SOFTWARE DESIGN & CONSTRUCTION
Lab 03-Interaction Diagram

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1. SUBMISSION GUIDELINE

You are required to push all your work to the valid GitHub repository complying with the naming convention:

"<MSTeamName>-<StudentID>.<StudentName>".

For this lab, you have to turn in your work twice before the following deadlines:

- **Right after class**: Push all the work you have done during class time to Github.
- **10 PM the day after the class**: Create a branch named "***release/lab03***" in your GitHub repository and push the full submission for this lab, including in-class tasks and homework assignments, to this branch.

2. IN-CLASS TASKS

In this section, we get started with the architecture design process by drawing interaction 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 "***Architectural Design***". 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 lab as the input for the architecture design 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"

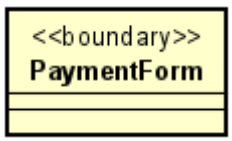
This subsection demonstrates how to create an architectural design for UC "Pay Order" step by step. At the end of this subsection, we achieve a sequence diagram and a communication diagram for UC "Pay Order", which is used to create the analysis class diagram in the next lab.

2.2.1. Analysis Classes

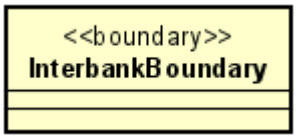
The steps to analyze classes for UC "Pay Order", i.e., the steps to find classes from use-case behavior, are illustrated as follows:

Step 1. Create a new class diagram.
Step 2. Find boundary classes:

a) User interface classes:



b) System/device interface classes:

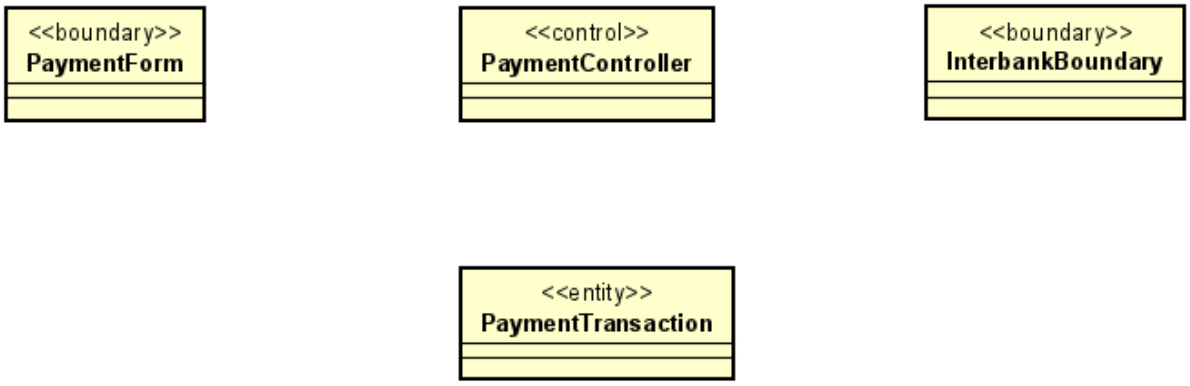


Step 3. Find entity classes:

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

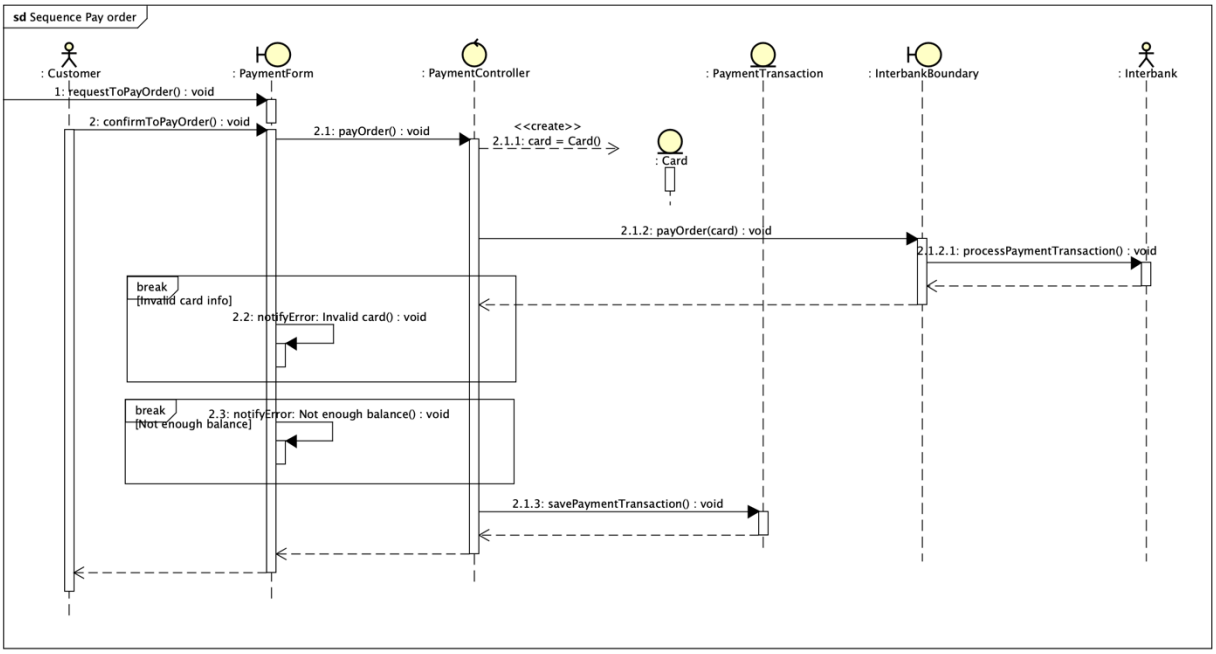
We use interaction diagram(s), i.e., sequence diagram and/or communication diagram, to allocate responsibilities to classes and model analysis class interactions.

