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This tutorial is designed to revise your knowledge on Sequence Diagrams.

**Activity 1**

Draw a sequence diagram for the given below description.

**Note: Identify the stereotypes**

A student can enroll for the semester online. When the student is using the online enrollment for the first time, he/she needs to register by giving the student ID (SID). Afterwards he/she can login to the system and can perform enrollment.

When students are enrolling the system will automatically check for any prerequisite subjects they have to complete before enrolling and for any outstanding semester payments. Once all prerequisite subjects have been completed and payments are not outstanding, the student can successfully enroll into the semester.

Prerequisite subject details and payments made by students are all stored in StudentDB. Once the enrolling is successful, student will get an enroll success message, when enrollment is not successful, they will get a message stating the enrollment is unsuccessful and ask to enroll again.

**Note: User Login process is already modeled as a separate sequence diagram.**

### Activity 2

Following is the use case scenario of “BookingTickets”. Read the scenario and answer the questions given below.

<b>Name:</b> BookingTickets
<b>Actor:</b> Passenger
<b>Main Flow of Events:</b>
1. Passenger provides his/her username and password in to LoginUI login into the system.
2. The system validates the user
3. If valid login, show the success message.
4. Each passenger can get more than one ticket
5. For each new ticket, passenger directs to the bookingUI. Then for each passenger, system ask for route details in the bookingUI
6. Then submit route details to the system. System checks the availability of busses for the route and display bus details to the passenger
7. Passenger selects the preferred bus and request for a booking
8. Then the system checks for vacant seats.
9. If there are vacant seat, the system increases the seat count and at the same time issue the e-ticket to passenger.
<b>Extension:</b>
3a. If login unsuccessful, ask the person to reenter login details.

- a) Draw the sequence diagram for step 1 to 3.
- b) What are the types of messages you use in the above diagram?
- c) What is/are the synchronous message/s that are there in your answer?
- d) Draw a sequence diagram for the above complete use case scenario referencing step 1 to 3 .  
(Assume that you have to refer the previous diagram (a) in this new diagram)
- e) What is the method to reuse the previous sequence diagram (a) in the new diagram (d)?
- f) What are the tags that you have used in the second diagram (d)?

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**Activity 3**

**Draw a sequence diagram for the following scenario. Class structure for the main process is given below.**

“Easy Map” is a Satellite based Navigation System, designed for mobile phones, which helps to find the best route for a destination location from the user’s current position.

A user has to login to the system first, in order to find a route. After a successful login, the user will request to find the route by providing a destination location to the system through EasyMap user interface. Then the system will check whether the Global Positioning System (GPS) is turned on in the device to get the user’s current location. If the GPS is turned off, the system will prompt a message to user, asking for the permission to GPS authorization. Once the user confirms to turn On GPS, the system will turn on GPS. Then, the system will get the user’s current position.

Once the system receives the current location of the user, it will find the best route by passing source and destination as parameters. Then the system will check for traffic on different routes heading to the given destination. At the same time, the system will calculate the distance of different routes. After receiving the traffic conditions and distance of each route, the system will calculate the Estimated Time of Arrival for each route. Then system will select the best route based on Time of Arrival and send details such as time, route coordinates and distance to MapAppHandler class. MapAppHandler class will then update these details on the Map. Then the updated map will be displayed to the user. Since the traffic of the given best route could change over time, the system should check continuously for faster routes from user’s new location and update the map until the user reaches their destination.

Hint: Assume that, User Login interaction is already modeled in another diagram. You can re-use it for the sequence diagram. You may use suitable boundary, control and entity classes to indicate login process.

## BSc (Hons) in Information Technology Year 2

### Tutorial 2 – Part 1

**IT2020 – Software Engineering**

**Semester 2, 2022**

<div>MapUI</div> <div>.....</div> <div>showGPSAuthorization() confirmGPSON()</div>	<div>MapController</div> <div>.....</div> <div>findRoute(Destination)</div>	<div>PositionSensor</div> <div>.....</div> <div>checkGPS() turnOn() getUserPosition()</div>
<div>MapAppHandler</div> <div>.....</div> <div>findBestRoute(S,D)</div>	<div>MapApplication</div> <div>.....</div> <div>checkTraffic() calcDistance() calcTime() selectBestRoute()</div>	<div>Map</div> <div>.....</div> <div>updateMap()</div>