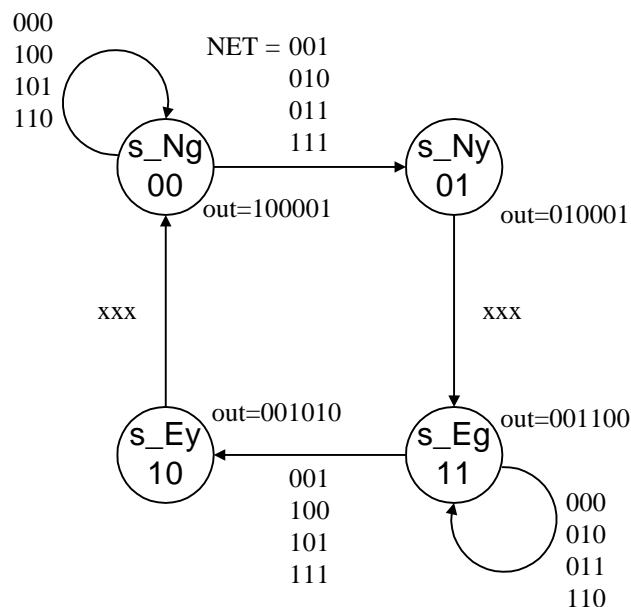# CS120B – Homework #1

Summer 2 2003. Professor Hwang

Given July 31, 2003. Due August 5, 2003 at the beginning of class.

No late homework accepted.

Your work must be completely typeset with a word processor. Circuit diagrams can be drawn using any drawing program or by hand but it must be very neat. Handwritten works will **NOT** be accepted. (12 points total)

1. Since we can use any of the four different types of flip-flops to synthesize the same functional circuit, we should, therefore be able to use one type of flip-flop to implement the functional operation of another type of flip-flop. Use the JK flip-flop to implement the operations of the SR, D, and T flip-flops. In other words, synthesize the circuit for the SR, D and T flip-flops using only JK flip-flops. You need to have three different circuits, one for each type of the three flip-flops. (3)

2. Synthesize a FSM for the following state diagram using SR flip-flops. The input bits are N, E, and T. The output bits are NSg, NSy, NSr, EWg, EWy, and EWr. (3)



3. Repeat question 2 but use T flip-flops. (3)
4. Repeat question 2 but use D flip-flops. (3)