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

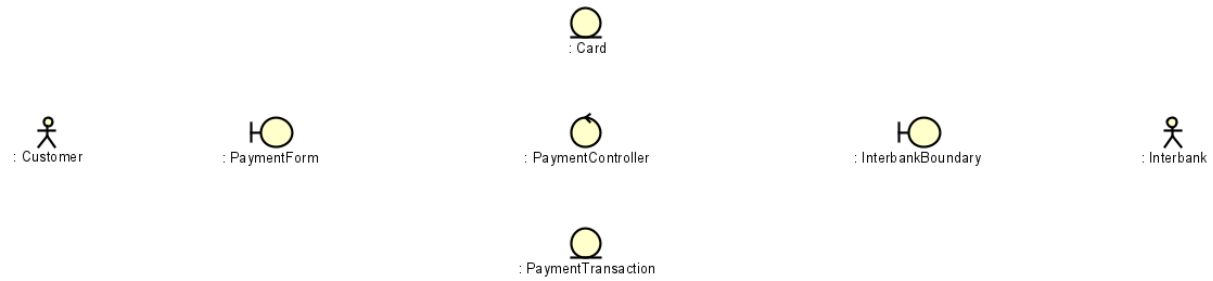


Step 4. Save your work

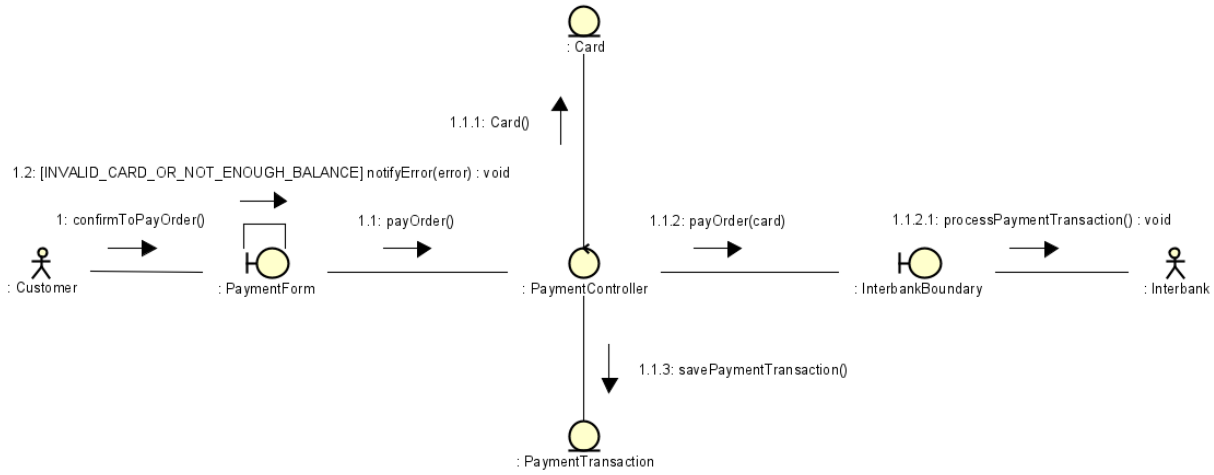
Communication diagram for UC "Pay Order"

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.

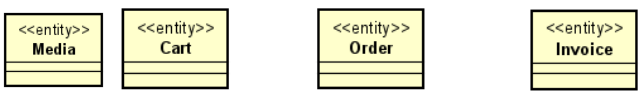
Step 1. Create a new class diagram.

