Participation P3

(Software Engineering CS487)

1. Describe 2 systems that you depend on and discuss how reliable you find each to be.

- ❖ The two systems which I depend on are:
  a. Smartphone
  b. Car

- Explain how this reliability can be formally tested.

a. Smartphone

- ➢ **Reliability:** It allows me to stay in touch with my friends and family, access information, manage tasks, and perform various activities efficiently.
- ➢ **Formal Testing:**
  - ***Hardware Quality Testing:*** This involves smartphone to various quality tests to ensure that the hardware components (such as the processor, memory, and battery) can run without failure.
  - ***Software Testing:*** Software testing involves testing for bugs, compatibility issues, and security vulnerabilities.
  - ***Network Connectivity Testing:*** This involves evaluating the smartphone's ability to connect to cellular networks, Wi-Fi networks, and Bluetooth devices under various conditions (e.g., different locations, network congestion).

c. Car

- ➢ **Reliability:** It helps me to commute to college, perform errands, and travel with ease.
- ➢ **Formal Testing:**
  - ***Mechanical Inspection:*** It begins with mechanical inspection to ensure that all main components (engine, transmission, brakes, suspension, etc.) are functioning correctly.
  - ***Road Testing:*** It involves driving the car under various conditions (highway, city streets, rough terrain) to evaluate its performance, handling, and comfort.
  - ***Safety Testing:*** It involves evaluating the car's safety features (air bags, structural durability)

- Discuss the engineering of each system which you believe contributes most significantly to its reliability.

- ❖ To summarize, many engineering elements such as hardware design, software development, material selection, safety engineering, and quality assurance processes all have significant effects on smartphone and automotive reliability. The combination of

sophisticated technologies, with respect to industry standards, and continuous improvement programs all help to improve the overall dependability and performance of these complex systems.

2. What is the "value" of reliability? and how can we measure it / test for it? Discuss in terms of nonfunctional requirements and associated test cases.

- The value of reliability is that it enables us to trust systems and products to work as expected. Reliable products and systems allow us to be more productive, efficient, and safe. It is financially valuable when we consider the cost-benefit of risk assessment. There are various methods for measuring and testing reliability. One typical method is to implement nonfunctional requirements and test cases that go with them. Nonfunctional requirements outline how the system or product should behave but do not include implementation details. Test cases are procedures used to ensure that a system or product meets its non-functional requirements.

  To test for reliability, test cases can be developed to ensure that the program meets the reliability requirements. These test cases can be classified as:

  - **Functional Test Cases:** Functional test cases ensure that the software system executes the functions as planned without errors. These tests ensure that the software system functions properly.

  - **Non-functional Test Cases:** Nonfunctional test cases assess the system's non-functional needs, such as dependability, usability, and performance. These tests guarantee that the system functions consistently over time.

  In addition to testing, a variety of engineering strategies can be employed to increase system reliability. These include redundancy, monitoring, and maintenance.

3. Discuss the role of user awareness in the runtime state of a system's reliability.

- User awareness has a significant effect on a system's runtime reliability. For example, if there is an HCI model and the human user presses the wrong button or pauses too long, resulting in a timing issue, the human user can do a variety of things to produce a problem. There are several approaches to increasing user knowledge of the runtime condition of a system's reliability. One method is to provide users with real-time updates on the system's status. This can be accomplished using a variety of methods, including a system status dashboard, email alerts, and SMS messages. Another option is to educate users on the system's dependability and how to minimize the impact of outages.