Concordia University
Department of Computer Science and Software Engineering

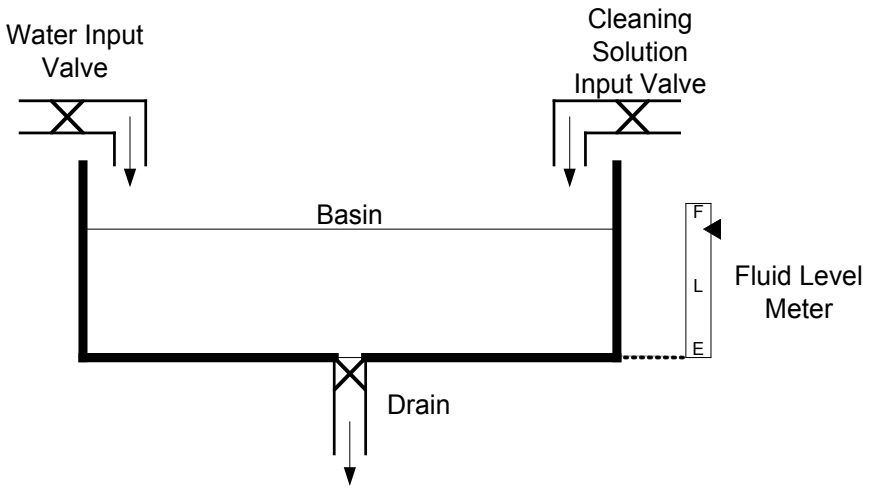
COMP 354 --- Software Engineering I
Fall 2005

Homework Assignment #2

Instructions

- This is an individual assignment.
- Similar questions (among others) will be asked in the quizzes.

1. **[40 points]** Following the below notation and guidelines, build a state transition diagram for the following problem description.



This question concerns a computer-controlled humidifier. This system hardware consists of:

- Large evaporation basin (a container from which the water evaporates),
- Water input valve,
- Cleaning solution input valve,
- Drain output valve,
- Fluid level meter,
- On/Off switch,
- Button labeled “Clean”.

Input Events		Output Events	
Name	**Description**	**Name**	**Description**
On	The “On/Off” switch is put “On”	OW	Open water input valve.
Off	The “On/Off” switch is put “Off”	CW	Close water input valve.
F	Fluid level is at Full or above	OC	Open cleaning solution valve.
L	Fluid level is between Low and Empty	CC	Close cleaning solution valve.
E	Fluid level reaches Empty	OD	Open drain (to let fluid out).
C	The “Clean” button is pressed	CD	Close drain.

Table 1, Humidifier Input and Output Events

The normal operation of the system consists of the following:

- The basin is filled with water.
- Water naturally evaporates into the open air, and this causes the water level to drop over time.
- The computer system adds water as is necessary to keep the water level above the “Low” level mark and below the “Full” level mark.

Occasionally, an operator is required to clean the humidifier. To do so, the operator simply presses the “Clean” button. In response the system will:

