ASM Diagram, Bubble Diagram, and Output Table

What is a bubble diagram (i.e., state diagram)?

State diagrams can be used to graphically represent finite-state machines. In this diagram, a state is represented by a circle, and the transition between states is indicated by directed lines (or arcs) connecting the circles.

What is an output table (i.e., state table)?

The state table representation of a sequential circuit consists of three sections labeled *present state*, *next state,* and *output*. The present state designates the state of flip-flops before the occurrence of a clock pulse. The next state shows the states of flip-flops after the clock pulse, and the output section lists the value of the output variables during the present state.

Read more about the state table & state diagram here:

http://www.ee.surrey.ac.uk/Projects/CAL/seq-switching/state_diagrams_and_state_tables.htm (http://www.ee.surrey.ac.uk/Projects/CAL/seq-switching/state_diagrams_and_state_tables.htm)

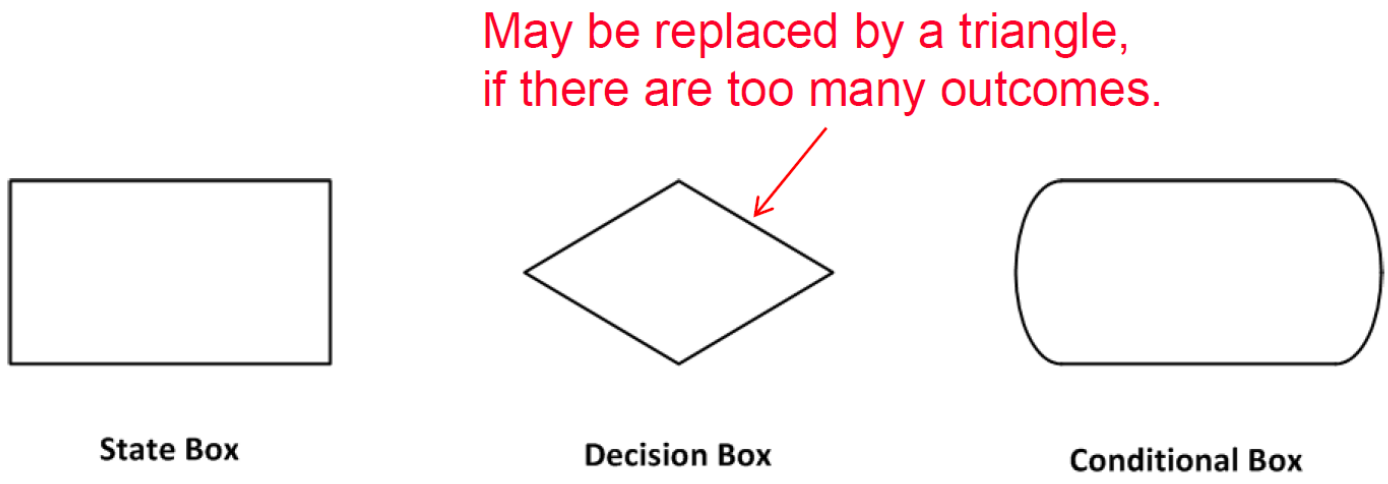
What is an ASM diagram?

The algorithmic state machine (ASM) method is a method for designing finite state machines. The ASM diagram is like a state diagram but more structured and, thus, easier to understand. An ASM chart is a method of describing the sequential operations of a digital system.

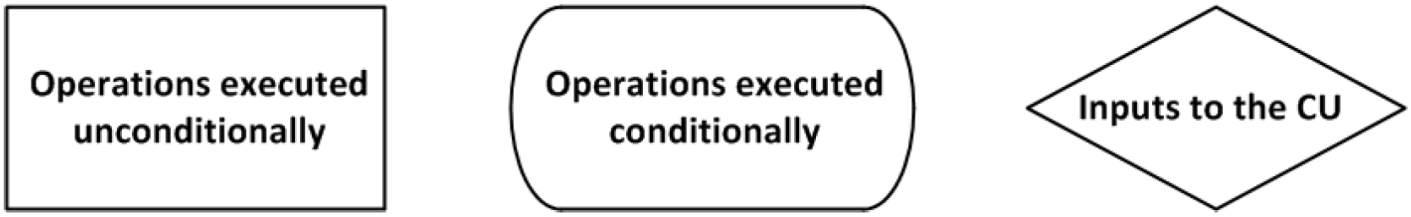
https://en.wikipedia.org/wiki/Algorithmic_state_machine (https://en.wikipedia.org/wiki/Algorithmic_state_machine)

Design procedure:

