**Student Details**

| Repository Name | DBS25P023 |
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| Registration Number | 2024-CS-23 |

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| ***Project*** |  |
| **Project Title** | FacultyFlex (Faculty Workload and Resource Allocation System) |
| **Executive Summary** | The project is about developing a **Faculty Workload and Resource Allocation System** for the Department of Computer Science at the University of Engineering and Technology (UET) Lahore. The system aims to address the inefficiencies and challenges faced by the department in managing faculty workload, allocating resources, and handling faculty requests. Currently, the department relies on manual processes like spreadsheets and emails to track and manage workloads and resources, which results in several issues such as data inconsistency, workload imbalances, inefficiency in resource allocation, and delays in generating reports required for departmental planning and accreditation purposes.  **Key Problems Identified**  The main problems identified with the current system are:   * **Workload Imbalance:** Faculty members are either overloaded with tasks or underutilized, making it difficult to distribute teaching and administrative responsibilities fairly. * **Tracking Issues:** Keeping track of teaching assignments, research supervision, and administrative duties manually is prone to errors and inconsistencies. * **Resource Allocation Complexity:** Assigning resources like classrooms, labs, consumables, and other teaching essentials is inefficient and unstructured. * **Faculty Requests Management:** Managing faculty requests for resources such as board markers, stationery, consumables, and lab equipment is cumbersome and lacks a systematic approach. * **Security and Access Control:** The current system does not have robust security features, leading to concerns over unauthorized access and data integrity.   **Objectives of the Project**  The goal of the project is to develop a **Windows Form Application** that will automate and streamline the management of faculty workload, resource allocation, and faculty requests. The application will be backed by a relational database to centralize data and ensure its consistency and accuracy. The system will also introduce role-based access control and user authentication to improve security.  **Key Features of the System**  The application will feature:   1. **User Authentication & Role Management**    * Secure login system with hashed passwords.    * Role-based access control (RBAC) for department head, faculty members, and administrative staff.    * Forgot password & account recovery system 2. **Faculty Management**    * Add, update, delete faculty profiles    * Store faculty details    * Assign faculty roles from predefined lookup values 3. **Workload Assignment**    * Assign courses to faculty members per semester.    * Manage final-year projects and research supervision.    * Track administrative duties (e.g., committees, coordination). 4. **Resource Allocation**    * Assign classrooms and labs to faculty members.    * Manage faculty requests for board markers, stationery, and consumables.    * Allow faculty members to track request status. 5. **Faculty Requests Management**    * Faculty members can request resources (board markers, lab space, stationery).    * Requests can be approved, rejected, or marked as fulfilled.    * Track inventory of consumables to ensure timely procurement.   **Tech Stack**   * C# .NET (Windows Forms) * MVC Architecture * MySQL Database * BCrypt.Net for password hashing * Singleton Pattern for database operations * Role-Based Authentication System   **User Roles and Permission**  There are 3 user roles   1. **Admin**    * Approve & Manage Admins, Department Heads and Faculty    * Manage Courses, Projects, Semesters, Rooms, Consumables    * Assign Courses and Projects    * Create Course Schedules    * Allocate Rooms    * Approve / Reject / Fulfill Faculty Requests    * Manage Database & Reinstall Database    * Profile Setup 2. **Department Head**    * Manage Department Heads and Faculty    * Manage Courses, Projects, Semesters, Rooms, Consumables    * Assign Courses and Projects    * Create Course Schedules    * Allocate Rooms    * Approve / Reject / Fulfill Faculty Requests    * Profile Setup 3. **Faculty**    * View Assigned Courses and Projects    * View Course Schedules    * View Allocated Rooms    * Create Request and View Status of Previous Requests    * Profile Setup |

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| ***Interface Name*** |  |
| SPLASH SCREEN   |  |  |  |  | | --- | --- | --- | --- | | **UI Component Name** | **Type of UI component** | **Class Attribute name,**  **Class name, attribute name** | **Linked to which database column/table** | | InstituteLogo | Picture Box |  |  | | InstituteName | Label |  |  | | AppLogo | Picture Box |  |  | | Title | Label |  |  | | Copyright | Label |  |  | | |

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| ***Interface Name*** |  |
| INSTALL   |  |  |  |  | | --- | --- | --- | --- | | **UI Component Name** | **Type of UI component** | **Class Attribute name,**  **Class name, attribute name** | **Linked to which database column/table** | | InfoPanel | Panel, Labels |  |  | | FormPanel | Panel, Labels, Textboxes | DBCred  ServerName: string  Port: string  DatabaseName: string  DatabaseUser: string  DatabasePassword: string |  | | ActionBtn | Button | InstallControl => Install () |  | |  |  |  |  | | |