Step 2. Find boundary classes:

a) User interface classes:

b) System/device interface classes: None

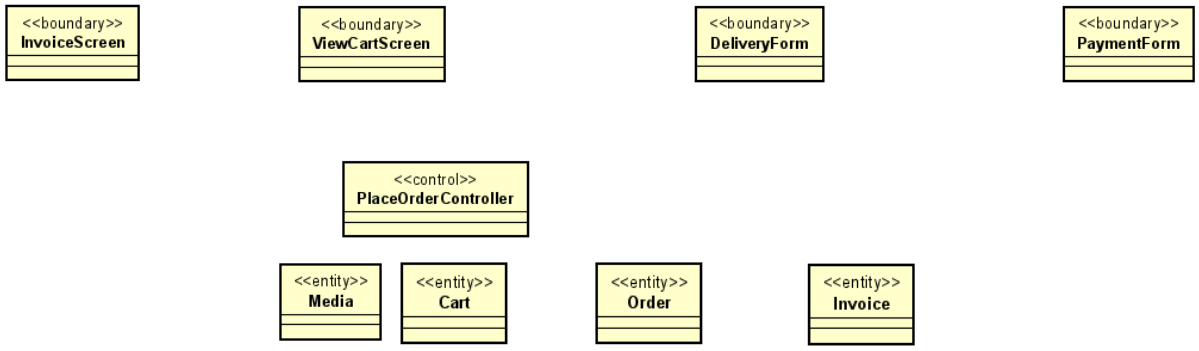
Step 3. Find entity classes:



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

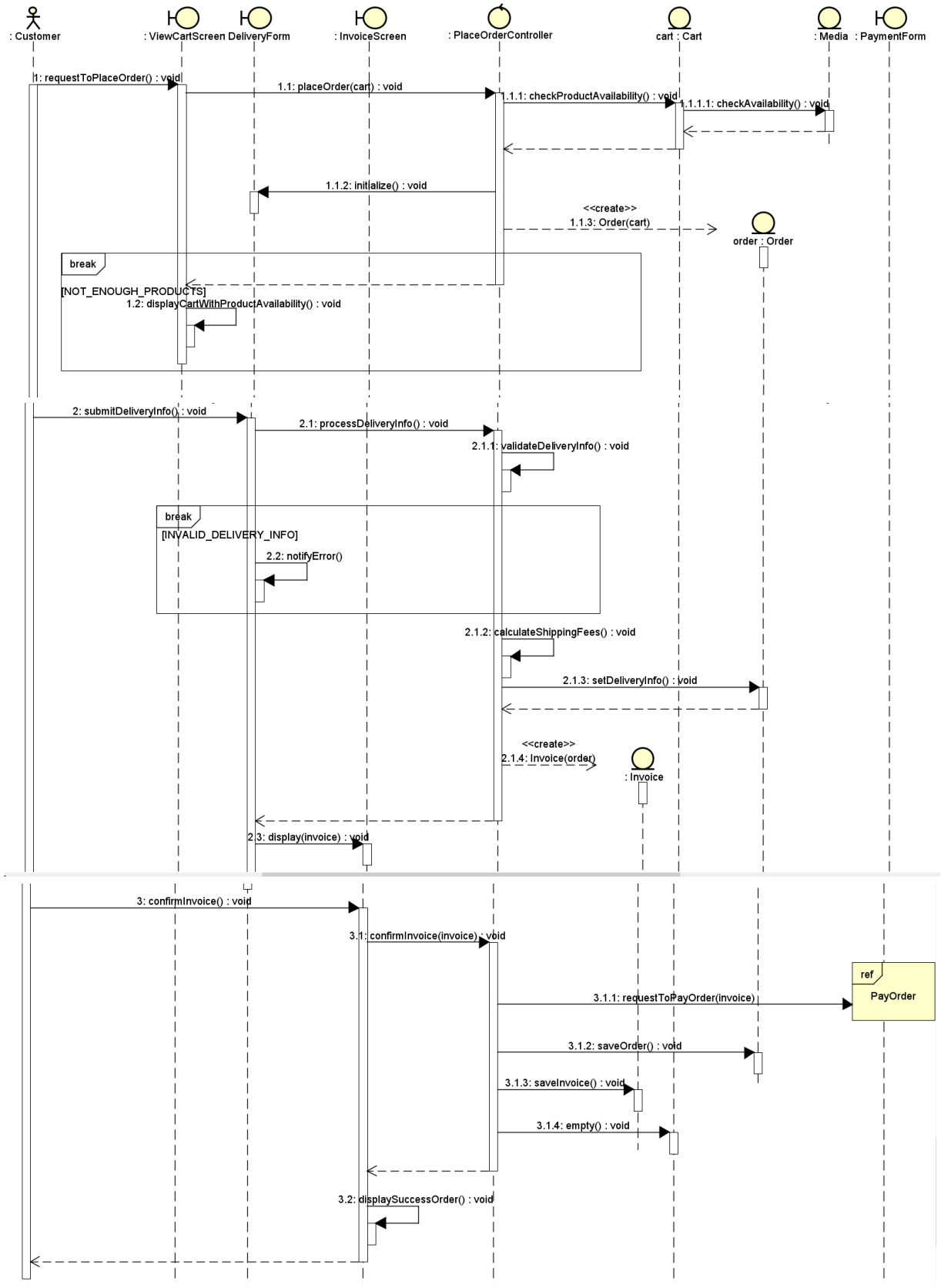
We use interaction diagram(s), i.e., sequence diagram and/or communication diagram, to allocate responsibilities to classes and model analysis class interactions.

