Massachusetts Institute of Technology

Model-Based Systems Engineering: Documentation and Analysis

Week 2: Building an MBSE Model

Project

Name

Jane Doe

Instructions

Before you begin, you should save your project on your local drive. We recommend the following format:

Lastname_Firstname_Course3_Week2

Please note: You will not be able to re-download your file after submission; therefore, please keep this file in a central location for future reference.

The work in the project deliverable is **individual**.

After you submit your project, you will self-assess your work. If you have any questions, feel free to start a thread in the Discussion Forum.

Although work is strictly individual, sharing ideas and concepts with other students is encouraged.

Note: edX has a 10MB file size limit for document submission. If you have selected large image(s), you may need to resize before submitting, OR you may simply include a web URL for the image in the image location. Be sure to submit your assignment at least one hour before the deadline to provide time for troubleshooting.

Once the deadline passes, you will not be able to upload the document and therefore will not be able to submit and complete the assignment.

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Week 2 Project

Overview

In this project, you will think about some of the most important queries you would write to inform your system engineering functions. Also, you would complete 3 SysML diagrams of your chosen system.

Note that scratch pages are included at the end of this document for you to capture any ideas, sketches, etc. that you have as you work through the project. These will not be assessed, and you are not required to submit them with your project (but you may do so if you think they offer any additional insight into your thinking process!).

REQUIRED STEPS

Step 1: Develop five queries for your system

Step 2: Develop a requirement diagram

Step 3: Develop a use case diagram

Step 4: Develop a behavior diagram or structure diagram

Step 5: Submit and self-assess your project

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Step 1: Develop Five Queries for Your System

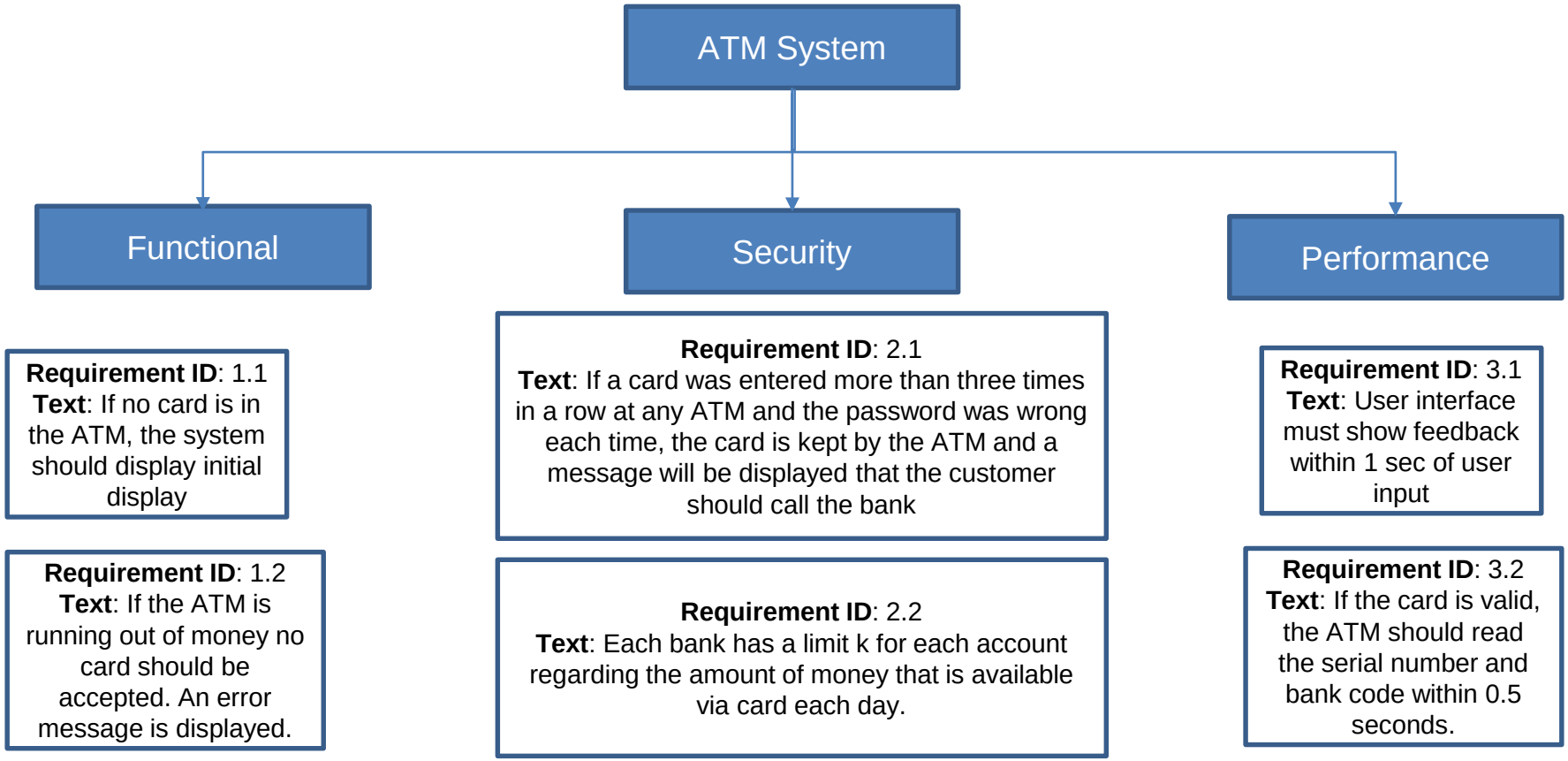
As you know by now, models provide a good deal more than just a set figures. Models are stored in repositories with a defined data structure. Like databases, the model repository makes it possible to query the model for specific information, e.g. an impact analysis when changing a requirement. SysML doesn't define a query language and most modeling tools allow to write a script to query the model. You can write queries like "are all actions allocated to parts?", "are all requirements satisfied?", and so on.

