S&SE – Software and Systems Engineering

Assignment #2: UML

Group 4

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Task 1:

An online banking system design should contain a user, a client program (in a web browser), and a server on which a web server and an application server are running.

1) Use case diagram.

2.1

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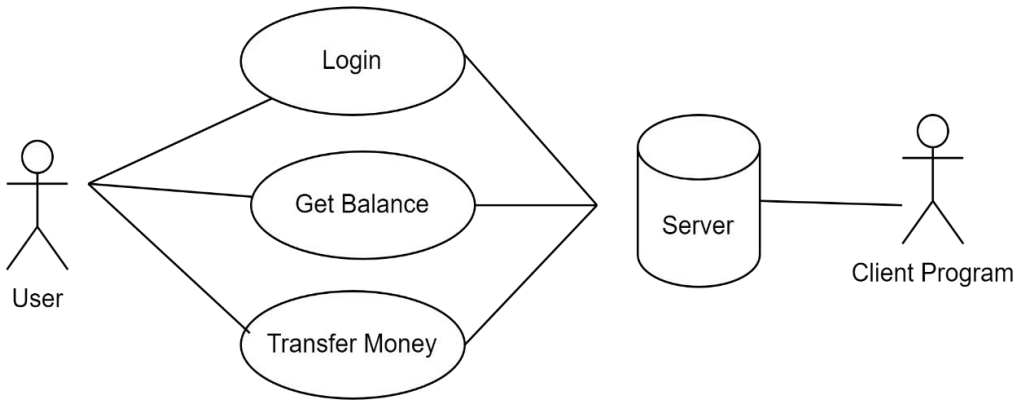

Figure 1.1

2) Sequence Diagram

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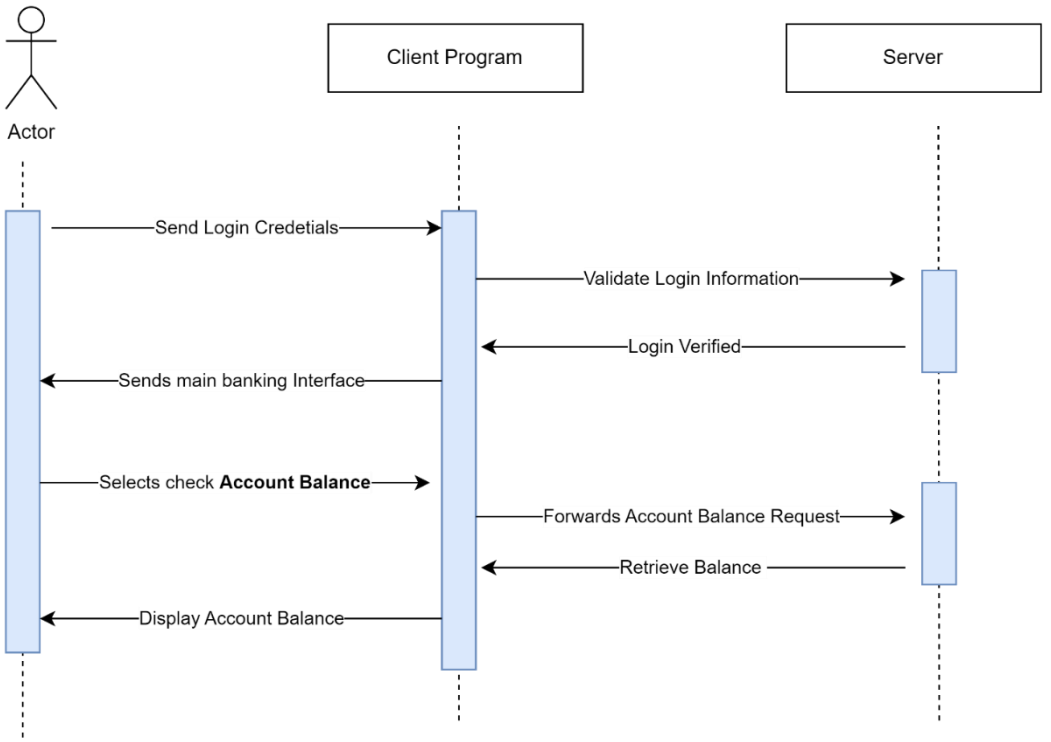

