SOFTWARE DESIGN AND CONSTRUCTION
Assignment 1. Use case analysis

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1. SUBMISSION GUIDELINE

When you want to submit your individual work of in-class tasks for the Case Study, you have to push your work to your individual GitHub repository, complied with the naming convention "TeamName-StudentID.StudentName" (e.g. TKXDPM.KHMT.20231.20192012.HoangNghiaPhu or TKXDPM.VP.20231-20192122.LuongHongHai).

2. IN-CLASS TASKS

In this section, we will analyse and realize use cases by identifying analysis classes, their interactions/relationships with interaction diagrams and analysis class diagrams for the Case Study.

You are asked to work individually for this section, and then put all your files (including both .astah files and exported PNG files) and sub-directories in a parent directory, namely "**Use case analysis**". After that, push your commit to your individual repository before the announced deadline. Remember to submit astah file(s) also.

We will use our Software Requirement Analysis (SRS) in the previous assignment as the input for the use case analysis process.

2.1. INTERACTION DIAGRAMS WITH ASTAH

In this subsection, you would get familiar with the components of a sequence diagram and a communication diagram in Astah.

2.1.1. Sequence diagram with Astah

Please see the following links to know how to make a sequence diagram with Astah.

https://astah.net/support/astah-pro/user-guide/sequence-diagram/

https://www.youtube.com/embed/Qi2CsTY4LSk

Some small tips:

https://astahblog.com/2015/10/15/search-models-in-diagram/

https://astahblog.com/2015/10/28/hide-sequence-message-number/

https://astah.net/support/astah-pro/user-guide/diagram-editor/

2.1.2. Communication diagram with Astah

See the following link to know how to make a communication diagram with Astah.

https://astah.net/support/astah-pro/user-guide/communication-diagram/

https://www.uml-diagrams.org/communication-diagrams.html

2.2. INTERACTION DIAGRAMS FOR UC "PAY ORDER"

This subsection demonstrates how to create an architectural design for UC "Pay Order" step by step. At the end of this subsection, we achieve a sequence diagram and a communication diagram for UC "Pay Order", which is used to create the analysis class diagram in the next lab.

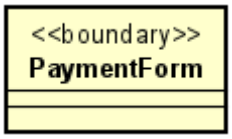
2.2.1. Analysis Classes

The steps to analyze classes for UC "Pay Order", i.e., the steps to find classes from use-case behavior, are illustrated as follows:

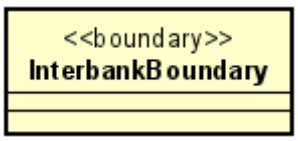
Step 1. Create a new class diagram.

Step 2. Find boundary classes:

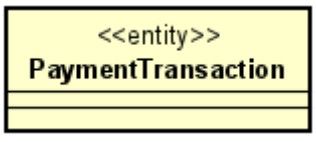
a) User interface classes:



b) System/device interface classes:



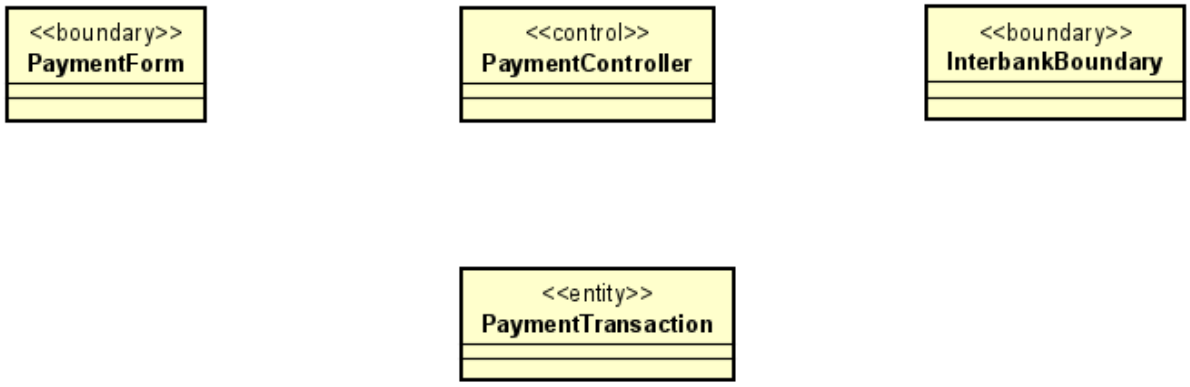
Step 3. Find entity classes:



