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Vellore Institute of Technology

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Reg. No. : 23MCA1030

Final Assessment Test (FAT) - May 2024

Programme	**M.C.A.**	Semester	**WINTER SEMESTER 2023 - 24**
Course Title	**SOFTWARE TESTING**	Course Code	**PMCA614L**
Faculty Name	**Prof. Renjith P N**	Slot	**G2**
		Class Nbr	**CH2023240501409**
Time	**3 Hours**	Max. Marks	**100**

General Instructions:

- Write only Register Number in the Question Paper where space is provided (right-side at the top) & do not write any other details.

Answer all questions (10 X 10 Marks = 100 Marks)

01. Imagine you are tasked with ensuring the quality of an e-commerce website before its launch. The website is designed to facilitate online shopping, with features such as product browsing, adding items to a cart, and secure checkout. You are responsible for planning and executing the testing process to ensure that the website functions flawlessly and provides a seamless user experience. **[10]**

a. Describe the various testing tiers essential for evaluating the functionalities of the e-commerce website. Consider aspects such as user interface, functionality, security, and performance. **[3 Marks]**

b. Conduct a thorough analysis of any 3 specific testing types suitable for the e-commerce website. Discuss their objectives, scopes, responsibilities, and the methodologies to be employed. Include testing types such as functional testing, usability testing, security testing, and performance testing. **[4 Marks]**

c. Elucidate the process of scrutinizing, synthesizing, and integrating results from each testing level to enhance the overall quality and reliability of the e-commerce website. Discuss the manner in which findings from different tests are analyzed, consolidated, and utilized to identify and rectify any issues or shortcomings. **[3 Marks]**

02. Imagine you are a software tester entrusted with the critical task of ensuring the robustness of a banking application's password validation feature. This feature is crucial for maintaining the security and integrity of user accounts. The application imposes strict criteria for passwords, requiring them to be between 8 and 16 characters in length, containing at least one uppercase letter, one lowercase letter, one digit, and one special character (e.g., ! @, #, $, %, ^, &, *), while prohibiting the use of spaces. Given the importance of this feature, it is essential to thoroughly test its functionality to ensure it meets the specified requirements and effectively safeguards user accounts. **[10]**

a. Describe your strategy for testing the password validation feature, taking into account the specified criteria and the importance of the feature for the banking application. Provide an in-depth exploration of three testing techniques to formulate a thorough assessment plan for evaluating the functionality of the password validation feature. **[5 Marks]**

b. Outline the test cases you would develop to cover boundary values and special conditions effectively, ensuring a thorough evaluation of the password validation feature's adherence to the specified criteria. Provide rationale for the selection of each test case and discuss its contribution to the overall testing strategy for the banking application's password validation feature. **[5 Marks]**

03. Imagine you are a quality assurance engineer tasked with overseeing a project to internationalize a university website. Originally designed exclusively for users in India, the website is now being updated to accommodate users from various countries around the world. Your goal is to develop a comprehensive test plan to ensure the successful implementation of these internationalization updates. **[10]**

a. Develop a test plan for the internationalization testing of the university website, which involves modifying it to cater to a global audience. Outline scenario-based test cases covering changes to pin codes, zip codes, and country/state lists. **[5 Marks]**

b. Elaborate on regression testing procedures to guarantee the ongoing functionality of existing features following the update. **[5 Marks]**

04. You are a quality assurance engineer tasked with assessing the reliability of a web-based email service's spam filtering feature using the State Transition Testing technique. The email service employs various spam detection mechanisms, including keyword filtering, sender reputation analysis, and machine learning algorithms. **[10]**

a. Develop a structured and comprehensive state transition diagram illustrating the different states and transitions involved in the spam filtering process of the email service. Include states such as "Inbox," "Spam Folder," "Blocked Senders," and transitions triggered by actions like marking an email as spam, marking it as not spam, adding senders to the blocked list, and removing them from the blocked list. **[4 Marks]**

b. Identify and expound the key states essential to the spam filtering process, such as the status of emails (spam or not spam), the effectiveness of the spam filter (active or inactive), and the status of the sender's reputation (trusted or untrusted). Describe the transitions between these states and the conditions that trigger each transition, such as the frequency of marking emails as spam or the sender's history of sending suspicious content. **[6 Marks]**

