

University of Colorado at Boulder
Department of Electrical and Computer Engineering
ECEN 2120 – Computers as Components

Quiz V

April 2008

STUDENT ID

- TIME ALLOWED = 50 minutes
- THIS IS A CLOSED BOOK EXAM
- NO CALCULATOR IS ALLOWED

Q1	Q2

TOTAL	
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Q1 (50pts) Two processes, A and B, share one data buffer. Design an algorithm to guarantee that only one process can access the buffer at each time. In addition, if both A and B both need to access the shared buffer, A will always have a higher priority.

Process A:

```
Flag[a] = 1;  
Turn = a;  
While(flag[b] == 1 and turn = a) {}  
Enter the critical section
```

Flag[a] = 0;

Process B:

```
Flag[b] = 1;  
Turn = b;  
While(flag[a] == 1) {turn = b;}  
Enter the critical section
```

Flag[b] = 0;

Q2 (50pts) People recently designed a new microprocessor which supports the following atomic operation: $y = \text{func}(x[0], x[1], \dots, x[n]) + z$, where func is a system function support both $\text{max}()$ and $\text{min}()$ operations. x is an data array, n and z are integer values. Use this atomic operation to simplify Bakery algorithm implementation.

Choosing[N] is no longer necessary.