Schedule Builder Low Level Design Document

Student Multi-Tool

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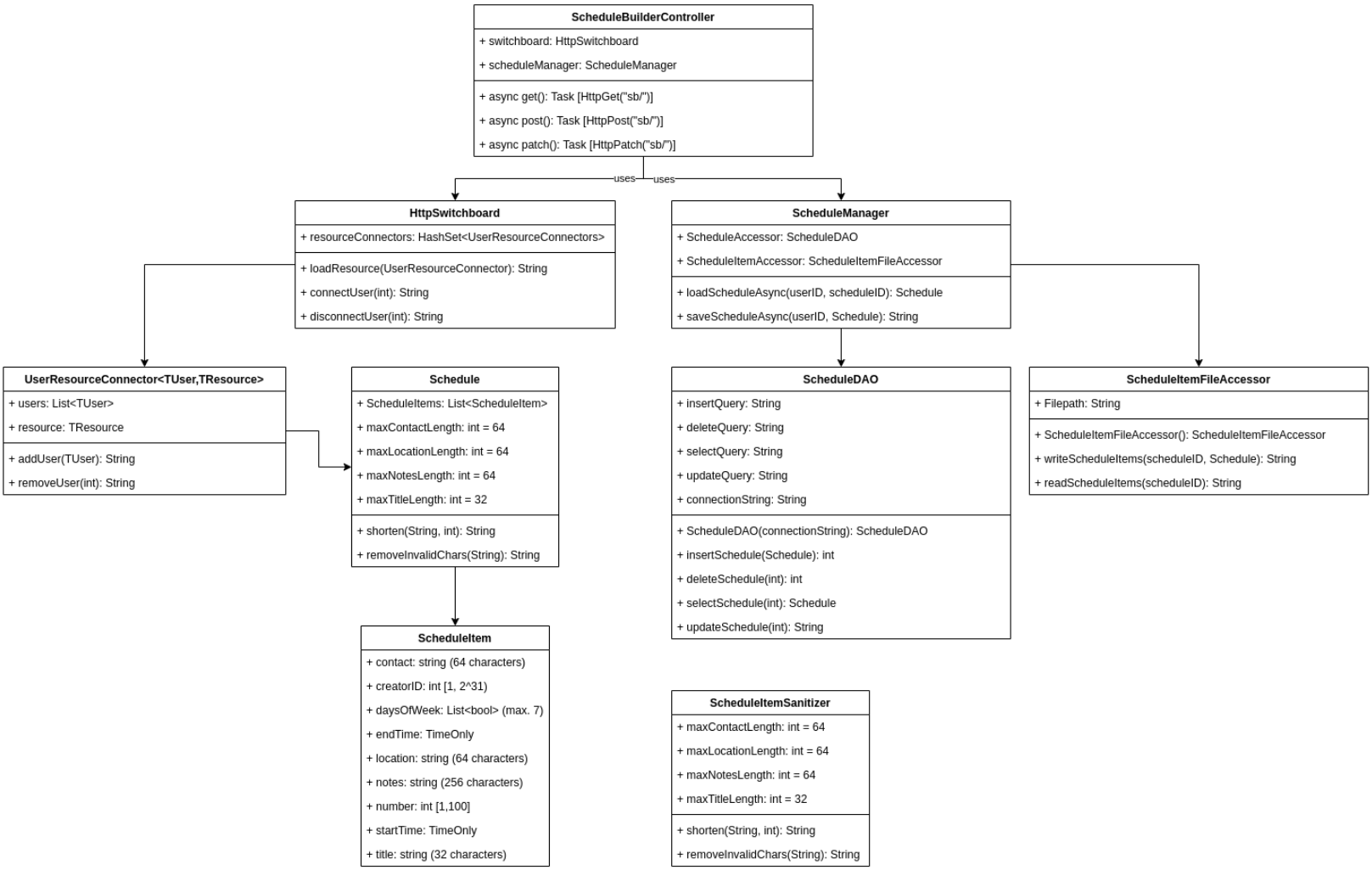
Technologies Used

