Examination Feedback for EEE411 – Advanced Computer Architecture
Autumn Semester 2010-11

Feedback for EEE411 Session: 2010-2011

Feedback: Please write simple statements about how well students addressed the exam paper in general and each individual question in particular including common problems/mistakes and areas of concern in the boxes provided below. Increase row height if necessary.

General Comments:

On balance, this paper was quite badly attempted. There was ample evidence that people had not learned the factual material or that they could not relate the facts to the questions asked. Furthermore, simple mathematical manipulations seemed to flummox people.

Question 1:

This was done reasonably or very badly. The 'thinking' part of the question required you to see how the hardware could be used to generate $\sin(\theta+\Delta)$ and $\cos(\theta+\Delta)$ from $\sin(\theta+\Delta)=\sin(\theta)\cos(\Delta)+\cos(\theta)\sin(\Delta)$ and $\cos(\theta+\Delta)=\cos(\theta)\cos(\Delta)-\sin(\theta)\sin(\Delta)$. This could be achieved by assuming that $\cos(\theta)$ and $\sin(\theta)$ emerged sequentially in consecutive clock cycles to be fed back into the input and then showing that $\sin(\theta+\Delta)$ and $\cos(\theta+\Delta)$ emerged in the same order at the end of the cycle. In truth, either order sin then cos or vice versa works. Those who did the question very badly failed to see that this was how the pipeline would need to operate.
The last part of the question was addressed quite badly. In this case, I was really looking for two things: that a number of Δ could be used e.g. $\pi/4$ then $\pi/2$ to allow a value of angle to be homed in on much more quickly and that by changing the + to – and vice versa then the circuit could be made to subtract Δ from the angle rather than adding it.

Question 2:

Question 2 was answered 'reasonably'. Whilst most people could answer part a) and b) some people thought that blocking related to the difference between packet and circuit switched networks – clearly, they had not absorbed the factual material well enough. In part c) most people could draw the organization of the cps well enough, fewer could connect them together properly and fewer still could tell me about digit-selectable addressing. The final part, d), was answered well. People know what the terms referred to and could come up with the right probability. Most people knew how the probability affected the throughput: some estimated, some proved, and some just stated the result of the proof.

Question 3:

Again, this question was reasonably well answered. However, in part a) a number of people provided a diagram for a simple pipelined processor as opposed to a superscalar process. In part b) a number of people provided answers relating to data dependency problems and not control dependency problems, as asked for. No marks are provided if you do not answer the question as asked. Part c) was well answered in the main although the level of detail provided in some cases made it difficult to mark. Furthermore, in the instances where R1/R2 are overwritten – potentially before being written for the first time, some people assumed that the same data register could be re-used. This is not the case because it would leave references to the same data register in reservation stations with no way of distinguishing between them.

Question 4:

This question was answered quite badly. This is odd because it was a very straightforward question. Many people could not recall the example that we did in class that was quite similar to part a) (apart from the internal time) and could not even come close (in some cases) to constructing the expression. Part b) was answered better but a number of people cannot, it seems, do simple mathematical manipulations. Part d) was asking for a value that was just sufficient to support parallelization. I would read this to mean when speed-up just exceeds 1 for the case when n=2 (n=1 is not parallelized, n=2 is).