Step 4. Find control classes

Step 5. Save your work.

The result we achieve in analysis classes is shown in the following figure.



2.2.2. Distribute use-case behaviour to classes

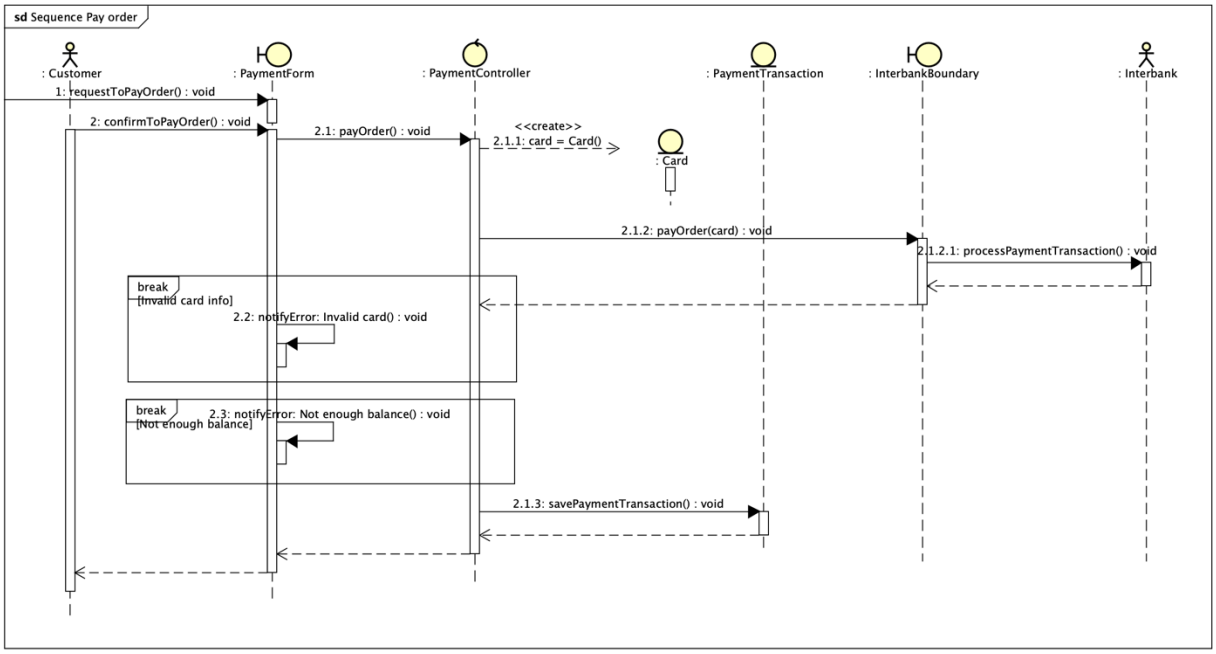
We use interaction diagram(s), i.e., sequence diagram and/or communication diagram, to allocate responsibilities to classes and model analysis class interactions.

Sequence diagram for UC "Pay Order"

Step 1. Create a new sequence diagram.

Step 2. Drag all the classes and related actor(s) from the structure tree and drop it on the newly created diagram.