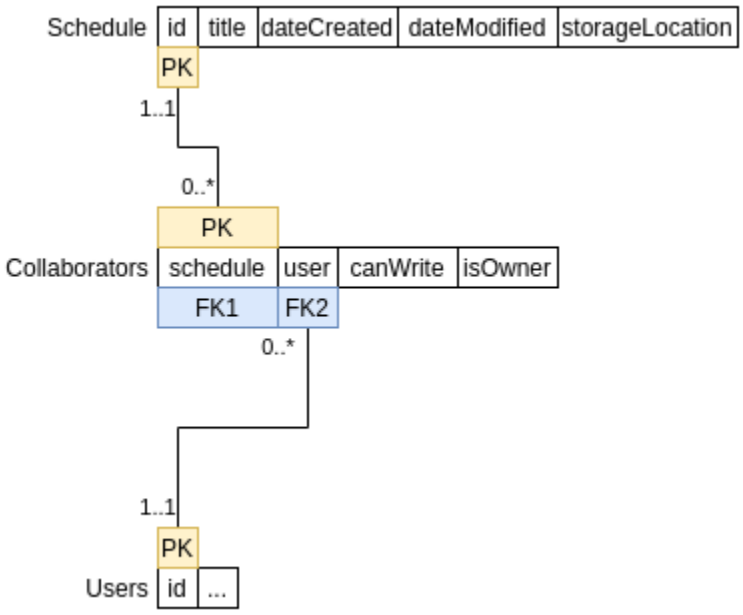
- C#
- .Net
- Ecmascript
- SQL Server 2019 Express Edition
- SQL Server Management Studio
- Video Studio Code and Visual Studio Community

Class Diagram



Database Diagram

Users are associated with Schedules via the Collaborators table, even when there is only one user associated with a Schedule.