If you had a full data model available for your system, what would be five of the most important queries you would write to inform your system engineering functions?

Query	Rationale
Do I have requisite functions of the system assigned to components of the system?	*Making sure that all the functions are allocated*
What is the requirement traceability through the system?	*Tracing the requirements to the source and how they are applied through the system*
Which components are leveraged in the value delivery path of a particular function?	*Checking the components which are involved in executing a particular function*
How many instances of a component are used in the overall system?	*Checking the total number of particular components needed for one system (X washers in whole assembly)*
What is the total number of unique components/modules in the overall system?	*Checking the total component list*

Step 2: Develop a Requirements Diagram

Here, we are going to provide examples for an ATM system.



Note: This is just a sample diagram done without using a commercial SysML software. We just want you to get key ideas without getting too deep into syntax.

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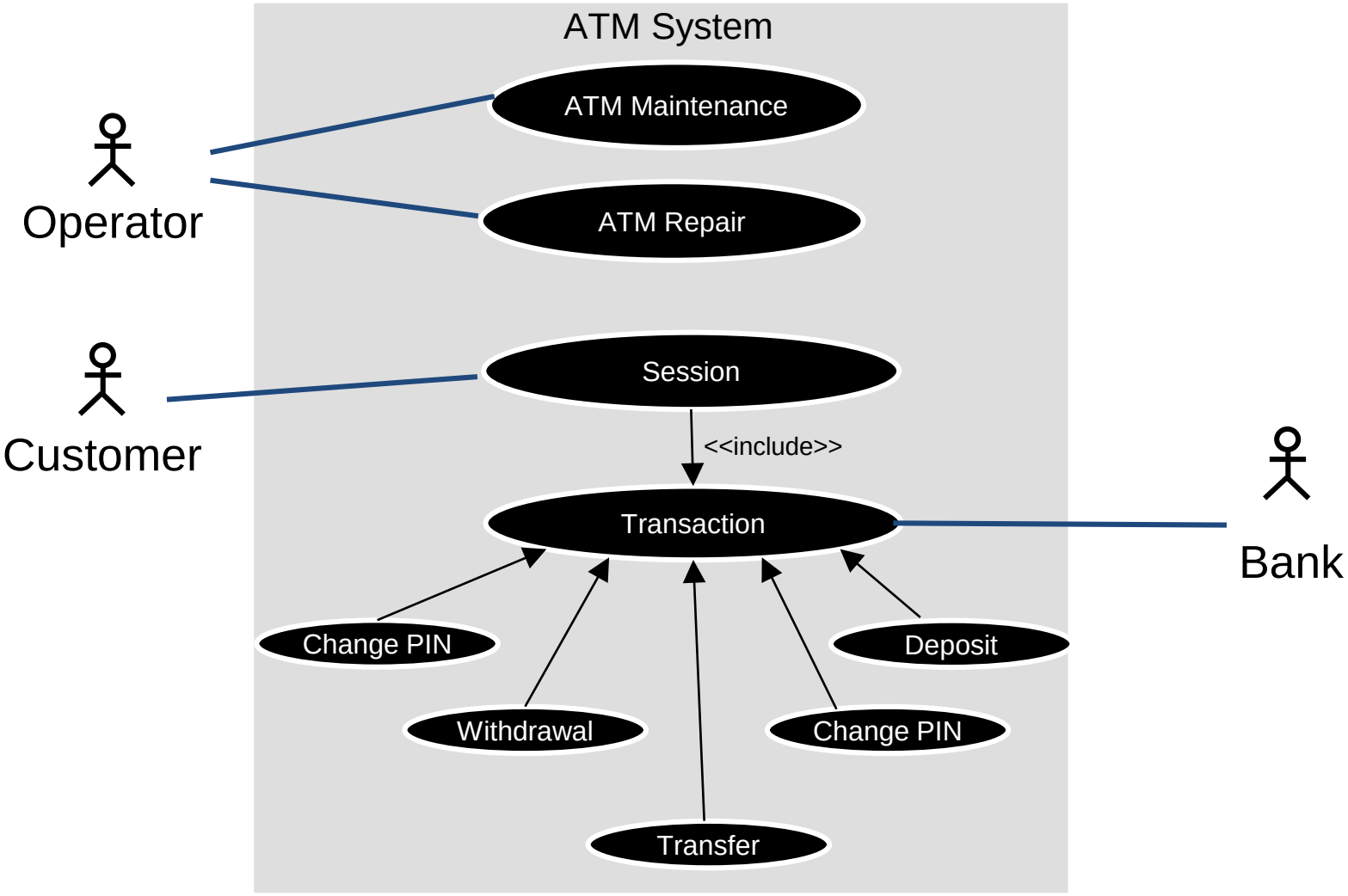
Step 3: Develop a Use Case Diagram