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| ***Interface Name*** |  |
| LOGIN   |  |  |  |  | | --- | --- | --- | --- | | **UI Component Name** | **Type of UI component** | **Class Attribute name,**  **Class name, attribute name** | **Linked to which database column/table** | | InfoPanel | Panel, Labels |  |  | | FormPanel | Panel, Labels, Textboxes | Faculty  Username: string  Password: string | users (username, password\_hash) | | Logo | Picture Box |  |  | | ActionBtn | Button | AuthControl => Login () |  | |  |  |  |  | | |

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| ***Interface Name*** |  |
| MAIN   |  |  |  |  | | --- | --- | --- | --- | | **UI Component Name** | **Type of UI component** | **Class Attribute name,**  **Class name, attribute name** | **Linked to which database column/table** | | Title Bar | PictureBox, Label, Panel |  |  | | Sidebar | Panels, Label, Button |  |  | | Content | UserControls | Dashboard  UserManagement  FacultyWorkload  ResourceAllcoation  Settings  FacultyRequests |  | |  |  |  |  | | |

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| ***Interface Name*** |  |
| DASHBOAR   |  |  |  | | --- | --- | --- | | **UI Component Name** | **Type of UI component** | **Linked to which database column/table** | | Total Faculty Member | PictureBox, Label, Panel | SELECT COUNT (\*) FROM users | | Total Approved Faculty | Panels, Label, Button | SELECT COUNT (\*) FROM faculty | | Total Active Courses | Panels, Label, Button | SELECT COUNT (\*) FROM courses | | Total Courses without Assigned Faculty | Panels, Label, Button | SELECT COUNT (\*) FROM faculty\_courses LEFT JOIN faculty using (faculty\_id) WHERE faculty\_id is null | | Total Courses with Assigned Faculty | Panels, Label, Button | SELECT COUNT (\*) FROM faculty\_courses JOIN faculty using (faculty\_id) | | Total Research Supervisors | Panels, Label, Button | SELECT COUNT (\*) FROM faculty\_projects JOIN faculty using (faculty\_id) | | Total Researches Supervisors Not Assigned | Panels, Label, Button | SELECT COUNT (\*) FROM faculty\_projects LEFT JOIN faculty using (faculty\_id) WHERE faculty\_id is NULL | | Total Admin Roles Assigned | Panels, Label, Button | SELECT COUNT (\*) FROM faculty\_admin\_roles JOIN faculty using (faculty\_id) | | Total Pending Faculty Requests | Panels, Label, Button | SELECT COUNT (\*) FROM faculty\_requests JOIN lookup ON status\_id = lookup\_id WHERE value = 'Pending' | | Total Approved Faculty Requests | Panels, Label, Button | SELECT COUNT (\*) FROM faculty\_requests JOIN lookup ON status\_id = lookup\_id WHERE value = 'Approved' | | Total Rejected Faculty Requests | Panels, Label, Button | SELECT COUNT (\*) FROM faculty\_requests JOIN lookup ON status\_id = lookup\_id WHERE value = 'Rejected' | | Total Fulfilled Faculty Requests | Panels, Label, Button | SELECT COUNT (\*) FROM faculty\_requests JOIN lookup ON status\_id = lookup\_id WHERE value = 'Fulfilled' | | Workload Hours | DataGridView |  | | FacultyRequestsData | DataGridView |  | | RequestChart | Chart |  | | |

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| ***Interface Name*** |  |
| USER MANAGEMENT   |  |  |  |  | | --- | --- | --- | --- | | **UI Component Name** | **Type of UI component** | **Class Attribute name,**  **Class name, attribute name** | **Linked to which database column/table** | | UserData | DataGridView | Faculty  SrNo: int  Id: int  User\_id: int  Name: string  Username: string  Password: string  Email: string  Contact: string  Role: Role  Designation: Designation  ResearchArea: string  TeachingHours: int | SELECT U.user\_id, U.username, F.faculty\_id, F.Name, U.email, F.contact, U.role\_id , L1.value as role, F.designation\_id, L2.value as designation, F.total\_teaching\_hours, F.research\_area FROM users U LEFT JOIN faculty F using(user\_id) JOIN lookup L1 ON L1.lookup\_id = U.role\_id LEFT JOIN lookup L2 ON L2.lookup\_id = F.designation\_id | | |