Step 3. Allocating responsibilities to classes

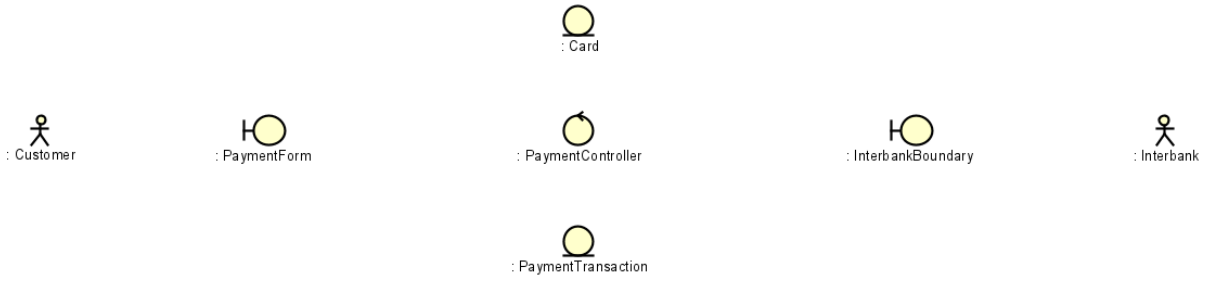


Step 4. Save your work

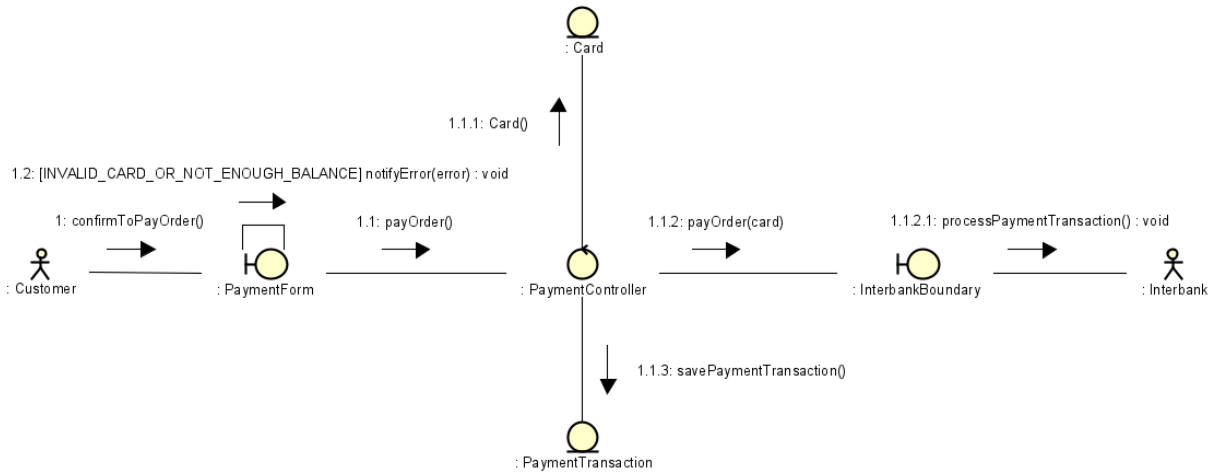
Communication diagram for UC "Pay Order"

Step 1. Create a new communication diagram.

Step 2. Drag all the classes and related actor(s) from the tree and drop it on the newly created diagram.



Step 3. Allocating responsibilities to classes



Step 4. Save your work

2.3. INTERACTION DIAGRAMS FOR UC "PLACE ORDER"

This subsection demonstrates how to create an interaction diagram for UC "Place Order" step by step. In the end of this subsection, we achieve a sequence diagram and a communication diagram for UC "Place Order", which are used to create the analysis class diagram in the next lab.

2.3.1. Analysis Classes

The steps to analyze classes for UC "Place Order", i.e., the steps to find classes from use-case behavior, are illustrated as follows.

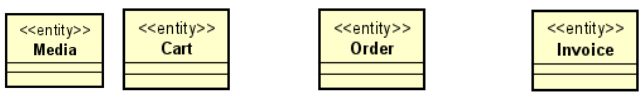
Step 1. Create a new class diagram.