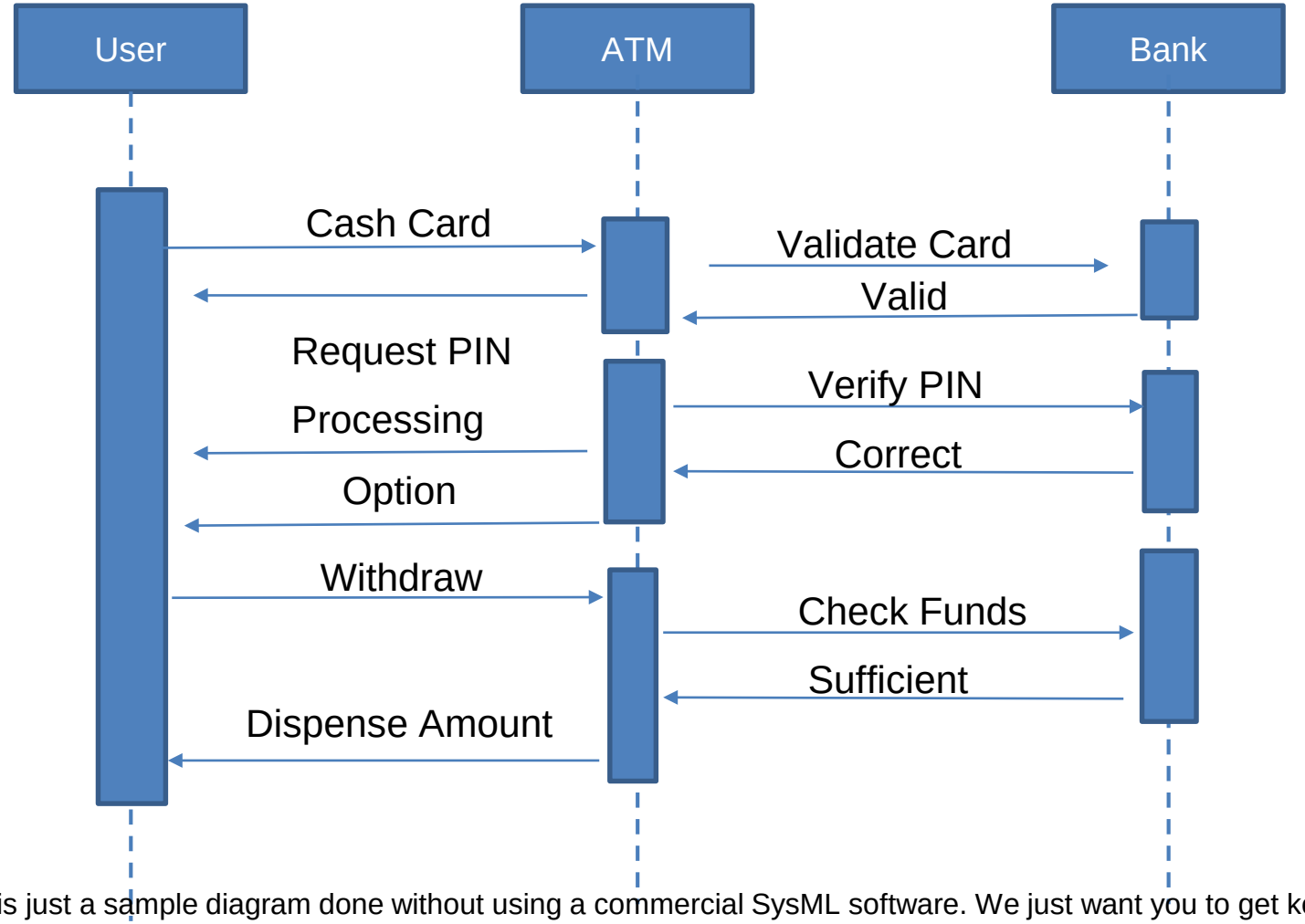
For the system you chose in Week 1, please create a use case diagram. Please feel free to leverage the format below or create your own.



