1. What is black box testing?

2. Give the equivalence partitions generated using the specification below.

Consider an automatic garden watering system which saves rain water in several rain barrels and pumps it to a garden automatically when needed. The system consists of two sensors (a rain barrel water level sensor and a soil moisture sensor) and two actuators (a water pump and a fill valve). The system operates as follows:

- The water level sensor’s “normal” readings should be integer values between 20 and 50 (inclusive), with higher numbers meaning more water is in the barrel. Values outside of this range are interpreted as 20.
- The soil moisture sensor’s “normal” readings should be integer values between 20 and 200 (inclusive), with higher numbers meaning more moisture. If the sensor returns a value outside of this range, the system will interpret the reading as 20.
- If the water level reading is less than 25, then the fill valve is commanded open. If the water level exceeds 40, then the fill valve is commanded closed.
- If the moisture level reading is between 75 and 125 (inclusive), then the water pump is activated.
- If the moisture level reading drops below 50 or the water level reading exceeds 45, the system sounds an error alarm.

3. “Mark” a test case in the partition below which would be selected using worst-case normal but not single-fault normal boundary value analysis.
4. Give the decision table representing the specification below.

Consider the following (modified) requirements for obtaining various types of Iowa fishing licenses. To qualify for a resident license, you must meet at least one of the following criteria.

- Iowa has been your principal residence for at least 90 consecutive days
- Full-time student at an accredited educational institution in Iowa
- Under the age of 18

If you do not meet any of the above criteria, you must purchase a nonresident license.

5. How are equivalence partitioning and boundary value analysis related? Can I have, for instance, strong robust equivalence partitioning with single-fault normal boundary value analysis?

6. In “theory”, equivalence partitioning by itself should be a sufficient test case generation strategy. Why do we also have boundary value analysis?

7. Several standards for safety-critical software (such as DO-178C) require organizations only use black-box testing. Defend this choice.