

ECECS 281: Homework #6

Due: Tuesday, November 16, 2004

Name: _____

Email: _____

1. Write a multi-precision function which shifts right logical 1-bit and returns the shifted out bit:
`int srl_char(char *f, char *a, int n) {`

2. Write a multi-precision function which shifts right arithmetic 1-bit and returns the shifted out bit:
`int sra_char(char *f, char *a, int n) {`

3a. Draw the data flow and for the following code. The char size is 2 bits and label the data path widths. 3b. Show the contents of each data-flow box at the logic level.

```
char a, b, c, d;  
if (a == b) { c+=2; }  
else      { c=d; }
```

4a. Draw the data flow and for the following code. The char size is 2 bits and label the data path widths. 4b. Show the contents of each data-flow box at the logic level.

```
char a, b, c, d;  
if (a >= b) { c+=2; }  
else      { if (a) { d=5; } }
```

5a. Draw the state transition diagram for a 1-bit input for the regular expression "0?1+0(1|0)*". Clearly show the start, final, and error states.

5b. Which of the follow inputs are acceptable inputs (i.e. circle them): 0111111100, 00111100, 010, and 111100.

5c. Write the state machine in C code using switch statements.

5d. Give the Moore State/output table. The output will be 2 bits one for the accepted state and the other for the error state.

5e. Give the binary transition table.

5f. Give the excitation optimal k-map of the transition table and clearly show circles. Treat each k-map independently (i.e. do not do multi-output k-map optimization).

q_0	$\bar{c}\bar{d}$	$\bar{c}d$	$c\bar{d}$	cd
$\bar{a}\bar{b}$				
$\bar{a}b$				
$a\bar{b}$				
ab				

q_1	$\bar{c}\bar{d}$	$\bar{c}d$	$c\bar{d}$	cd
$\bar{a}\bar{b}$				
$\bar{a}b$				
$a\bar{b}$				
ab				

5g. Give the MSP for q_0 , q_1 , f , and e .

5h. Fill in the firmware of the PLA.