Step 2. Find boundary classes:

a) User interface classes:

b) System/device interface classes: None

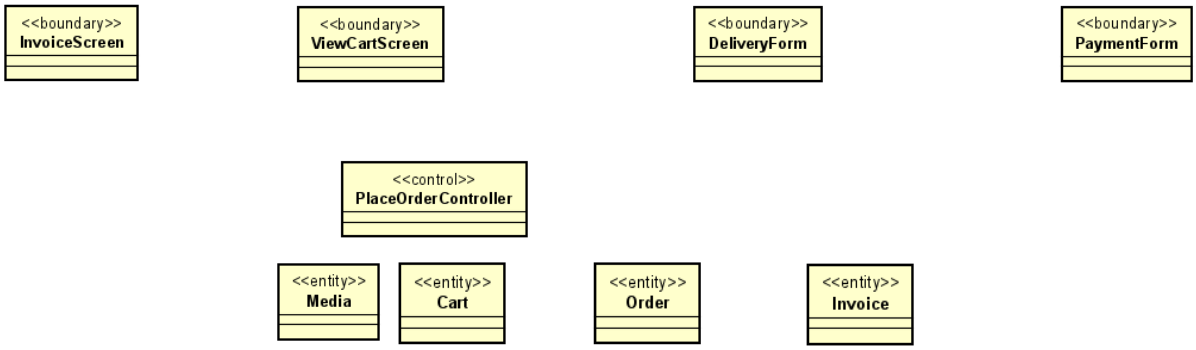
Step 3. Find entity classes:



Step 4. Find control classes

Step 5. Save your work.

The result we achieve in analysis classes is shown in the following figure.



2.3.2. Distribute use-case behaviour to classes

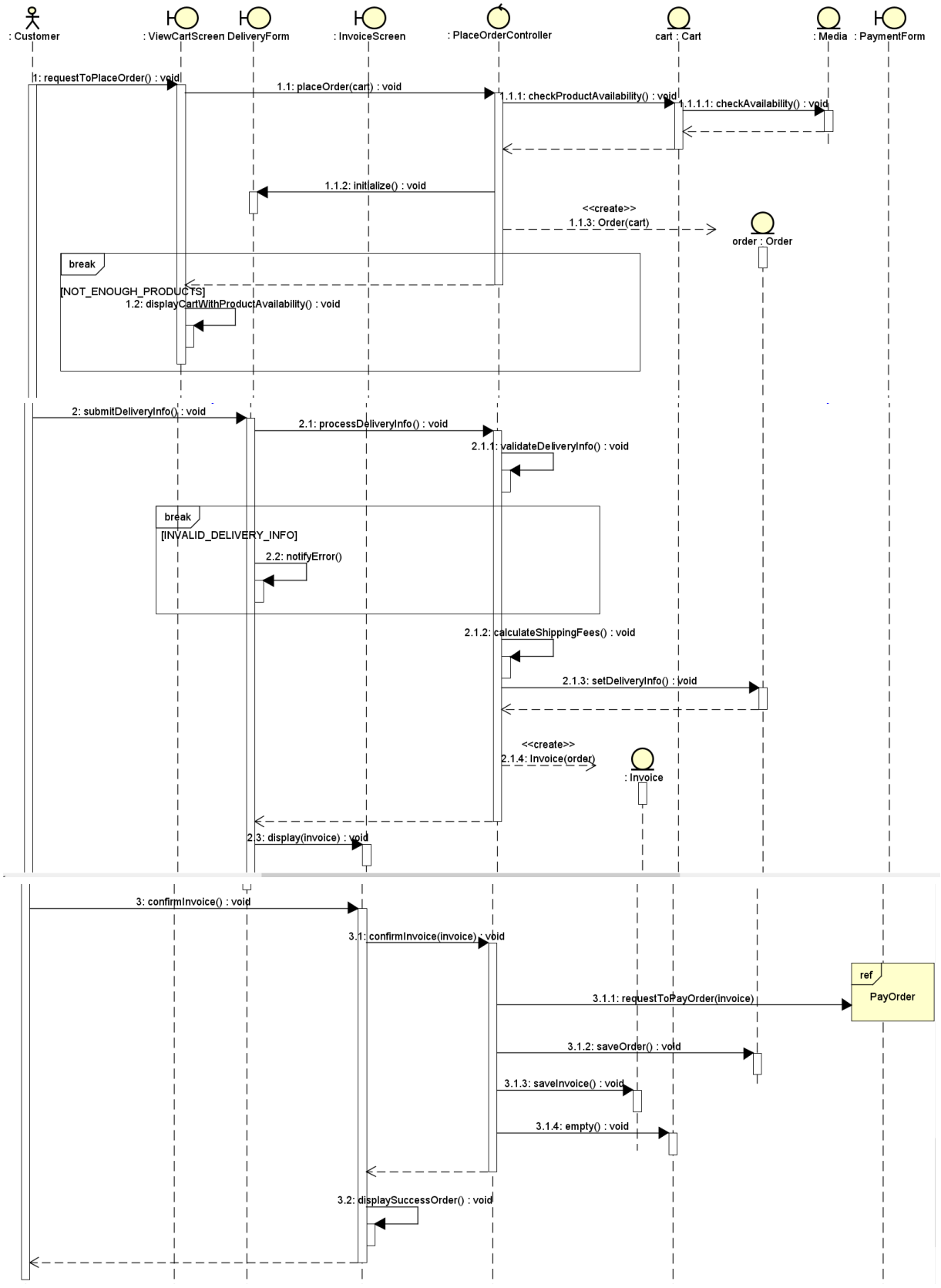
We use interaction diagram(s), i.e., sequence diagram and/or communication diagram, to allocate responsibilities to classes and model analysis class interactions.

