1. Backend Framework Used:
The backend is built using **Flask**.

2. Database Used:
The database used is **MySQL**,

3. Key Backend Endpoints (APIs) and Their Functionalities:

A. Authentication/Login:
1. **Student Login**:
   - **Endpoint**: `/auth/student-login`
   - **Method**: `POST`
   - **Request Body**:
        ```json
        {
        "usn": "string",
        "password": "string"
        }
        ```

  - **Response Body**:
        - On success:
        ```json
        {
        "message": "Student login successful"
        }
        ```
        - On failure:
        ```json
        {
        "error": "Invalid credentials"
        }
        ```

2. **Faculty Login**:
   - **Endpoint**: `/auth/faculty-login`
   - **Method**: `POST`
   - **Request Body**:
        ```json
        {
        "id": "string",
        "password": "string"
        }
        ```

- **Response Body**:
    - On success:
    ```json
    {
    "message": "Faculty login successful"
    }
    ```

    - On failure:
    ```json
    {
    "error": "Invalid credentials"
    }
    ```

B. Student Module:
1. **Apply Leave**:
   - **Endpoint**: `/student/apply-leave`
   - **Method**: `POST`
   - **Request Body**:
        ```json
        {
        "leave_type": "string",
        "reason": "string",
        "start_date": "YYYY-MM-DD",
        "end_date": "YYYY-MM-DD"
        }
        ```
   - **Response Body**:
        - On success:
        ```json
        {
        "message": "Leave application submitted."
        }
        ```
        - On failure:
        ```json
        {
        "error": "string"
        }
        ```

2. **View Leave Status/History**:
   - **Endpoint**: `/student/leave-status`
   - **Method**: `GET`

- **Response Body**:
    ```json
    [
    {
    "Leave_ID": "integer",
    "Type": "string",
    "Reason": "string",
    "Start_Date": "YYYY-MM-DD",
    "End_Date": "YYYY-MM-DD",
    "Status": "string"
    }
    ]
    ```

C. Faculty Module:
1. **View Pending Leave Requests**:
   - **Endpoint**: `/faculty/leave-requests`
   - **Method**: `GET`
   - **Response Body**:
       ```json
       [
       {
       "leave_id": "integer",
       "student_name": "string",
       "leave_type": "string",
       "reason": "string",
       "start_date": "YYYY-MM-DD",
       "end_date": "YYYY-MM-DD",
       "status": "PENDING"
       }
       ]
       ```

2. **Approve/Reject Leave Request**:
   - **Endpoint**: `/faculty/leave-requests/<leave_id>`
   - **Method**: `POST`
   - **Request Body**:
       ```json
       {
       "status": "APPROVED/REJECTED"
       }
       ```
   - **Response Body**:
       - On success:

```json
{
"message": "Leave status updated successfully."
}
```

- On failure:
```json
{
"error": "string"
}
```

3. **View Processed Leave History**:
   - **Endpoint**: `/faculty/leave-history`
   - **Method**: `GET`
   - **Response Body**:
```json
[
{
"leave_id": "integer",
"student_name": "string",
"leave_type": "string",
"reason": "string",
"start_date": "YYYY-MM-DD",
"end_date": "YYYY-MM-DD",
"status": "APPROVED/REJECTED",
"action_taken_on": "YYYY-MM-DD"
}
]
```

D. Admin Module:
1. **View All Leave Requests**:
   - **Endpoint**: `/admin/leaves`
   - **Method**: `GET`
   - **Response Body**:
```json
[
{
"user_type": "Student/Faculty",
"name": "string",
"leave_type": "string",
"reason": "string",
"start_date": "YYYY-MM-DD",
```

```
      "end_date": "YYYY-MM-DD",
      "status": "string",
      "submitted_on": "YYYY-MM-DD HH:MM:SS"
      }
      ]
      ```
```

2. **View Departments & Users**:
   - **Endpoint**: `/admin/departments-users`
   - **Method**: `GET`
   - **Response Body**:
      ```json
      [
      {
      "name": "string",
      "users": [
      {
      "name": "string",
      "role": "Student/Faculty"
      }
      ]
      }
      ]
      ```

3. **Manage User Accounts**:
   - **List Users**:
      - **Endpoint**: `/admin/users`
      - **Method**: `GET`
      - **Response Body**:
      ```json
      [
      {
      "user_id": "string",
      "name": "string",
      "email": "string",
      "role": "Student/Faculty",
      "department": "string"
      }
      ]
      ```

   - **Add New User**:
      - **Endpoint**: `/admin/users`

- **Method**: `POST`
- **Request Body**:
```json
{
"user_id": "string",
"name": "string",
"email": "string",
"password": "string",
"role": "Student/Faculty",
"department": "string"
}
```

- **Response Body**:
- On success:
```json
{
"message": "User added successfully."
}
```

- On failure:
```json
{
"error": "string"
}
```

- **Edit User**:
    - **Fetch Single User**:
    - **Endpoint**: `/admin/users/<user_id>`
    - **Method**: `GET`
    - **Response Body**:
    ```json
    {
    "user_id": "string",
    "name": "string",
    "email": "string",
    "role": "Student/Faculty",
    "department": "string"
    }
    ```

    - **Update Single User**:
    - **Endpoint**: `/admin/users/<user_id>`
    - **Method**: `PUT`

- **Request Body**:
```json
{
"name": "string",
"email": "string",
"role": "Student/Faculty",
"department": "string"
}
```

- **Response Body**:
- On success:
```json
{
"message": "User updated successfully."
}
```

- On failure:
```json
{
"error": "string"
}
```

- **Delete User**:
    - **Endpoint**: `/admin/users/<user_id>`
    - **Method**: `DELETE`
    - **Response Body**:
    - On success:
    ```json
    {
    "message": "User deleted successfully."
    }
    ```

    - On failure:
    ```json
    {
    "error": "string"
    }
    ```