Classroom booking system

Advanced programming (CSE201)

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Implementation details and design patterns

- **Adaptor**: SimpleDateFormat used with other formats.
- **Prototype**: Creator.java is used to create rooms and courses objects.
- **Singleton**: Admin.requests same for all admins. Single instance.
- **Flyweight**: All rooms and users stored are unique.
- **Template**: While booking room for student, booking room method is divided into 3 parts: checking room availability, sending request to admin, saving request for student.
- **Factory**: Constructor of Users class and its sub-classes(Admin, Faculty, Student), Room class constructor, Course class constructor, syncDB method in Main class.
- **Decorator**: New SimpleDateFormat().format() and new SimpleDateFormat().parse(): Methods for formatting date to other formats and to other data types.
- **Observer**: Admin.requests, booked in Room class, roomsBooked in User class. when any of them is changed, other are notified.
- Various **OOPS concepts** like Abstraction, Encapsulation, Inheritance are used.

Issues faced while implementation

- Issue while checking conditions for time overlapping. Resolved by, java.util's date data structure, using Date.compareTo method.
- Issue while sending request to admin: admin object not getting serialised. Resolved by making the HashMap serialised separately in requests.a.
- Issue while storing courses: each course was stored in a different file, with the course code being the file name. 4 HSS courses with same name. Resolved by storing all courses in a single file, using an ArrayList.
- Issue in serialisation while updating and running several instances of the application at one time. Resolved by serialising whenever updating. Deserialising at each instance.

Individual Contributions

Ankur Sharma:

- User Interface(including CSS styles, JFoenix library, fxml style properties)
- Database structure of courses, rooms, users. Using serialisation.
- Data Structures for storing students requests, room booking, etc.
- Algorithms: Search algorithm for students on key listener, checking time intervals overlapping while room booking, auto room allotment, etc.
- Email client for sign up process, password recovery and room booking request status.

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Bonus features

- In the **Sign-up process**, we have incorporated an **OTP feature**, which sends the user an email, with the OTP, to complete the sign-up process. Simple Mail Transfer Protocol (SMTP) is used.

- The request status of the room booking is sent to the student via email, automatically, when Admin accepts or rejects the request.

- **Forgotten Password Recovery:** is done by sending an OTP to user's email id.