Sequence diagram for UC "Place Order"

Step 1. Create a new sequence diagram.

Step 2. Drag all the classes and related actor(s) from the structure tree and drop it on the newly created diagram.

Step 3. Allocating responsibilities to classes



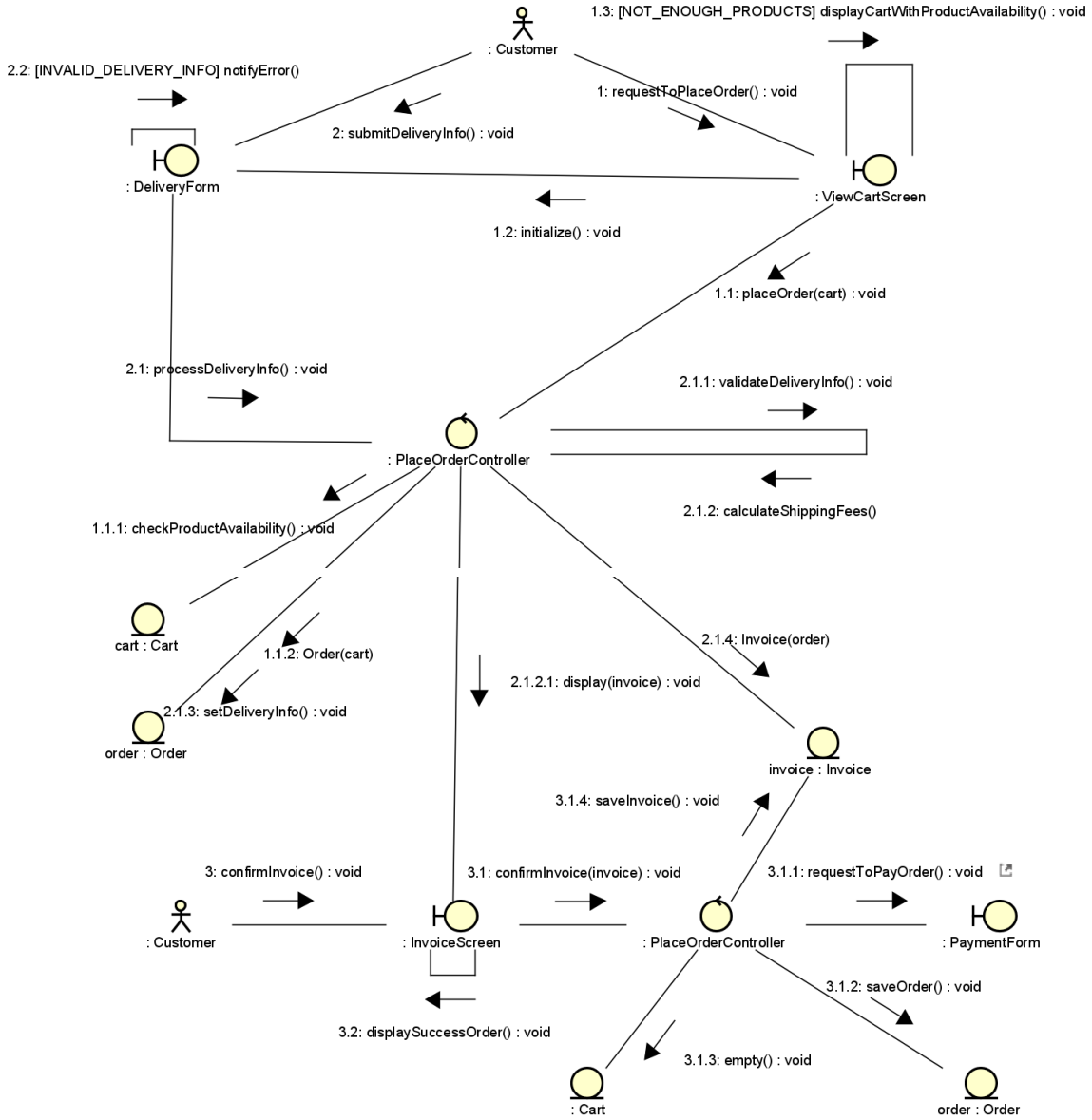