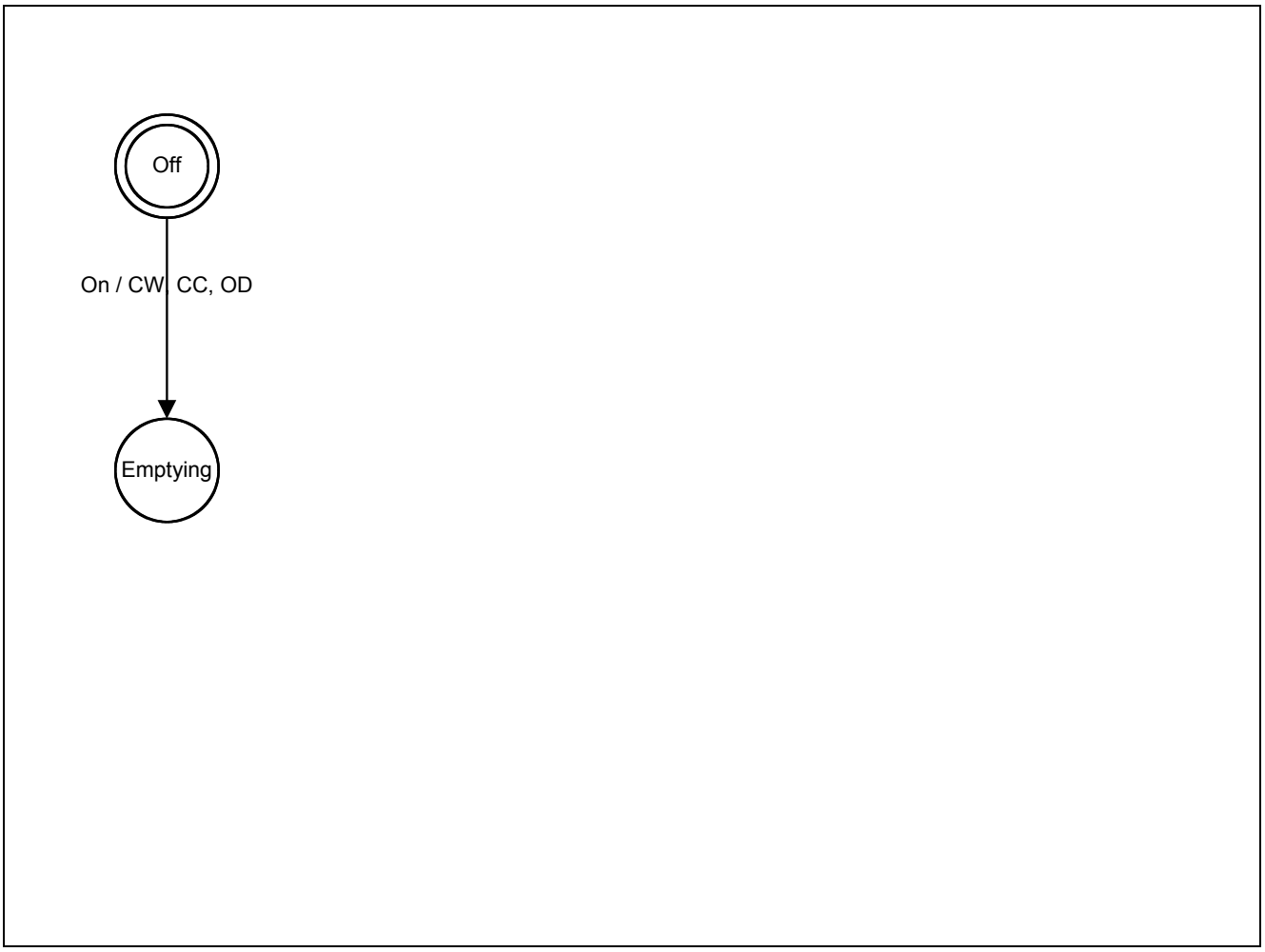
- Empty the basin.
- Fill the basin with a cleaning solution.
- Once it is full with the cleaning solution, the basin is emptied again.
- After this, the humidifier is ready for normal operation.

The following are additional details concerning the required behavior of the system:

- The first thing the system does when it is turned on is to empty the basin (in case there is any left-over fluid, water or cleaning solution, from a previous operation). This is depicted in the partial solution given on the next page.
- As long as the system is turned on, the fluid level meter generates an event according to the following conditions: an E event is generated if the basin is empty, an F event if the fluid level is at or above the FULL mark, and an L event is generated when the fluid level is between the “Low” and “Empty” level mark.
- As long as the system has not started filling the basin with the cleaning solution, then the cleaning operation can be cancelled by pressing the “Clean” button. Once the system has started dispensing the cleaning solution then the cleaning operation must run to completion.

In this question you must create a state transition diagram (STD) for this system. You must make use of the events listed in Table 1 and no other events. All transitions in your STD should be clearly labeled with input and output events using the notation: I / O1, O2, … O*m* where I is an input event and the O*j* are output events triggered by the system.

Complete the humidifier STD given below so that it complies with the problem description given above. Off is the starting state.



2. [30 points] Inspect Section 4 the example document on the web page ("Example using another template --- three phases in one document"). Identify what kind of UML diagrams you will be using in your second deliverable in the project for : (1) architectural design, (2) module interface design, and (3) detailed design. Give an example of each of such diagrams.

3. [15 points] List two items of criticism or problems pertaining to how your project has been conveyed up to now. Explain what impact these problems had on the project. Explain what better approach you would use to overcome this problem if you face it again in the future in another project.

4. [15 points] List and explain the possible impact of two risks inherent to what remains to be done in your term project. Explain what solutions or precautions can be used to avoid incidents related to this risk in your project.