CSE_321 Assignment-01

Chapter 1: Introduction

EXERCISES [3]

1. What is the difference between a software process model and a software process? Suggest two ways in which a software process model might be helpful in identifying possible process improvements.

2. Apart from the challenges of heterogeneity, rapid delivery and trust, identify other problems and challenges that software engineering is likely to face in the 21st century.

3. To help counter terrorism, many countries are planning the development of computer systems that track large numbers of their citizens and their actions. Clearly this has privacy implications. Discuss the ethics of developing this type of system.

Chapter 2: Socio-technical systems

EXERCISES [4]

4. Consider a security system which is intended to protect against intrusion and to detect fire. It incorporates smoke sensors, movement sensors, door sensors, video cameras under computer control, located at various places in the building, an operator console where the system status is reported, and external communication facilities to call the appropriate services such as the police and fire departments. **Draw a block diagram of a possible design for such a system**.

5. A flood warning system is to be procured which will give early warning of possible flood dangers to sites that are threatened by floods. The system will include a set of sensors to monitor the rate of change of river levels, links to a meteorological system giving weather forecasts, links to the communication systems of emergency services (police, coastguard, etc.), video monitors installed at selected locations, and a control room equipped with operator consoles and video monitors. Controllers can access database information and switch video displays. The system database includes information about the sensors, the location of sites at risk and the threat conditions for these sites (e.g., high tide, southwesterly winds), tide tables for coastal sites, the inventory and location of flood control equipment, contact details for emergency services, local radio stations, and so on.

Draw a block diagram of a possible architecture for such a system. You should identify the principal sub-systems and the links between them.

6. Explain why legacy systems can cause difficulties for companies that wish to reorganise their business processes.

7. You are an engineer involved in the development of a financial system. During installation, you discover that this system will make a significant number of people redundant. The people in the environment deny you access to essential information to complete the system installation. To what extent should you, as a systems engineer, become involved in this? Is it your professional responsibility to complete the installation as contracted? Should you simply abandon the work until the procuring organization has sorted out the problem?

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Chapter 3: Critical systems

EXERCISES [3]

8. Giving reasons for your answer, suggest which dependability attributes are likely to be most critical for the following systems:

- An Internet server provided by an ISP with thousands of customers
- A computer-controlled scalpel used in keyhole surgery
- A directional control system used in a satellite launch vehicle
- An Internet-based personal finance management system.

9. Reliability and safety are related but distinct dependability attributes. Describe the most important distinction between these attributes and explain why it is possible for a reliable system to be unsafe and vice versa.

10. Is it ethical for an engineer to agree to deliver a software system with known faults to a customer? Does it make any difference if the customer is told of the existence of these faults in advance? Would it be reasonable to make claims about the reliability of the software in such circumstances?

Chapter 4: Software processes

Exercise [4]

11. Giving reasons for your answer based on the type of system being developed, suggest the most appropriate generic software process model that might be used as a basis for managing the development of the following systems:

- A system to control anti-lock braking in a car
- A virtual reality system to support software maintenance
- A university accounting system that replaces an existing system
- An interactive system that allows railway passengers to find train times from terminals installed in stations.

12. Explain why programs that are developed using evolutionary development are likely to be difficult to maintain,

13. Explain how both the waterfall model of the software process and the prototyping model can be accommodated in the spiral process model.

14. Suggest how a CASE technology classification scheme may be helpful to managers responsible for CASE system procurement.

15. 1 At the end of their study program, students in a software engineering course are typically expected to complete a major project. Explain how the agile methodology may be very useful for the students to use in this case.
15.2 Explain why agile methods may not work well in organizations that have teams with a wide range of skills and abilities and well-established processes.