Figure 1.2

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Task 2:

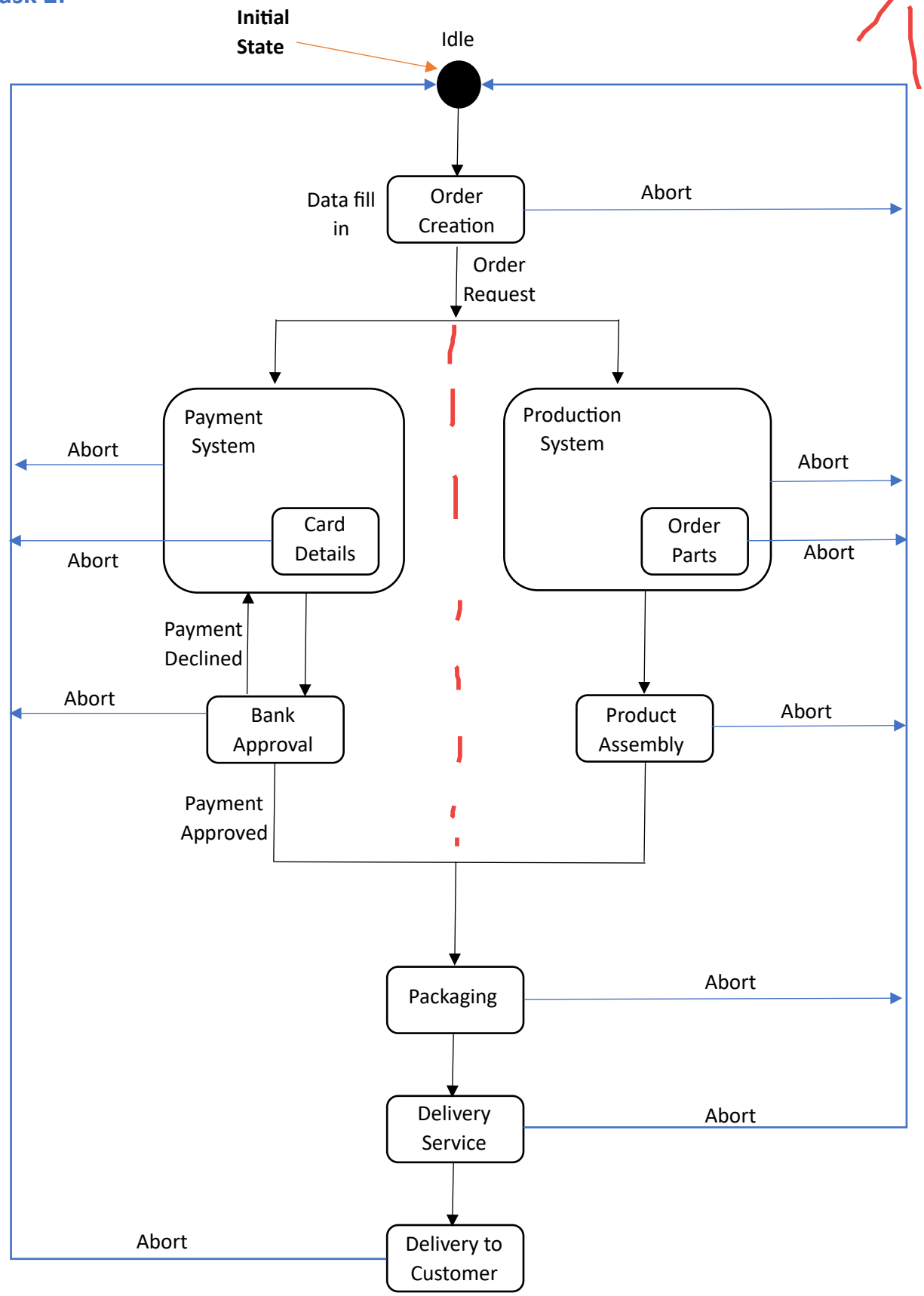

Figure 2.1

Task 3:

1)

i. Car Traffic Light

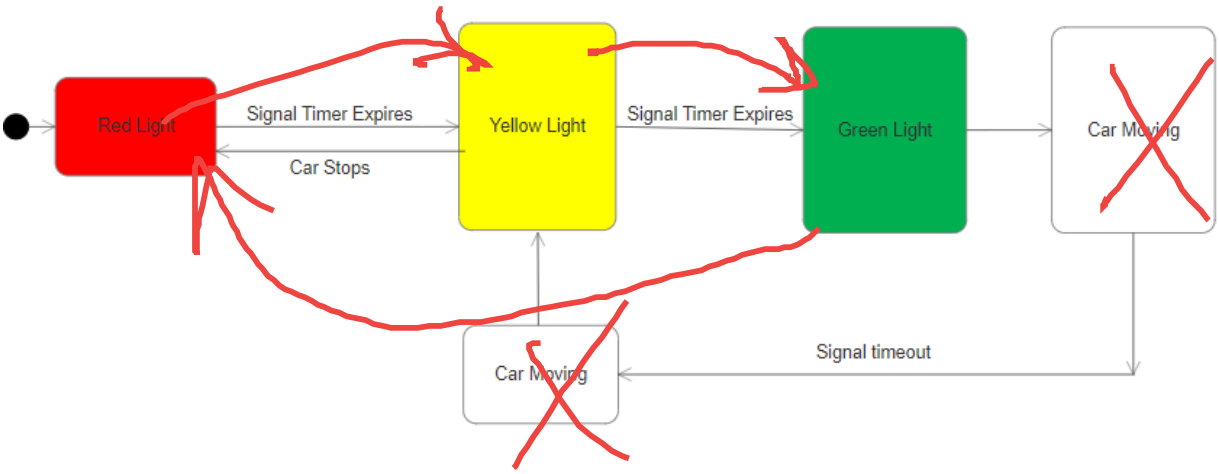

Figure 3.1

States: Red, Yellow, and Green
Transition:
Red -> (Signal Timer Expires) -> Yellow
Yellow -> (Signal Timer Expires) -> Green
Green -> (Signal Timer Expires) -> Yellow
Yellow -> (Signal Timer Expires) -> Red

ii. Pedestrian Traffic Light

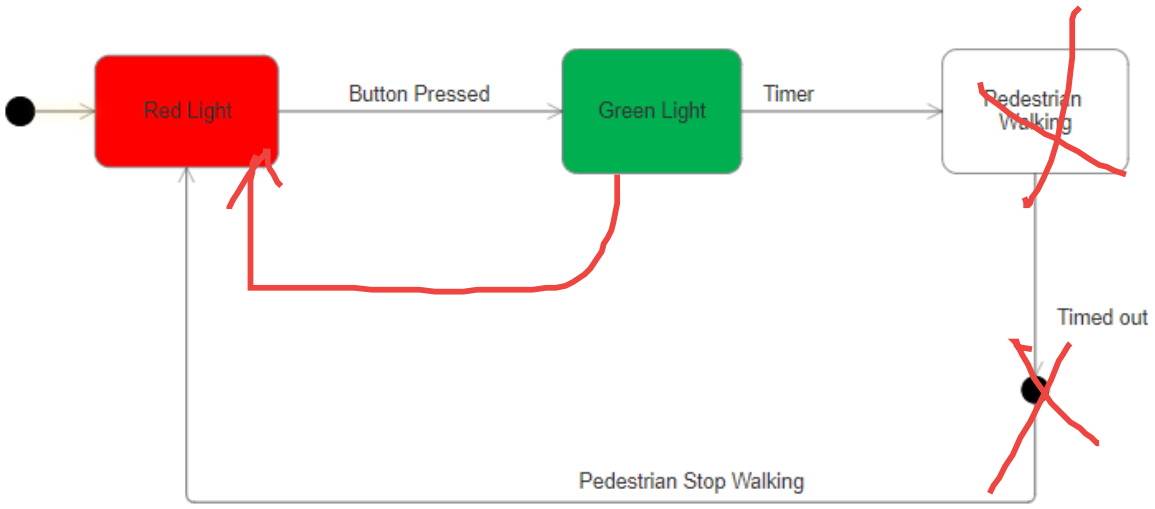

Figure 3.2

States: Red and Green light
Transition:

When the 5.1 tton is pressed it transitions to green.
After the timer expires it transitions back to red.