Step 4. Save your work

Communication diagram for UC "Place Order"

Step 1. Create a new communication diagram.

Step 2. Drag all the classes and related actor(s) from the tree and drop it on the newly created diagram.

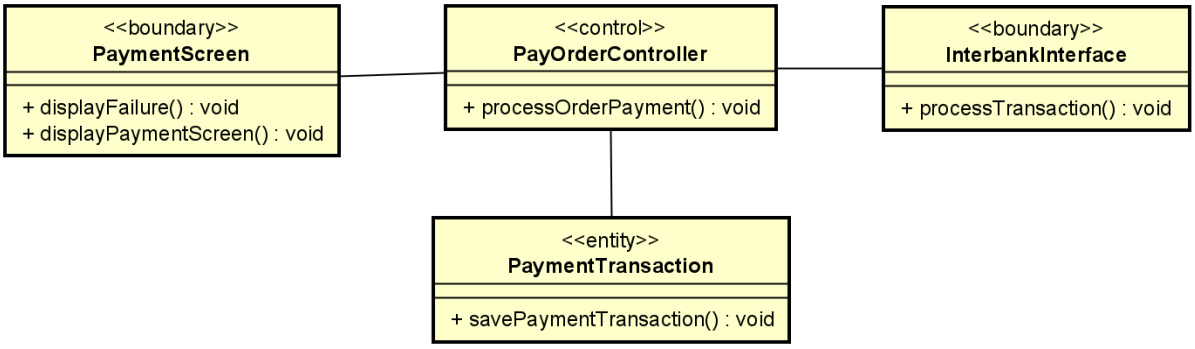
Step 3. Allocating responsibilities to classes



