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MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

A Constituent Institute of Manipal University

FIRST SEMESTER MTech. (COMPUTER NETWORKING AND ENGINEERING)

END SEMESTER EXAMINATION, NOV 2017

SUBJECT: SOFTWARE ENGINEERING [ICT-5102]

(REVISED CREDIT SYSTEM)
(18 /11/2017)

TIME: 3 HOURS

MAX. MARKS: 50

Instructions to candidates:

- Answer ALL questions.
- Missing data, if any, may be suitably assumed.

1A. Write a pseudocode/program to find second highest value from array of elements. For the program identify suitable back box testing and white box testing method to do the following :
i. Identify error related to execution paths
ii. Avoid testing for all possible values or reduce the number of test cases but acheive exhaustive testing
Also, Design test cases using the identified testing method to test the code. [05]

1B. Model the working of a simple digital watch described below using a state transition diagram for the following narrative:
A simple digital watch has a display and two buttons to set it, the A button and the B button. The watch has two modes of operation, display time and set time. In the display time mode, the watch displays hours and minutes, separated by a flashing colon. The set time mode has two submodes, set hours and set minutes. The A button selects modes. Each time it is pressed, the mode advances in the sequence: display, set hours, set minutes, display, etc.Within the submodes, the B button advances the hours or minutes once each time it is pressed. Buttons must be released before they can generate another event. [03]

1C. List the life cycle model which is least appropriate and most appropriate for the development of Web-enabled e-business system . The major aspects of the project are: project team composition is unstable,future scalability of design is critical, and finally project objectives are very clear; Also, justify of your answer. [02]

2A. Identify the classes for the given problem statement and draw the class diagram for the same. The system provides the basic services to manage a bank accounts at a bank called XYZBank. XYZBank has many branches, each of which has an address and branch ID. A client opens accounts at a branch. Each account is uniquely identified by a account number, it has balance and a credit or overdraft limit. There are many types of accounts, including: A mortgage account(which has a property as collateral), a cheque account, and a credit card account(which has an expiry date and can have secondary cards attached to it). It is possible to have a joint account. Each type of account has a particular interest rate, a monthly fee and a specific set of privileges(e.g. ability to write cheques etc.). XYXBank is divided into divisions and subdivisions such as planning, Investmets and Consumer. The branches are considered subdivisions of consumer division. Each division has a manager and a set of employees. Each customer is assigned a particular employee as his or her personal banker. [05]

2B. What is the basic objective of SCM process? Explain the configuration management process. [03]

2C. Is spiral model a realistic approach for development of large-scale system and software when compared to systematic aspects of the waterfall model? Justify your answer. [02]

3A. Explain the Rational Unified Process(RUP) model with suitable illustrations. Also, list the advantages of the RUP model and it's application scenario. [05]

3B. Create a swimlane diagram based on the following narrative of Single Sign-On (SSO) to Google process.

Google uses single sign-on based on OASIS SAML 2.0 protocol. Google acts as service provider with services such as Gmail or Start Pages. Partner companies act as identity providers and control user names, passwords, and other information used to identify, authenticate and authorize users for web applications that Google hosts. Each partner provides Google with the URL of its SSO service as well as the public key that Google will use to verify SAML responses.

When a user attempts to use some hosted Google application, such as Gmail, Google generates a SAML authentication request and sends redirect request back to the user's browser. Redirect points to the specific identity provider. SAML authentication request contains the encoded URL of the Google application that the user is trying to reach.

The partner identity provider authenticates the user by either asking for valid login credentials or by checking for its own valid authentication cookies. The partner generates a SAML response and digitally signs it. The response is forwarded to Google's Assertion Consumer Service (ACS). Google's ACS verifies the SAML response using the partner's public key. If the response is valid and user identity was confirmed by identity provider, ACS redirects the user to the destination URL. Otherwise user will see error message. [03]

3C. Mention the difference between the following concepts.

i. Software refactoring and software refinement

ii. Coupling and Cohesion [02]

4A. Explain the following :

i. Any one software architecture style

ii. Any two software design principles [05]

4B. What is the aim of requirements engineering phase of software development? Discuss various activities undertaken during this phase. [03]

4C. What do you mean by risk mitigation? Bring out a mitigation strategy for the risk of high staff turn over. [02]

5A. Consider the Student Auditorium Management Software (SAMS) system described below. Various types of social and cultural events are conducted in the students auditorium. There are two categories of seats: Balcony seats and Ordinary seats. Normally, the Balcony seats are more expensive in any show. The show manager fixes the price of these two categories of seats. The show manger also determines the number of Balcony and Ordinary seats that can be put on sale, since for each show some seats are offered as complimentary gifts to VIPs. The show manager also enters the show dates, the number of shows on any particular dates and the show timings. The spectators book their seats in advance by paying the full ticket price using SAMS. The spectator indicates the type of the seat, and the computer should therefore, printout the ticket clearly showing the seat numbers. The spectators can cancel their booking before 3 days of the show. In this case, the ticket price is refunded after deducting Rs 5/- as the booking charge. If a ticket is returned later, but before one day of a show, a booking charge of Rs 10/- is deducted, for ordinary tickets and Rs 15/- for balcony tickets. On the last day of the show, the deduction is 50% of the ticket price. The system should let the spectators to query the availability of different classes of seats. The show manager can query any time the percentage of seats booked for various classes of seats and the amount collected in each case.

i. Draw the use case diagram for the above problem statement.

ii. Write the use case specification for any two use cases of the use case diagram drawn in Q.5A(i). [05]

5B. Model sequence diagram according to all possible interaction sequences for the class diagram and its operational sequence description given in Fig Q.5B . [03]

5C. List the kind of errors targeted by unit and integration testing with suitable examples. [02]

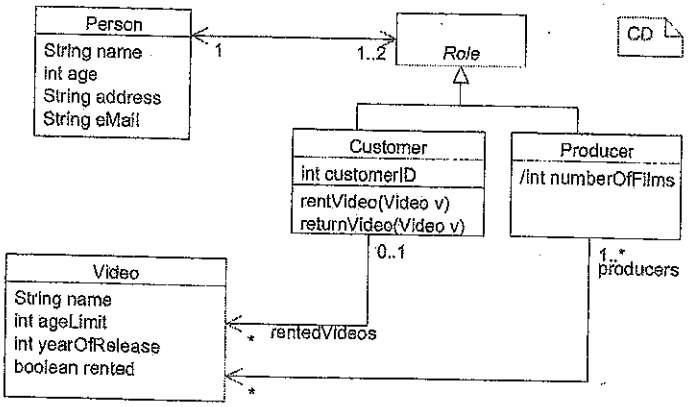

Fig. Q.5B