Student Details

Repository Name	DBS25P023
Registration Number	2024-CS-23

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
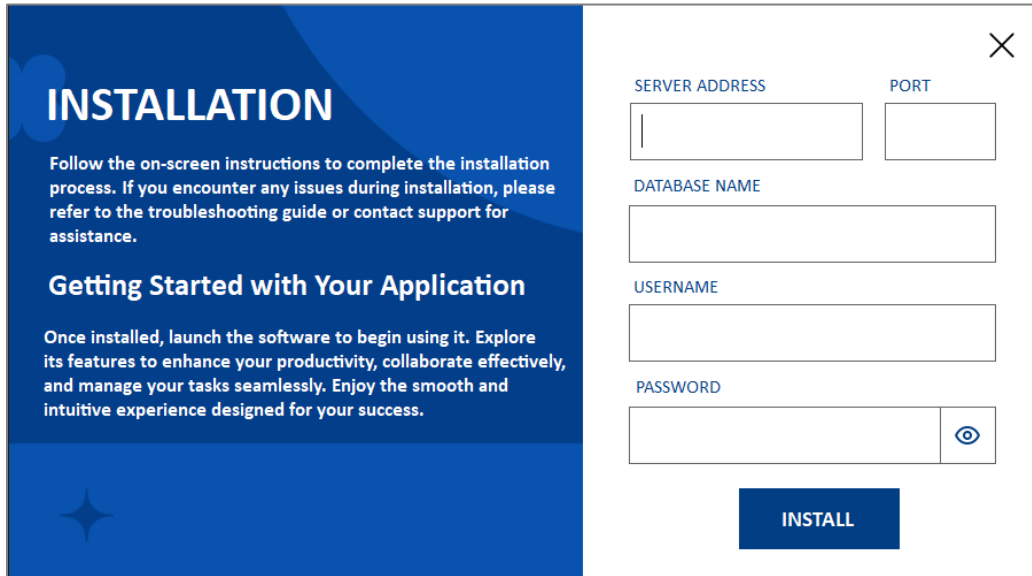
1. **Admin**