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| ***Interface Name*** |  |
| WORKLOAD MANAGEMENT   |  |  |  |  | | --- | --- | --- | --- | | **UI Component Name** | **Type of UI component** | **Class Attribute name,**  **Class name, attribute name** | **Linked to which database column/table** | | AssignCourse | DataGridView | FacultyCourse  SrNo: int  Id: int  Faculty: Faculty  Course: Course  Semester: Semester | SELECT FC.\*, F.Name, C.course\_name, C.course\_type, C.contact\_hours, S.Term, S.Year FROM faculty\_courses FC LEFT JOIN faculty F using (faculty\_id) JOIN courses C using (course\_id) JOIN semesters S using (semester\_id) JOIN users U using(user\_id) JOIN lookup L1 ON L1.lookup\_id = U.role\_id | | AssignProject | DataGridView | FacultyProject  SrNo: int  Id: int  Faculty: Faculty  Project: Project  Semester: Semester  SuperVisionHours: int | SELECT FP.\*, F.Name, P.title, S.Term, S.Year FROM faculty\_projects FP LEFT JOIN faculty F using (faculty\_id) JOIN projects P using (project\_id) JOIN semesters S using (semester\_id) JOIN users U using(user\_id) JOIN lookup L1 ON L1.lookup\_id = U.role\_id | | AssignAdminRole | DataGridView | AdminRole  SrNo: int  Id: int  Faculty: Faculty  Name: string  Semester: Semester | SELECT FR.\*, F.Name, S.Term, S.Year FROM faculty\_admin\_roles FR LEFT JOIN faculty F using (faculty\_id) JOIN semesters S using (semester\_id) JOIN users U using(user\_id) JOIN lookup L1 ON L1.lookup\_id = U.role\_id | | CourseSchedule | DataGridView | CourseSchedule  SrNo: int  Id: int  FacultyCourse: FacultyCourse  Room: Room  DayofWeek: string  StartTime: string  EndTime: string | SELECT fcs.schedule\_id, fcs.day\_of\_week, fcs.start\_time, fcs.end\_time, fc.faculty\_course\_id, f.faculty\_id, f.name AS faculty\_name, c.course\_id, c.course\_name, c.course\_type, c.contact\_hours, r.room\_id, r.room\_name, r.room\_type FROM faculty\_course\_schedule fcs JOIN faculty\_courses fc ON fcs.faculty\_course\_id = fc.faculty\_course\_id JOIN faculty f ON fc.faculty\_id = f.faculty\_id JOIN courses c ON fc.course\_id = c.course\_id LEFT JOIN rooms r ON fcs.room\_id = r.room\_id JOIN users U USING(user\_id) JOIN lookup L1 ON L1.lookup\_id = U.role\_id | | Courses | DataGridView | Course  SrNo: int  Id: int  Name: string  Type: string  CreditHours: int  ContactHours: int | SELECT \* FROM courses | | Projects | DataGridView | Project  SrNo: int  Id: int  Title: string  Description: string | SELECT \* FROM projects | | Semesters | DataGridView | Semester  SrNo: int  Id: int  Term: string  Year: int | SELECT \* FROM semesters | | |

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| ***Interface Name*** |  |
| RESOURCE ALLOCATION   |  |  |  |  | | --- | --- | --- | --- | | **UI Component Name** | **Type of UI component** | **Class Attribute name,**  **Class name, attribute name** | **Linked to which database column/table** | | AllocateRoom | DataGridView | FacultyRoom  SrNo: int  Id: int  Faculty: Faculty  Room: Room  Semester: Semester  ReservedHours: int | SELECT FA.\*, F.Name, C.room\_name, C.room\_type, S.Term, S.Year FROM faculty\_room\_allocations FA LEFT JOIN faculty F using (faculty\_id) JOIN rooms C using (room\_id) JOIN semesters S using (semester\_id) JOIN users U using(user\_id) JOIN lookup L1 ON L1.lookup\_id = U.role\_id | | Rooms | DataGridView | Room  SrNo: int  Id: int  Name: string  Type: string  Capacity: int | SELECT \* FROM rooms | | Consumables | DataGridView | Consumable  Id: int  Name: string | SELECT \* FROM consumables | | |

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| ***Interface Name*** |  |
| FACULTY REQUESTS   |  |  |  |  | | --- | --- | --- | --- | | **UI Component Name** | **Type of UI component** | **Class Attribute name,**  **Class name, attribute name** | **Linked to which database column/table** | | FacultyRequests | DataGridView | RequestStatus  Id: int  LookUp\_Id: int  Value: string  FacultyRequest  SrNo: int  Id: int  Faculty: Faculty  Item: Consumable  Quantity: int  Status: RequestStatus  TimeStamp: string | SELECT r.\*, f.Name, c.item\_name, l.value AS status FROM faculty\_requests r JOIN faculty f ON r.faculty\_id = f.faculty\_id JOIN consumables c ON r.item\_id = c.consumable\_id JOIN lookup l ON r.status\_id = l.lookup\_id JOIN users U USING(user\_id) JOIN lookup L1 ON L1.lookup\_id = U.role\_id | |  |  |  |  | | |

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| ***Interface Name*** |  |
| SETTINGS   |  |  |  |  | | --- | --- | --- | --- | | **UI Component Name** | **Type of UI component** | **Class Attribute name,**  **Class name, attribute name** | **Linked to which database column/table** | | Profile | Labels, Textboxes, Button | Faculty  Id: int  User\_id: int  Name: string  Username: string  Password: string  Email: string  Contact: string |  | |  |  |  |  | | |