW is different to the old CW). [4 marks]</p> <p>(d) Briefly explain the concept of a DWARF as elaborated in the Berlkeley paper, and provide one example of such a DWARF. [3 marks]</p>	11
Q6	<p>(a) Briefly explain the difference between the spatial and the temporal computing paradigms. (Optional rough sketch to aid your explanation.) [4 marks]</p> <p>(b) Briefly discuss why parallel programs would probably be more effectivly implemented using a language within the spatial paradigm of computing. [3 marks]</p>	7
Q7	<p>Implement the following lines of pseudo code as lines of OCTAVE code. If you can't remember all the command names and syntax, just try your best. It won't be marked too stringently. Build in commands like sort won't be accepted in the solution.</p> <pre>function sort (x : array of values) swapped = true N = length of X while swapped do begin swapped = false for i = 1 to N - 1 do: // see if a pair is out of order if (x[i-1] > x[i]) then // swap them and indicate that a pair was swapped swap A[i-1] with A[i] swapped = true end if end for end while end function</pre>	10
Q8	<p>** BONUS MARK QUESTION: **</p>	[2]
	<p>The concept of 'small is beautiful' was used in seminar 1 to refer to many small cores giving many possible advantages over a comparative approach of fewer big cores. Which one of the following advantages of a multiple small cores architecture is generally false:</p> <p>A. Small cores give highest performance / area B. Small cores give fine granularity C. Small cores give maximum power consumption D. Small cores are easier to design & work with</p>	
TOTAL :		64