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



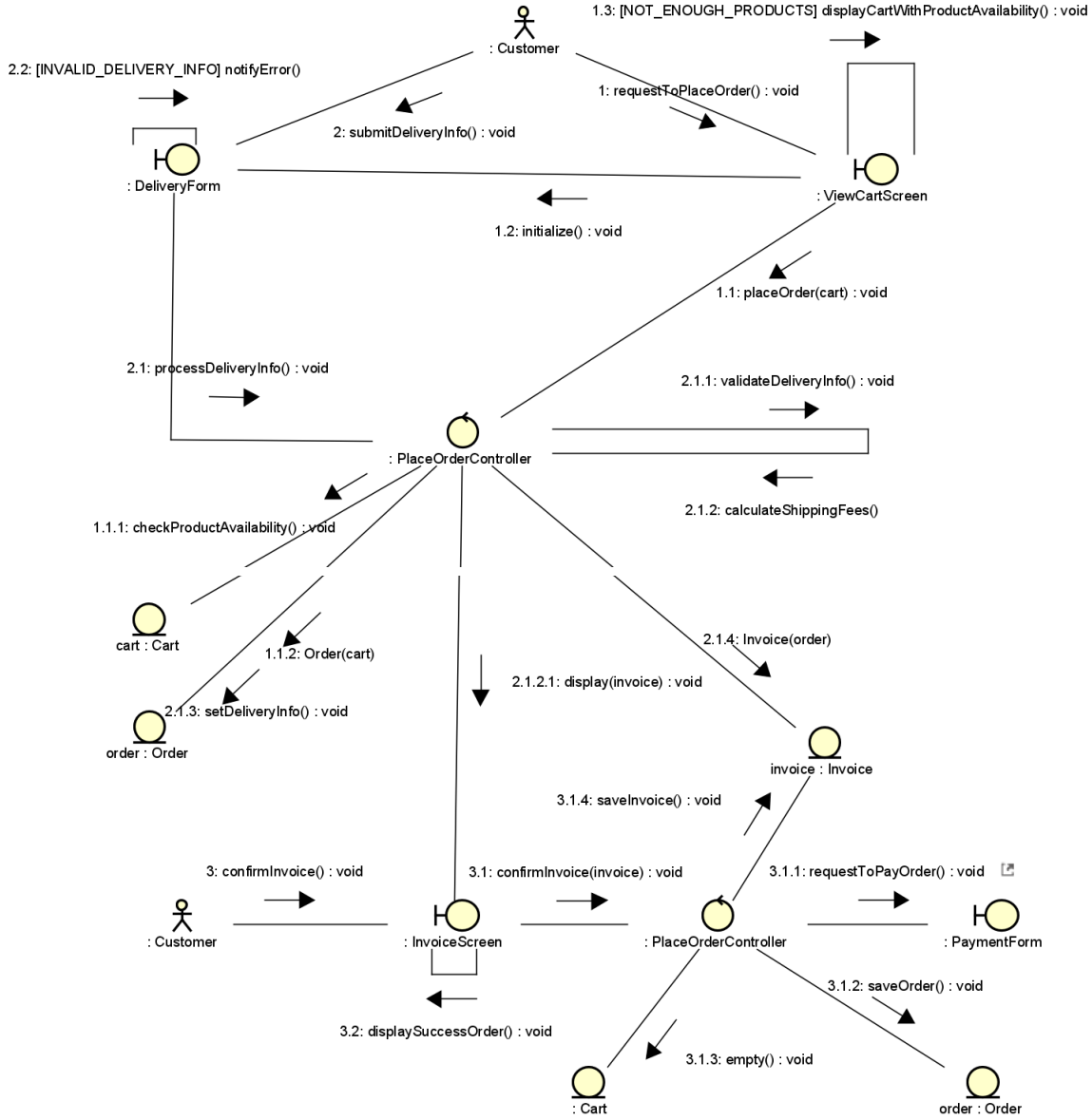
Step 4. Save your work

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

3. HOMEWORK ASSIGNMENTS

INTERACTION DIAGRAMS 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.

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