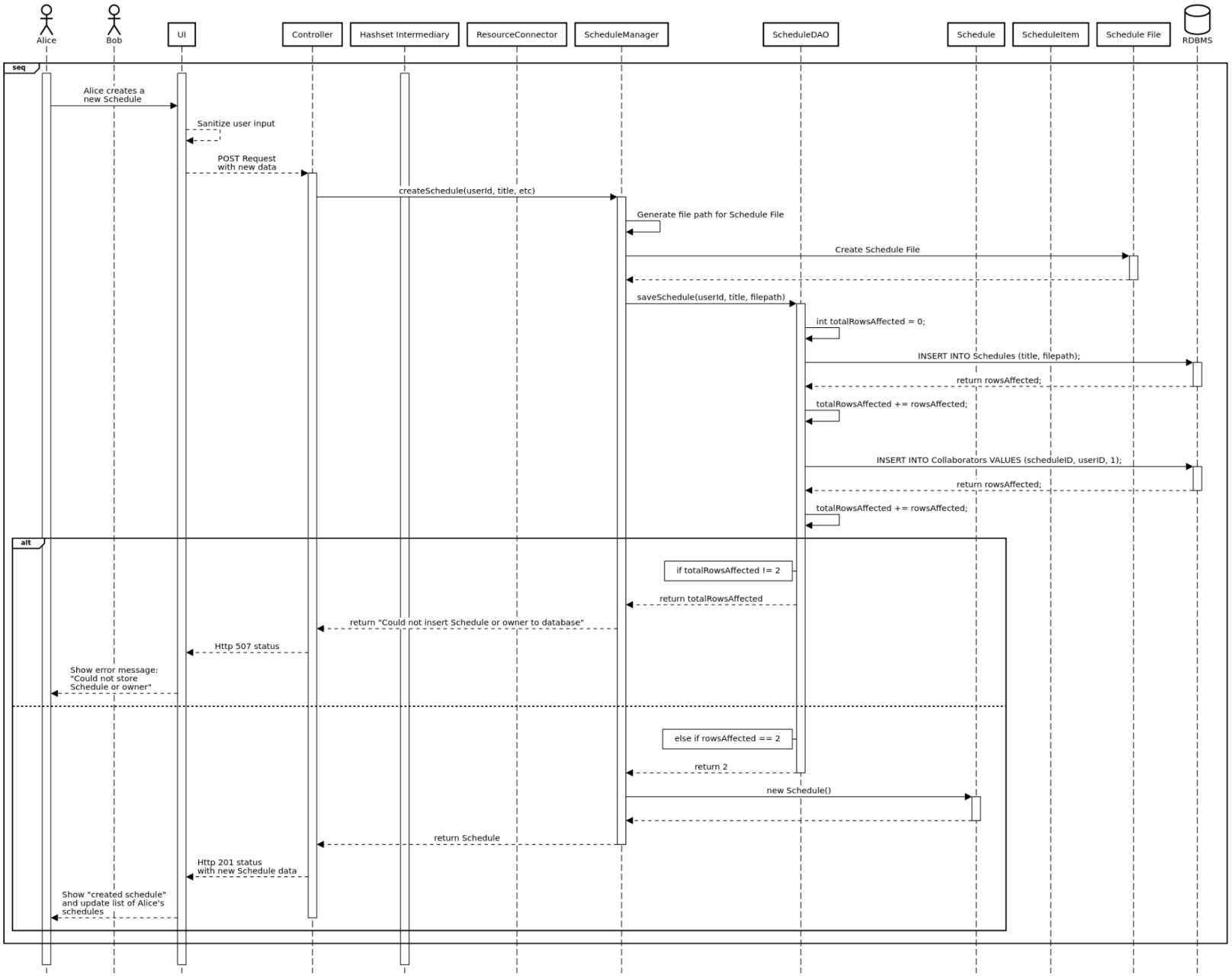


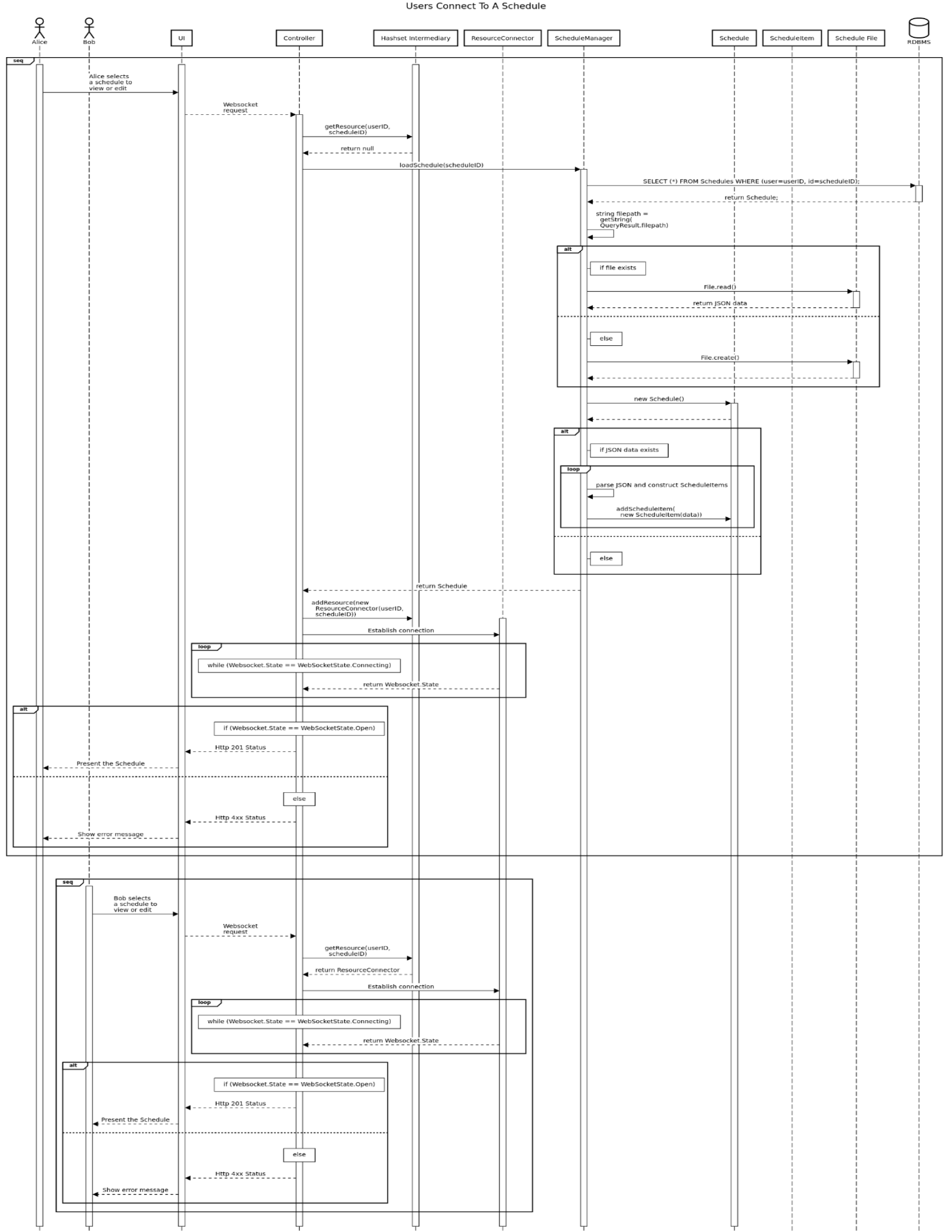
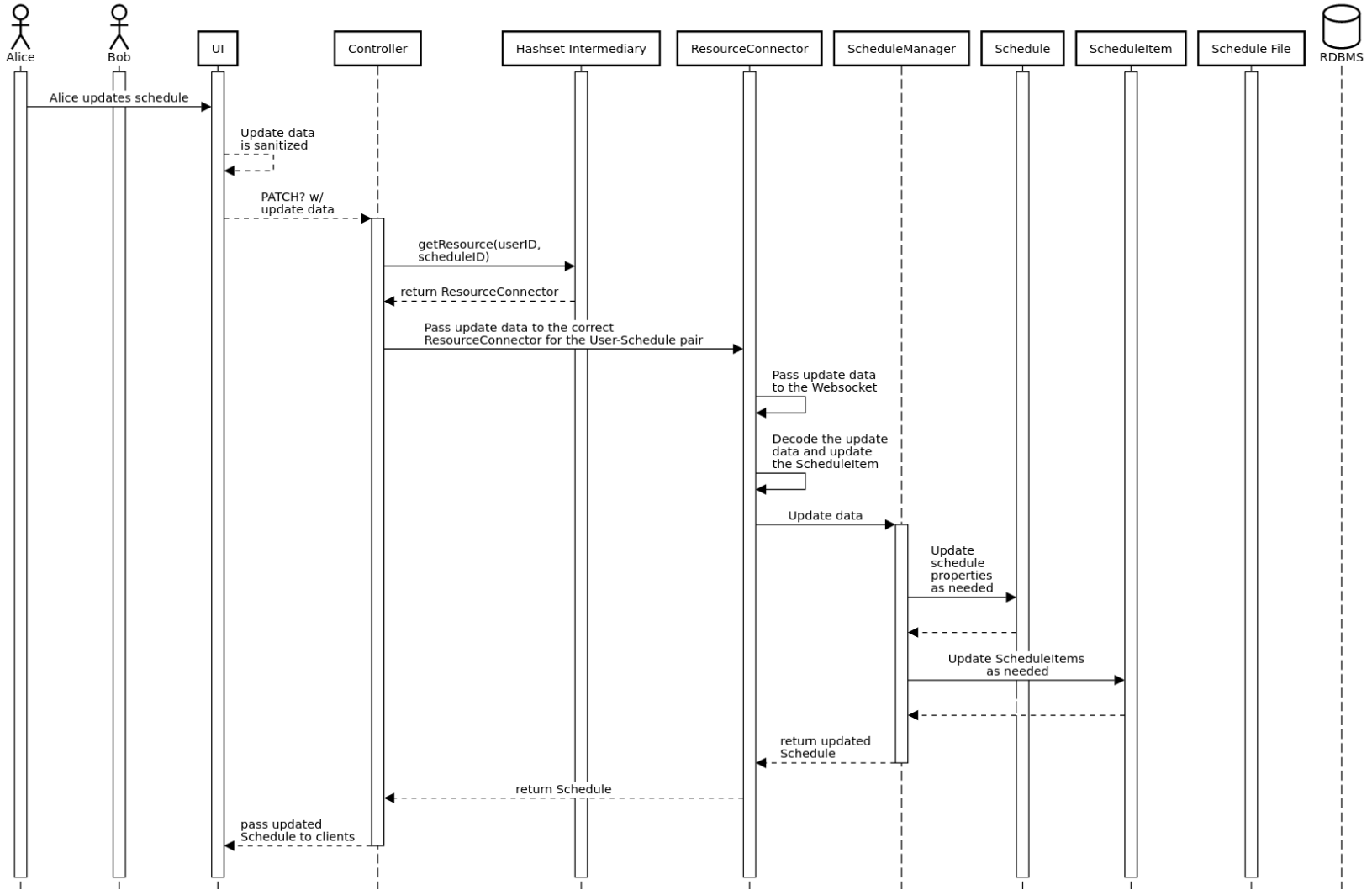
Sequence Diagrams