Step 4. Save your work

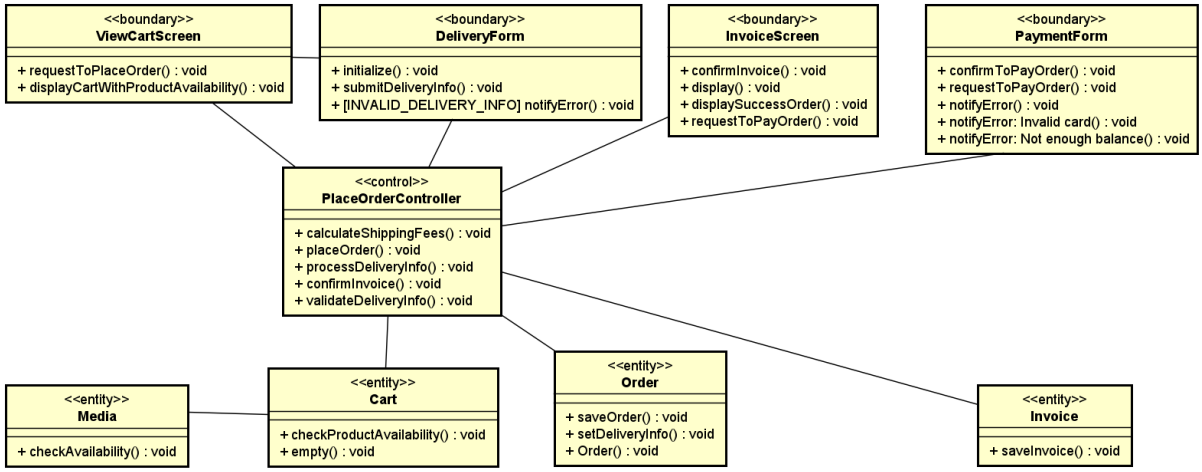
2.4. ANALYSIS CLASS DIAGRAM OF UC "PAY ORDER"

From either the communication diagram or the sequence diagram of UC "Pay Order" made in the previous lab, we can achieve the analysis class diagram as follows. Please remember to add necessary attributes for classes, based on the input/output data specifications.