2) State chart Model

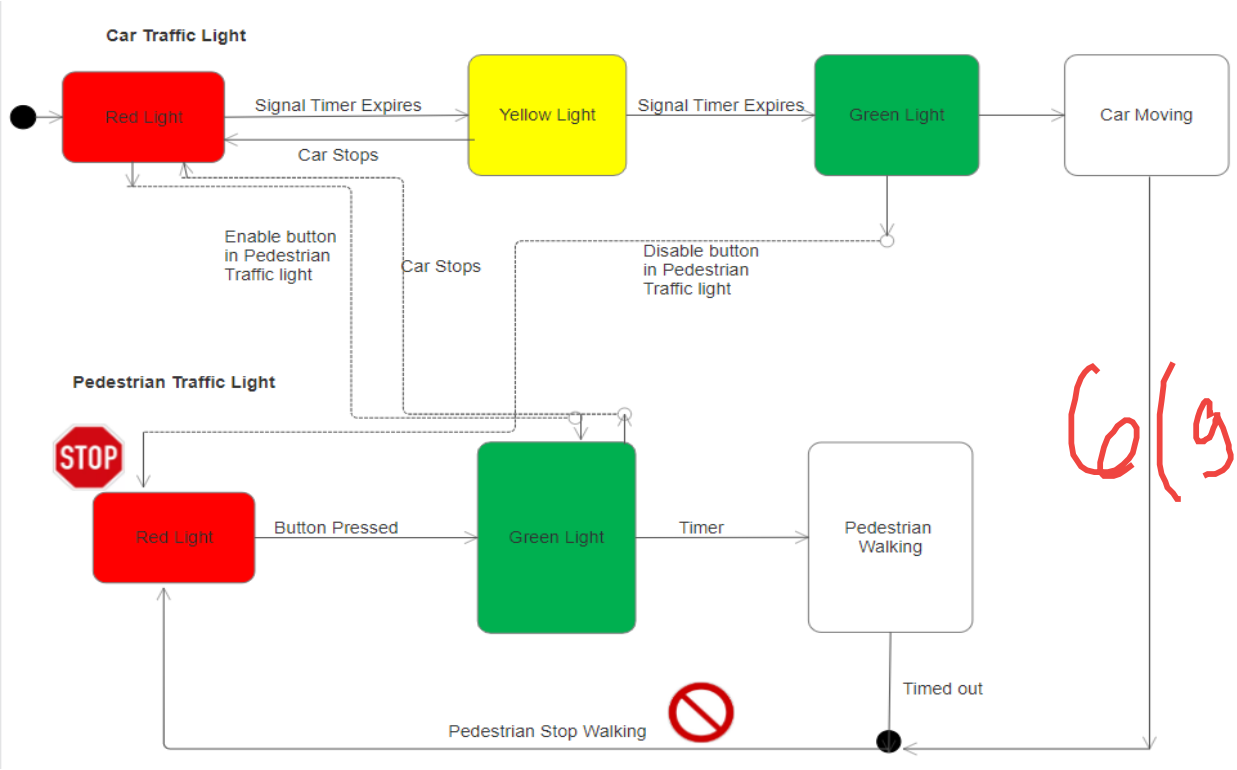

Figure 3.3

In this model:

- When the car traffic light is green, the pedestrian traffic light is red and the button is disabled.
- When the car traffic light turns red, the button becomes enabled for pedestrians.
- The pedestrian light turns green only if the car traffic light is red.

This synchronization ensures a safe operation by controlling the interaction between the car traffic light and the pedestrian traffic light. Which prevents potential accidents of the pedestrians with the car.

3) What would make such a system design optimal? I.e., which measure should be minimized/maximized while keeping the system safe? How can that be improved in comparison with your initial design?

The signal management needs to be optimal and for that things that need to be optimized are:

- Minimize the waiting time: Minimizing the waiting time will allow both the car driver and pedestrian to be patient rather than breaking the signal.

- Efficient Traffic Flow: Signal timing should be adjusted according to traffic flow, which is which timings are peak hours for the traffic and should have minimized waiting time and vice versa.
- Maximizing safety: This means that both pedestrians and cars should not be moving together. There must be a difference of a few seconds between the transitions of both traffic signals.

Improvements:

- Effective/ Smart Sensors: It is very important to implement smart sensors that can detect any presence of cars and pedestrians and for adjusting time according to traffic flow.

Feedback: It is one the best ways to gather data from the users and pursue what changes are required and whether are users satisfied or not.

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