CSE 471: System Analysis and Design

| **Name:** | **ID:** | **Section:** |
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| 1] Explain Fan-in and Fan-out in short? Explain using a diagram.  Structural Complexity of a method is S(i) = fan-out(i) \* fan-in(i).  Calculate the structural complexity of method Process. [CO3]      2] **Explain** decomposition and why do we need it in designing a DFD diagram?  3] There is a module that performs two tasks:  Analyzing a user's search query and Generating relevant search results.  The output of the first task, which is the analyzed search query, serves as the input for the second task, which is generating the search results. What type of cohesion is demonstrated in this situation, and why?  4] Component Diagram:  Suppose you are designing a music streaming application with several modules. The application consists of five modules: User Authentication, Playlist Management, Music Recommendation, Audio Playback, and User Profile.  The User Authentication module provides an interface called "authenticateUser," which is required by the Playlist Management module. The Playlist Management module, in turn, provides an interface called "managePlaylists" that is required by the Music Recommendation module.  The Music Recommendation module provides an interface called "getRecommendedSongs," which is required by both the Audio Playback and User Profile modules. Additionally, the Audio Playback module provides an interface called "playSong," which relies on song data received from the Music Recommendation module.  The User Profile module provides an interface called "getUserDetails," which is required by the Audio Playback module. Furthermore, the User Profile module also provides an interface called "updateUserPreferences," which is utilized by the Music Recommendation module.  [ Hint for the type of cohesion: In this scenario, each module relies on specific interfaces from other modules to perform its tasks effectively, showcasing the concept of component cohesion within the overall system. If the type of cohesion for this scenario was asked, this type of answer is expected.]  Draw a component diagram based on the above scenario.  5] DFD:  A ticket reservation system allows users to book tickets for various events. Users provide their personal information, select the event they wish to attend, and specify the number of tickets they want to purchase. The system checks the availability of tickets for the selected event and verifies the user's payment information. If tickets are available and the payment is successful, the system confirms the reservation and generates a unique reservation code. If tickets are not available or the payment fails, the system notifies the user that the reservation cannot be completed.  a. Draw a Level-0 Data Flow Diagram (DFD) of the ticket reservation system.  b. Draw a Level-1 Data Flow Diagram (DFD) of the ticket reservation system.  6] Structure Chart:  A banking system requires a comprehensive software solution to manage its operations effectively. The system consists of several key components:  Customer Relationship Management (CRM) Component: This component handles (Hint:“handles” is synonymous to input) customer information and interactions. It stores customer details, tracks communication history, and manages (Hint:“manages” is synonymous to output) customer inquiries and support.  Account Management Component: This component is responsible for managing customer accounts. It handles (Hint:“handles” is synonymous to input) account creation, updates, and closures. It also processes (Hint:“processes” is synonymous to output) transactions such as deposits, withdrawals, and transfers.  Loan Management Component: This component handles loan-related processes. It takes loan applications, approvals, and disbursements as inputs. It also handles loan repayments, interest calculations, and overdue loan monitoring.  Payment Processing Component: This component facilitates payment transactions. It integrates with external payment gateways, processes card transactions, and ensures secure and reliable payment processing for customers as output.  Reporting and Analytics Component: This component generates reports and provides data analytics functionalities. It collects data from various components, processes it, and presents insights on customer behavior, financial performance, and operational efficiency.  Database Component: The database component stores and manages data related to customer accounts, transactions, loans, and system configurations. It provides the necessary data storage and retrieval capabilities for the entire banking system.  The components mentioned above work together to create a robust and efficient banking system, enabling the institution to deliver excellent customer service, manage financial operations effectively, and maintain the security and integrity of customer data.  7] Calculate Table volume at 5 years using following information.   | **Field** | **Average size** | | --- | --- | | Student ID | 8 | | Student Name | 25 | | Phone no | 11 | | Admission Date | 7 | |  |  | | Overhead | 25% | |  |  | | Initial table size | 1000 | | Initial table volume |  | |  |  | | Growth rate/month | 300 | |
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