   - 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

Interface Name	

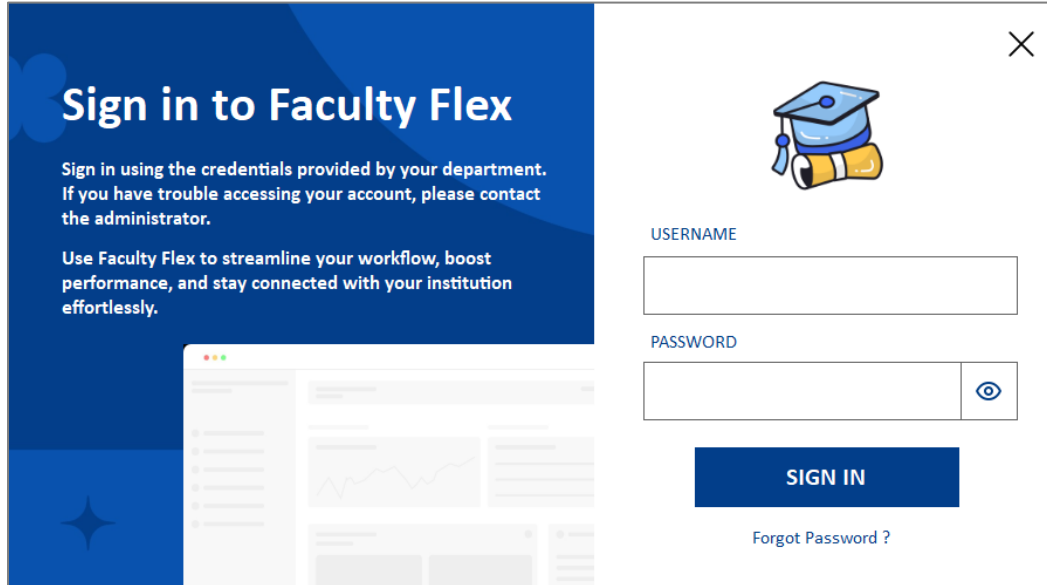SPLASH SCREEN

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		

Interface Name	
INSTALL	

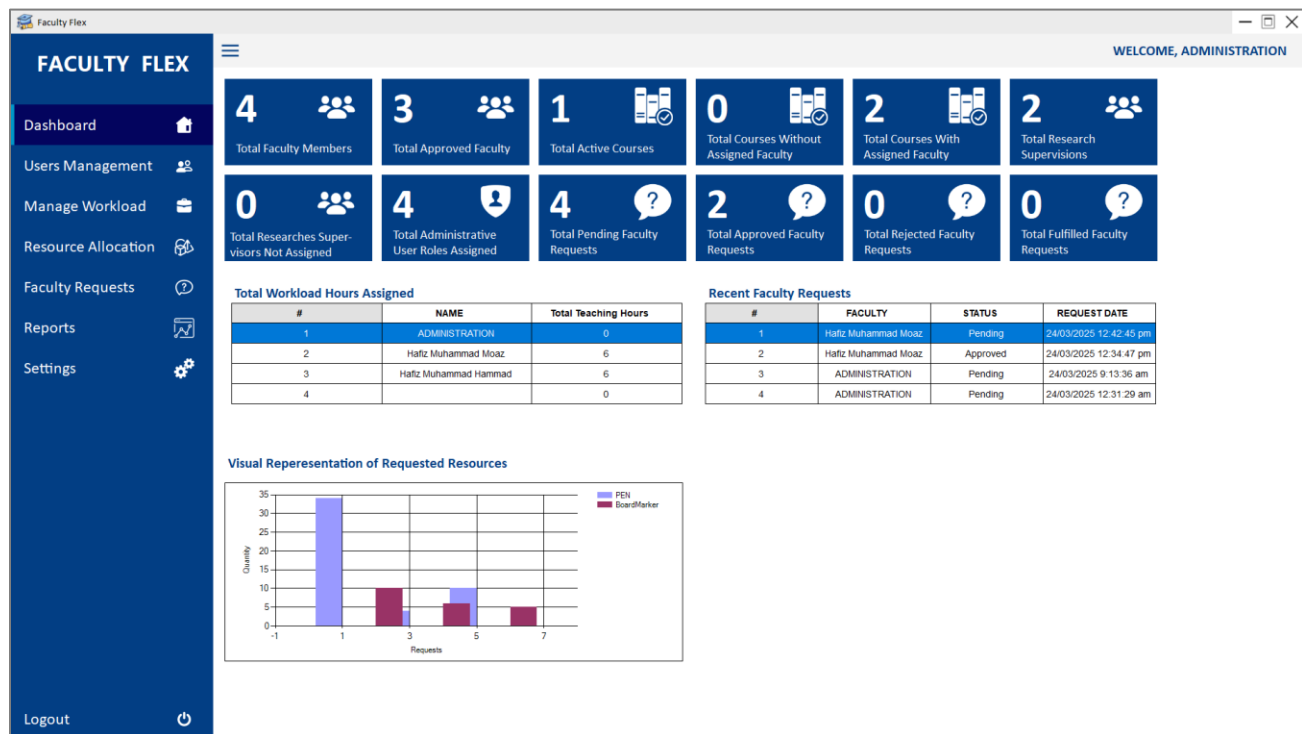| UI Component Name	Type of UI component	Class Attribute name, Class name, attribute name	Linked to which database column/table
InfoPanel	Panel, Labels		

FormPanel	Panel, Labels, Textboxes	DBCred
		    ServerName: string
		    Port: string
		    DatabaseName: string
		    DatabaseUser: string
		    DatabasePassword: string	

ActionBtn	Button	InstallControl => Install ()	

Interface Name	
LOGIN	

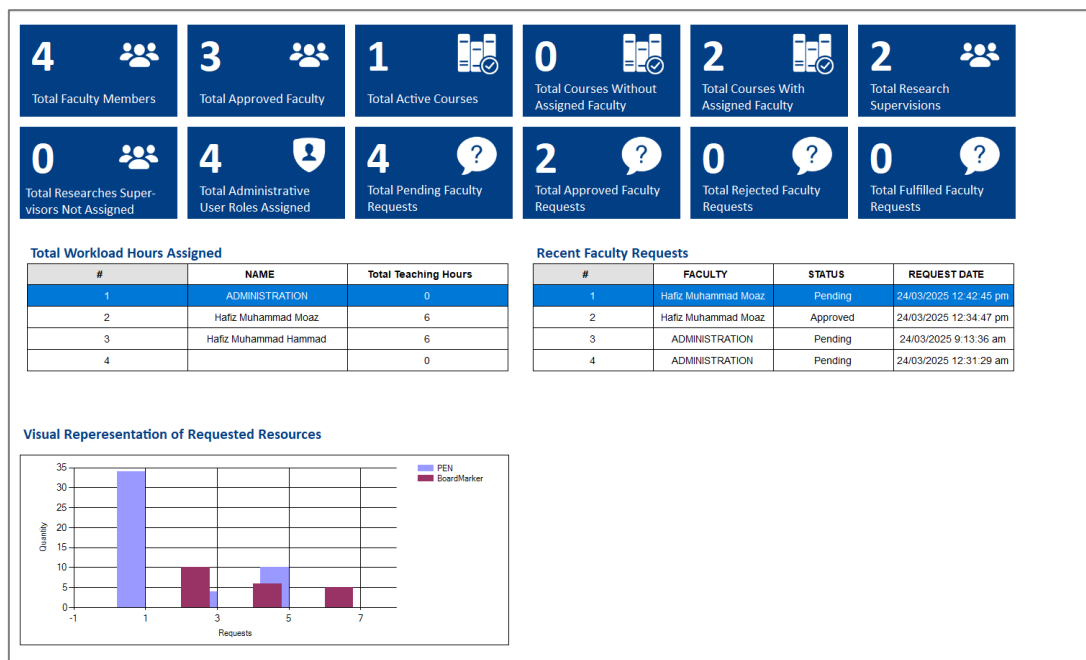| UI Component Name	Type of UI component	Class Attribute name, Class name, attribute name	Linked to which database column/table
InfoPanel	Panel, Labels		

FormPanel	Panel, Labels, Textboxes	Faculty
		   Username: string
		   Password: string
			users (username, password_hash)

Logo	Picture Box		
ActionBtn	Button	AuthControl => Login ()	

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	

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	

Interface Name	
USER MANAGEMENT	

Faculty Management

Register Faculty Members and wait for the Admin to approave Faculty.

REGISTER

#	NAME	USERNAME	EMAIL	CONTACT	ROLE	DESIGNATION
1	ADMINISTRATION	administration	admin@facultyflex.com	0000-0000000	Admin	Professor
2	Hafiz Muhammad Moaz	hafizmmoaz	hafizmoazkhalid@gmail.com	0000-0000000	Faculty	Professor
3	Hafiz Muhammad Hammad	hafizmhammad	hafiz@mail.com	0305-9993331	Department Head	Associate Professor
4	Not Approved	newuser	newuser@dfg	-	Faculty	-

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 |

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

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
			SELECT * FROM rooms

		Capacity: int	

Consumables	DataGridView	Consumable
		  Id: int
		  Name: string
			SELECT * FROM consumables

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

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	