Note: This is just a sample diagram done without using a commercial SysML software. We just want you to get key ideas without getting too deep in syntax.

Step 4: Develop a Behavior ~~or Structure~~ Diagram

Here, we provide a sample sequence diagram for an ATM system (Note: There can be many sequence diagrams based on different functions in consideration)



Note: This is just a sample diagram done without using a commercial SysML software. We just want you to get key ideas without getting too deep into syntax.

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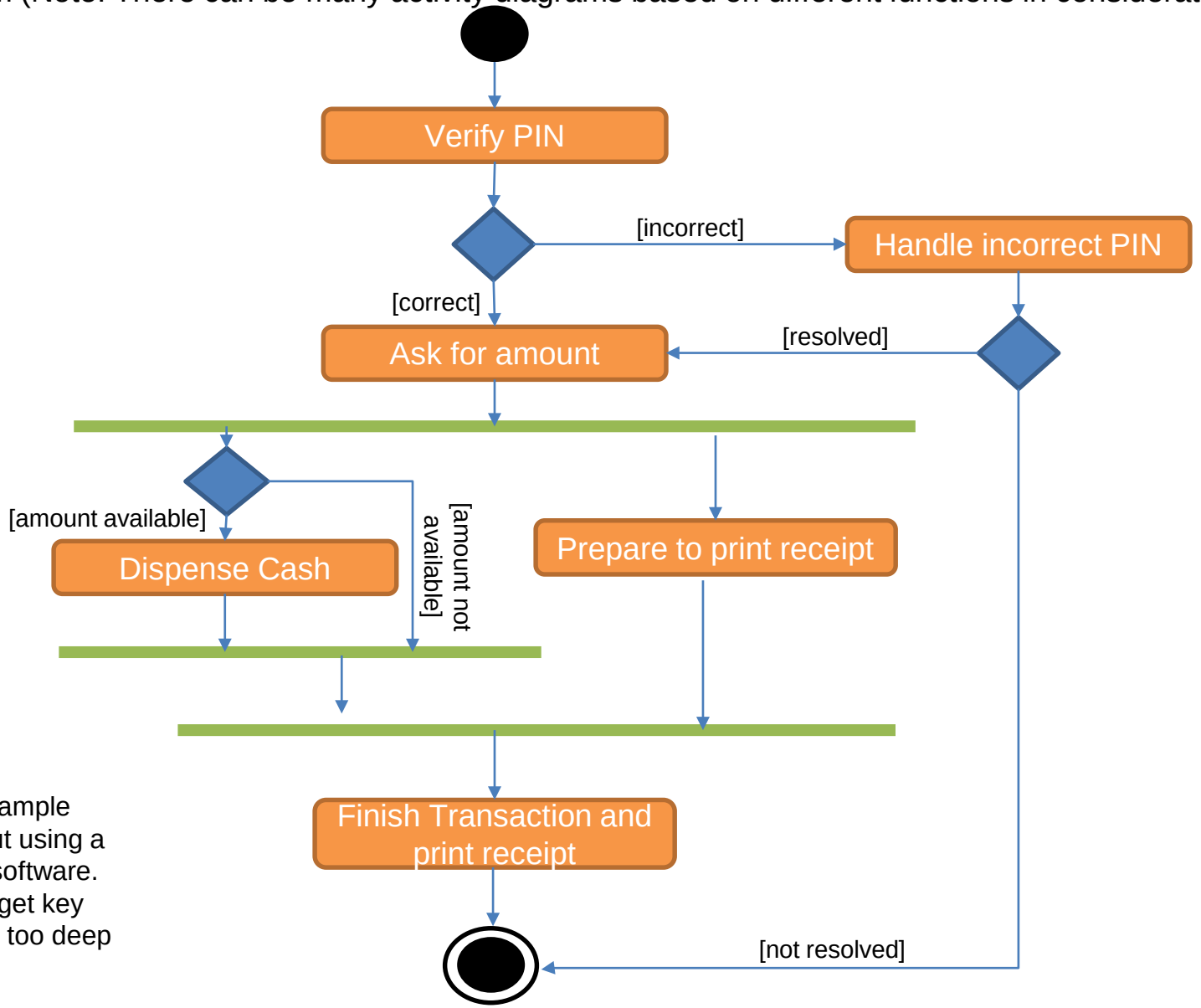
Step 4: Develop a Behavior ~~or Structure~~ Diagram

