EECS 281: **Homework #8** **Due: Tuesday, April 19, 2005**

Name: _____ Email: _____ Grade: _____

1. (a) Give the three excitation optimal k-map of the transition encoded table and clearly show circles. Unused states are Don't Cares. Treat each k-map independently (i.e. do not do multi-output k-map optimisation). (b) Give the minimal SOP expression for each k-map. Let $q_1 = a$, $q_0 = b$ and $i = c$.

q_1	q_0	i	q_1	q_0
0	1	0	1	1
0	1	1	0	0
1	1	0	0	0
1	1	1	0	1
0	0	0	0	1
0	0	1	1	1

q_1	$\overline{b}\overline{c}$	$\overline{b}c$	bc	$b\overline{c}$
$\overline{a}$				
a				

q_0	$\overline{b}\overline{c}$	$\overline{b}c$	bc	$b\overline{c}$
$\overline{a}$				
a				

MSOP of q_1 is _____

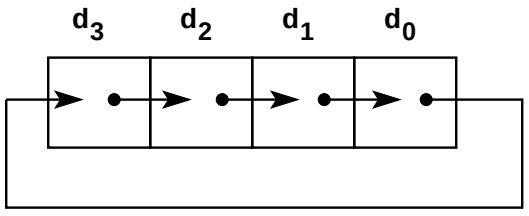
MSOP of q_0 is _____

2. (2a) Draw the state transition diagram for a 1-bit input state machine of problem 1. Use the following state symbols Q=q_1q_0: S=01 for start, W=11, and Z=00. (2b) Convert to regular expression.

3. Draw the Dataflow diagram for the following code and show all datapath widths. The char size is 4-bit.

```
char a, b, c, d;  if ( a <= b ) { a = c * d; }  else { a = b + c * d; }
```

4. Write a (4a) C function, (4b) 8051 assembler, use register A for passing parameter and return value (4c, **LAB 4**) use j51 with screen-shot and source code using putchar and the following test cases: which rotates the lower 4-bits of an 8-bit character right 1-bit. For example, ror1(0x48) returns 0x44; ror1(0x49) returns 0x4c; ror1(0x31) returns 0x38;




```
char ror1(char a) {
```