

Coen-120 Final Exam

December 1, 2000.

You have just been given the assignment to develop a home irrigation controller.

The controller shall provide for the timed control of up to 8 solenoid activated irrigation valves. (A solenoid activated valve is either ON or OFF, i.e. binary control)

The user should be able to specify:

1. The current time (using a 24 hour clock, 0:00 - 23:59),
2. The day of week (0=Sun, 6=Sat),
3. The day of week and start time for each *valve sequence*(see below),
4. The duration in minutes of each valve per *valve sequence*,
5. Allow for up to 21 *valve sequences* per week,
6. Allow the user to delete a *valve sequence*,
7. Allow the user to see a summary of all *valve sequences*.

The user should be allowed to modify any of these values at any time.

[A *valve sequence* is defined as one round of turning on and off all 8 valves for their required duration times. e.g. if on a given day of the week the start time for a valve sequence is 2:00, and the duration times for each of the 8 valves are 1, 3, 2, 4, 0, 0, 5, & 3 minutes respectfully, then the valves would come on at the following times. V1@ 2:00; V2@ 2:01, V3@ 2:04; V4@ 2:06; V5 does not come on; V6 does not come on; V7@ 2:10; V8@ 2:15.]

Be careful not to allow the user to overlap *valve sequences*. No two valves are ever allowed to be ON at the same time.

The controller should continually display the current time and day of week, and the status of each valve (ON or OFF).

In order to facilitate testing use a 10:1 time speed up. i.e. 1 sec = 100ms NOT 1000ms.

For the exam, create a Use Case for the irrigation controller, an Object Model Diagram, and appropriate state charts for each object. You may wish to include sequence diagrams to assist you in verifying your design, however they are not necessary.

You will have 3 hours to complete your design and testing. You must demonstrate your final product to me. You must create a report of your exam and place it in the "FinalExam" directory on the server.

You should name your exam and report with your LastName.

Hint: Sometimes it is best to maintain time in its smallest unit for the entire week. There are $60 \times 24 \times 7 = 10080$ minutes in a week.