2.5. ANALYSIS CLASS DIAGRAM FOR UC "PLACE ORDER"

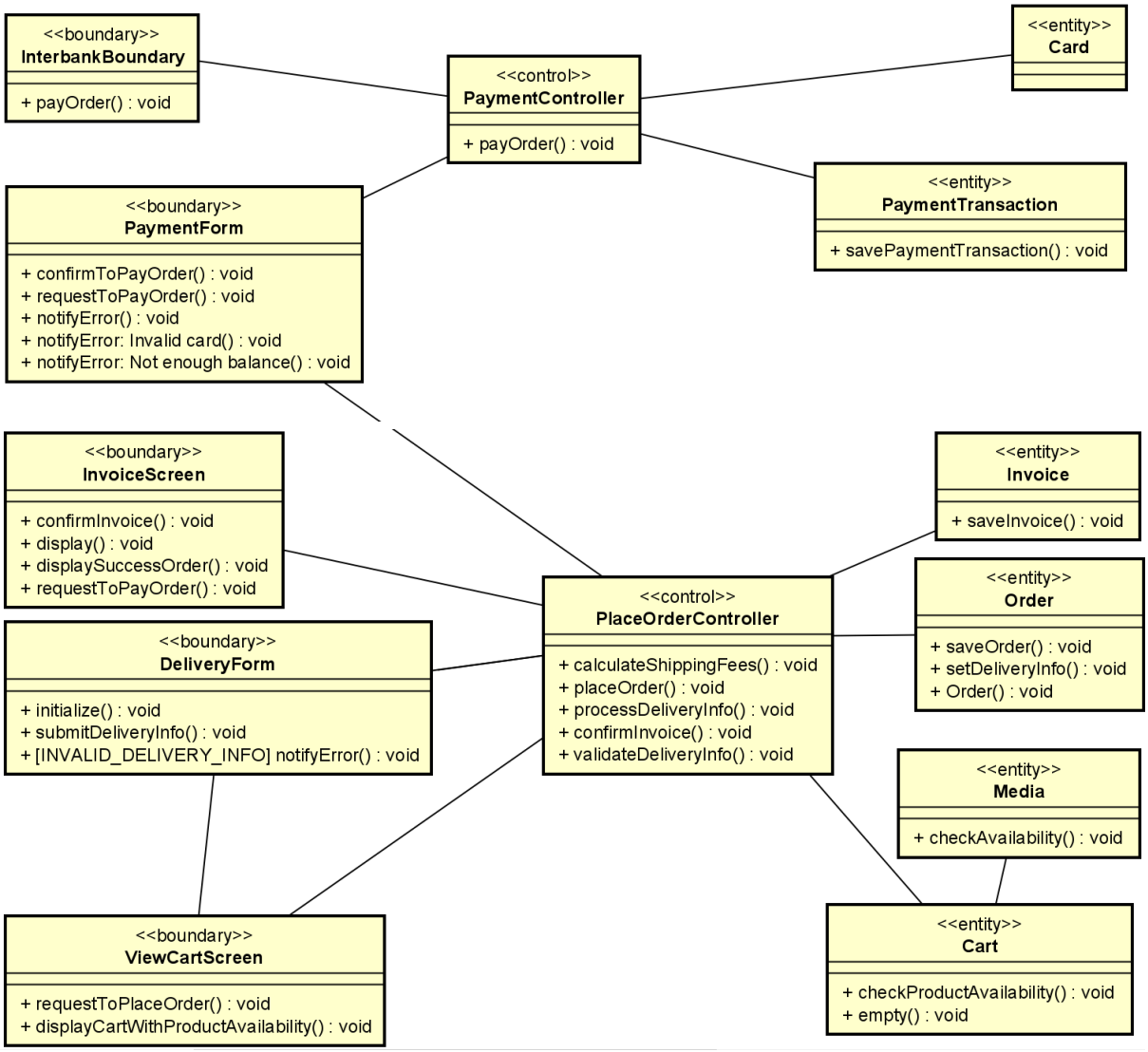
From either the communication diagram or the sequence diagram of UC "Place Order" made in the previous lab, we can achieve the analysis class diagram as follows. Please remember to add necessary attributes for classes, based on the input/output data specifications.



2.6. MERGED ANALYSIS CLASS DIAGRAM FOR UC "PLACE ORDER" WITH "PAY ORDER"

You are asked to design the analysis diagram for UC "Place Order" merged with UC "Pay Order."

When you complete the tasks, please export your work to PNG files and push them to GitHub. Do not forget to add necessary attributes for classes, based on the input/output data specifications.



3. HOMEWORK ASSIGNMENTS

3.1. COMPLETE AT-CLASS EXERCISES

Complete all in-class exercises (in section 2,3) following the guidelines.

3.2. EXTEND WITH UC "PLACE RUSH ORDER"

USE CASE ANALYSIS FOR UC "PLACE RUSH ORDER": In this assignment, you are asked to design the interaction diagrams for UC "Place Rush Order".

Please remember to modify the interaction diagrams for UC "Place Order" with this new use case.

In case you model the relationship between UC "Place Rush Order" and UC "Place Order" as an extension, think of where and when the extension use case is inserted in the base use case (i.e., at which message of which class under which conditions the extension use case starts). Then use the event flow in SRS to create interaction diagrams.

After completing interaction diagram(s) and analysis classes diagram(s) for the UC "Place rush order", please combine the results with use cases that you've done before (i.e. "Place order" and "Pay order") to a merged analysis class diagram for all use cases related to place order.

When you complete the assignment, please export your diagram to a PNG file and push it to GitHub.