I WILL NOT GRADE THE HOMEWORK. HOWEVER, SOLVING THE HOMEWORK'S PROBLEM WILL PREPARE YOU FOR THE MIDTERM.

Sequential Circuits Problems

PROBLEM: **<u>Designing a traffic light using a D f/f</u>**
state 0 (R/R) → state 1 (G/R) → state 2 (Y/R) → state 3 (R/R) → state 4 (R/G) → state 5 (R/Y); 6 states (000 – 101)

PROBLEM:
Add an Emergency State:
RY blink: for x = 1 go into emergency state
for x = 0 go into next state;

Consider the emergency state to be 110. We have 7 states now (0 to 6) and 4 variable table, for ABC and X. From emergency for x=1 stays in emergency for x=0 reset to 000. Since it was not clearly mentioned, you can also consider that by 0/1 stays in emergency state. In that case you will get different expressions for the f/f inputs.

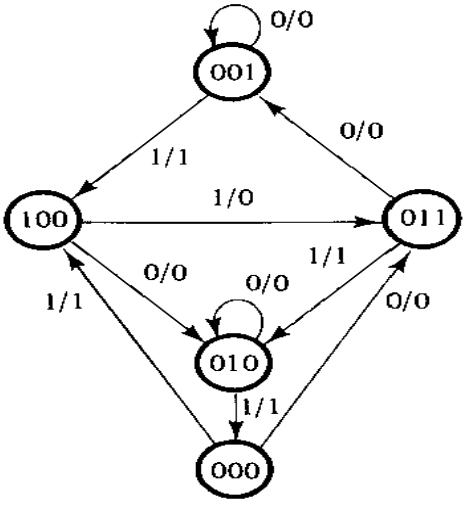
PROBLEM:
A sequential circuit with two D f/f, A and B; two inputs , x and y and one output, z is specified by the following next-state and output functions:

$A(t+1) = x'y + xA$
$B(t+1) = x'B + xA$
$Z = B$

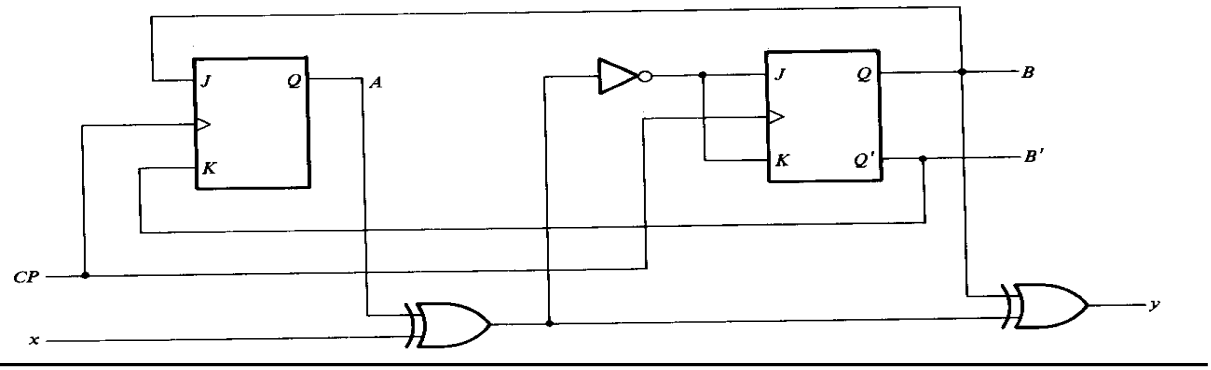
Draw the circuit
Derive the state table
Derive the state diagram

PROBLEM:
A sequential circuit has one f/f Q; two inputs, x and y; and one output S. It consists of a full adder circuit connected to a D f/f. Derive the state table and state diagram of the sequential circuit.

PROBLEM: A sequential circuit had three f/f A,B,C; one input x; one output y. The circuit is to be designed by treating the unused states as don't care conditions. Analyze if the circuit is self-correcting. Use D f/f in the design.



PROBLEM: A sequential circuit has 2 JK f/f, one input x, and one output y. The logic diagram is shown below. Derive the state stable and state diagram.



ADDRESSING MODES

Consider an instruction. The address field of the instruction contains the value **2000**. When needed, **register #18** is used. **Register 18** contains value **1600.**

The list below shows a few addresses and the memory content of each of these addresses.

Address (bytes)	Memory Content
48	844
2000	3000
1600	400
2500	800
3000	1200
3600	500

For each of the Addressing Modes, specify the Effective (Target) Address and value found at that address. For each case give a brief explanation.

Addressing Modes	Effective Address (bytes)	Value
IMMEDIATE		
DIRECT		
INDIRECT		
REGISTER		
REGISTER INDIRECT		
DISPLACEMENT		