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APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

FIRST SEMESTER M.TECH DEGREE EXAMINATION, DECEMBER 2017

Branch:
Computer Science and Engineering

Stream(s):
Computer Science and Engineering

Course Code & Name:
01CS6107 Advanced Software Engineering

Answer *any two full* questions from *each* part
Limit answers to the required points.

Max. Marks: 60 Duration: 3 hours

PART A

1. a. Why is the pure Waterfall model of software development not recommended for large sale software projects? 3

   b. An online information system is being developed using a modified version of the Waterfall model. It is likely to be based on Web technology. 6

      i. How much the choice of technology should be considered during the feasibility study?

      ii. In how much detail should the choice of technology be specified during the requirements phase of the project?

      iii. At what stage should the decision be made to use an Apache Web Server 2.0 with Tomcat 4.1?

2. a. Most problems are large and sometimes tricky to handle. A process we can follow is that we first analyze it by breaking the problem into several small components that are easy to handle. And then putting all solutions together in a large structure. Is there any case that the problem components are relatively simple, but the difficulty in solving the problem lies in the interconnections among sub-problem components? 5

   b. Describe about different choices for process modeling tools and techniques. 4

3. a. Define a system. Considering respiratory system as a system illustrate it with required attributes. 4

   b. Explain Wasserman's Discipline of Software Engineering. 5

PART B

4. a. You are developing the requirements for an online shopping system. To place an order, a user connects to the system, searches to find items to purchase, selects one or more items, and supplies credit card information to pay for them. 9

      i. Create a scenario for a user making a purchase.

ii. Develop a use case diagram and brief specification for a use case, *PlaceOrder*, which is modeled on this scenario. The use case should show a relationship to a previously specified use case, *Pay*, which models credit card payments. (You do not need to specify the *Pay* use case.)

iii. A user might interact with the online shopping system in other ways. Draw a diagram for a different use case in which the same actor interacts with the online shopping system.

5. a. You are modeling the requirements for a cruise control system on an automobile. From interviews with the client you have developed the following understanding: 9

The cruise control system is controlled by a master switch and three buttons. Initially, it is turned on by the master switch. The master switch can be turned off at any time. When first turned on, the system enters stand-by mode.

When the system is in stand-by mode, the driver of the automobile can press Button 1 to engage the cruise control at the current speed of the automobile.

When the cruise control is engaged, if the driver presses the brake or presses Button 1 the system will be disengaged and return to stand-by mode. After returning to stand-by mode, the driver can press Button 2 to engage the cruise control at the speed that it was set at previously.

When the cruise control is engaged, the driver can press Button 2 to increase speed by one mile per hour or Button 3 to decrease speed by one mile per hour.

Model the system as a finite state machine suitable for discussion with a client.

i. What are the states and the transitions for this system?

ii. Draw the state-transition diagram.

iii. What is the state-transition table?

6. a. What is an Architectural Styles? Describe about different Architectural Styles with necessary diagrams. 3

b. A company that makes sports equipment decides to create a system for selling sports equipment online. The company already has a product database with description, marketing information, and prices of the equipment that it manufactures. To sell equipment online the company will need to create: a customer database and an ordering system for online customers. The plan is to develop the system in two phases. During Phase 1, simple versions of the customer database and ordering system will be brought into production. In Phase 2, major enhancements will be made to these components. Draw the the system architecture of both Phases. 6

PART C

7. a. Suppose a program contains N decision points, each of which has two branches. How many test cases are needed to perform path testing on such a program? If there are M choices at each decision point, how many test cases are needed for pa th testing? Can the program's structure reduce this number? Give an example to support your answer. 6

b. Explain why the success of a system depends heavily on the quality of the documentation generated during system development. 6

8. a. Discuss the differences in testing a business-critical system, a safety-critical system, and a system whose failure would not seriously affect lives, health, or business. 6

b. Name and describe briefly the following: 6
   i. Any Black Box Testing method,
   ii. Any White Box Testing method,
   iii. Any Integration Testing method.

9. a. Suppose you are building a tax preparation system that has three components. The first component creates forms on the screen, allowing the user to type in name, address, tax identification number, and financial information. The second component uses tax tables and the input information to calculate the amount of tax owed for the current year. The third component uses the address information to print forms for country, state, and city taxes., including the amount owed. Describe the strategy you would use to test this system, and outline your test cases in a test plan. 6

b. Explain why maintenance programming may be more challenging than new development. Why must a good maintenance programmer have good "people skills"? What are the other desirable characteristics of a maintenance programmer? 6