Quiz Number 1 – Solutions

Open Book; Open Notes
Time Given=15 minutes (18/03/2003)

“I certify that I have neither received nor given unpermitted aid on this examination and that I have reported all such incidents observed by me in which unpermitted aid is given.”

Signature ________________

Name ____________________________
Student ID __________________________

Problem 1: [10 points] We need to find maximum size and maximum weight matches, $M_s$ and $M_w$, respectively in a $4 \times 4$ input queued (IQ) switch in a given time slot. The switch uses virtual output queues and the states of the queues for the time slot of interest are shown in figures. In the following two figures, draw lines from inputs to outputs to indicate the two matches. Numbers written within cells show destination numbers.

![Fig. 1: Maximum size matching](image1)

![Fig. 2: Maximum weight matching](image2)

Problem 2: [10 points]

(a) State the difference between maximal-size match and maximum-size match? Which of them is larger? Can they be equal?

A maximal-size match is obtained iteratively without removing the connections made in previous iterations; matching in each iteration is usually done by random arbitration. Maximum-size match, however, is obtained by looking at all the inputs and outputs simultaneously. Thus, a maximum-size match is always greater than or equal to a maximal-size match.

(b) Intuitively, why $i$SLIP performs better than round-robin? You may like to think what happens to Request, Grant, and Accept in the two cases.

The only difference between $i$SLIP and round-robin is that $i$SLIP desynchronizes the Grant and Accept arbiters at the inputs and outputs, respectively. This results in the possibility of a larger match by avoiding locking of Grant arbiters; a higher throughput is thus expected in case of $i$SLIP algorithm.