

EE/CSE371 QUIZ 3

Name: _____
Student ID
Number: _____

Please do not turn the page until 11:50.

Instructions

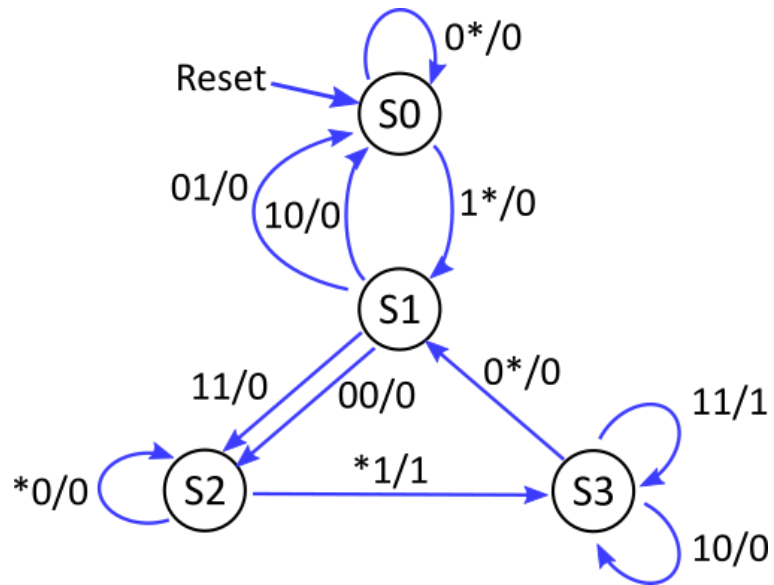
- This quiz contains 3 pages, including this cover page. You may use the backs of the pages for scratch work.
- Please clearly indicate (box, circle) your final answer.
- The quiz is closed book and closed notes.
- Please silence and put away all cell phones and other mobile or noise-making devices.
- Remove all headphones and watches.
- You have 30 (+5) minutes to complete this quiz.

Advice

- Read questions carefully before starting. Read *all* questions first and start where you feel the most confident to maximize the use of your time.
- There may be partial credit for incomplete answers; please show your work.
- Relax.

ASM Chart

The state diagram below has inputs x and y (in that order) and an output z . * means don't care/any. Draw the equivalent ASM chart. [10 pts]



ASMD Chart

The following *incomplete* ASMD chart is for a sequential circuit that **counts how many times a 6-sided die is rolled before a specified number num is seen**. An appropriate LFSR-based pseudorandom number generator is part of the datapath and has an input **enable** (assume a control signal of the same name) to generate the next output **roll** between 1-6.

- The system inputs are: **reset**, **start** (starts the computation), and **num** (1-6; no need to check this). You should ensure that changing **num** once the rolling has started doesn't affect the outcome.
- The system outputs are: **ready** (while idling), **done** (high for one cycle when computation is complete), and **count** (number of rolls it took). The final value of **roll** should match **num**.

Complete the chart by adding any necessary **boxes**, **blocks**, **control signals**, and **RTL operations** (*i.e.*, no extra states). Please choose reasonable names for control signals and data registers. [14 pts]

- Use the RTL syntax "**next**" to indicate the next random number generated by the LFSR.

S_idle

S_roll

S_done