05. You are a software engineer tasked with designing the user registration module for a new social media platform. The registration process requires users to input their personal information, including name, email address, and password. To ensure the robustness of the registration system, you decide to apply the Equivalence Class Partitioning technique. **[10]**

a. Outline the key input fields within the user registration module that would benefit from Equivalence Class Partitioning, and explain the rationale behind your selection. **[4 Marks]**

b. Illustrate the application of Equivalence Class Partitioning to discern distinct classes of input data for each input field, ensuring comprehensive test scenario coverage. **[3 Marks]**

c. Discuss potential challenges or limitations associated with applying Equivalence Class Partitioning in the context of designing the user registration module for the social media platform, and propose strategies to overcome them. **[3 Marks]**

06. Write a program in any of your comfortable language (like C,C++,Java /Python) that compares three integer variables and display the sum of the greatest two numbers among the three. **[10]**

a. Analyze the program using Control Flow Graph (CFG) generation and Cyclomatic Complexity calculation. **[4 Marks]**

b. Implement Data-Flow Testing on your program. Assess its complexity and elaborate Data-Flow Testing's contribution to code quality and maintainability. **[3 Marks]**

c. Devise strategies to optimize the identified areas and improve the overall quality and maintainability of your program **[3 Marks]**

07. As a software test engineer responsible for ensuring the reliability of a payment processing system, you are tasked with testing the validation logic for credit card transactions. The system must accurately detect and reject invalid credit card numbers based on predefined criteria. **[10]**

The validation rules are as follows:

- The credit card number must be 16 digits long.
- The first digit must be 4 for Visa cards, 5 for Mastercard, and 3 for American Express.
- The last digit must pass the Luhn algorithm for credit card number validation.
- The credit card must not be expired, with the expiration date being in the future.
- The CVV/CVC code must be a 3-digit (Visa, Mastercard) or 4-digit (American Express) number.

a. Illustrate a decision tree diagram showcasing the sequence of checks and conditions involved in validating credit card transactions. **[5 Marks]**

b. Formulate a test plan delineating specific test scenarios and cases to thoroughly validate the credit card validation logic, accounting for both valid and invalid inputs. **[5 Marks]**

08. You are a test manager overseeing testing activities for a software development project. Your role involves orchestrating testing efforts and ensuring quality standards are maintained throughout the software development lifecycle. **[10]**

a. Describe the responsibilities of test management in coordinating testing activities and upholding quality standards throughout the software development lifecycle. Illuminate the essential components of a comprehensive test plan and discuss their significance in ensuring successful test execution. **[6 Marks]**

b. Assess the significance of the test process in achieving efficient and effective testing outcomes. Identify key stages and activities within the testing lifecycle that contribute to the overall success of the testing process. **[4 Marks]**

09. You've been assigned as a quality assurance engineer for a healthcare application that manages patient records and appointments. Your task is to automate the testing process for the appointment scheduling module using Selenium WebDriver and the TestNG framework. **[10]**

a. Outline the steps for configuring Selenium WebDriver and TestNG for automated testing of the appointment scheduling module. Provide details on setting up the testing environment and integrating Selenium WebDriver with TestNG. **[6 Marks]**

b. Develop pseudocode for conducting automated testing on the appointment scheduling module using Selenium WebDriver and TestNG. Include the necessary steps for navigating through the application, inputting appointment details, and verifying the scheduling functionality. **[4 Marks]**

10. As a specialist in database and SQL testing, you've been assigned to address a critical data leakage concern in the "SecureVault" web application. Reports of unauthorized access to sensitive user information have surfaced, originating from the application's backend database. **[10]**

a. Outline your approach for developing a comprehensive database and SQL testing strategy to detect and rectify the data leakage issue in the "SecureVault" web application. **[6 Marks]**