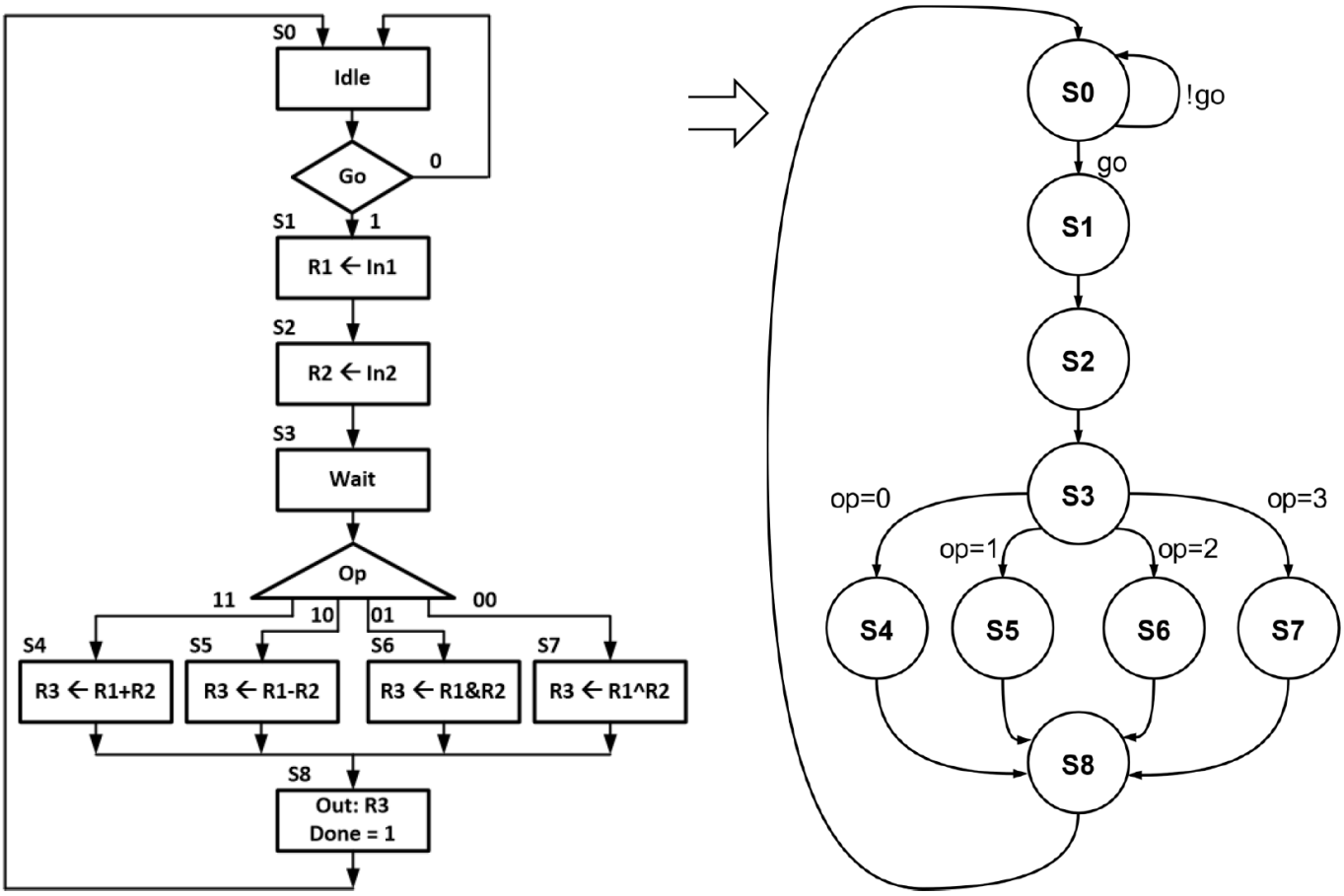
1. Use an ASM chart to describe the cycle-accurate system operations. ASM has 3 elements as shown below:



What should be in ASM elements:



2. Extract control information from the ASM (on the left) to construct the bubble diagram of the FSM (on the right):



3. With the help of the CU-DP diagram, the ASM diagram, and the bubble diagram, construct the output table, as shown below (Note: you should also include the Next State in the outputs).

Input	Outputs									
CS	s1	WA	WE	RAA	REA	RAB	REB	C	s2	Done
S0	00	00	0	00	0	00	0	00	0	0
S1	01	01	1	00	0	00	0	00	0	0
S2	10	10	1	00	0	00	0	00	0	0
S3	00	00	0	00	0	00	0	00	0	0
S4	11	11	1	01	1	10	1	00	0	0
S5	11	11	1	01	1	10	1	01	0	0
S6	11	11	1	01	1	10	1	10	0	0
S7	11	11	1	01	1	10	1	11	0	0
S8	00	00	0	11	1	11	1	10	1	1