One major problem that the Schedule Builder needs to solve is connecting multiple users to the same shared resource (in this case, Schedules).

- A class intended to solve this problem is an intermediary data structure that the controller can use to connect users to resources. This is intended to be a hash set due to the O(1) best-case access time hashtables offer, but other data structures could be used.
- This is designed with .NET Websockets (System.Net.Websockets) in mind, but could be adapted to use SignalR or other technologies.

User Creates A Schedule




Users Connect To A Schedule
Alice
Bob
UI
Controller
Hashset Intermediary
ResourceConnector
ScheduleManager
Schedule
ScheduleItem
Schedule File
RDBMS
seq
Alice selects a schedule to view or edit
Websocket request
getResource(userID, scheduleID)
return null
loadSchedule(scheduleID)
SELECT (*) FROM Schedules WHERE (user=userID, id=scheduleID);
return Schedule;
string filepath = getString(QueryResult.filepath)
alt
if file exists
File.read()
return JSON data
else
File.create()
new Schedule()
if JSON data exists
loop
parse JSON and construct ScheduleItems
addScheduleItem(new ScheduleItem(data))
return Schedule
addResource(new ResourceConnector(userID, scheduleID))
Establish connection
while (Websocket.State == WebSocketState.Connecting)
return Websocket.State
if (Websocket.State == WebSocketState.Open)
Http 201 Status
Present the Schedule
Http 4xx Status
Show error message
Bob selects a schedule to view or edit
return ResourceConnector

Users Update A Shared Schedule