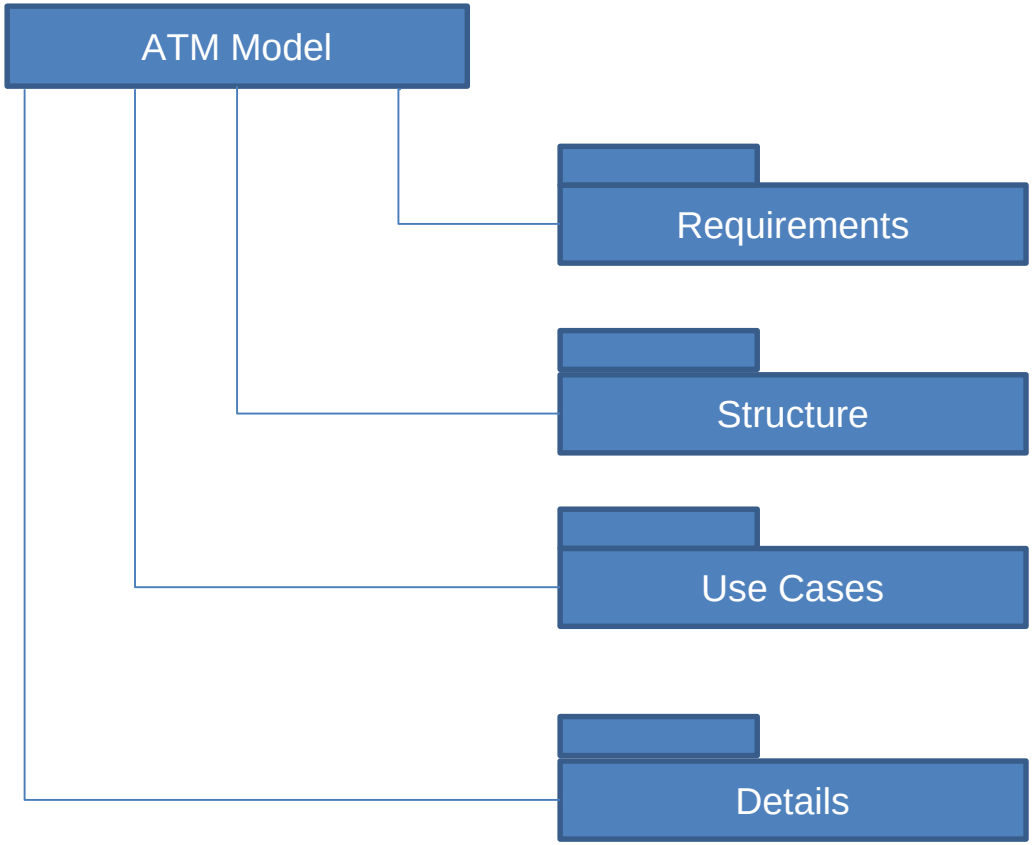
Here, we provide another sample (you only need to do one) of a behavior diagram for an ATM system. This is an activity diagram (Note: There can be many activity diagrams based on different functions in consideration).



Note: This is just a sample diagram done without using a commercial SysML software. We just want you to get key ideas without getting too deep into syntax.

Step 4: Develop a ~~Behavior or~~ Structure Diagram

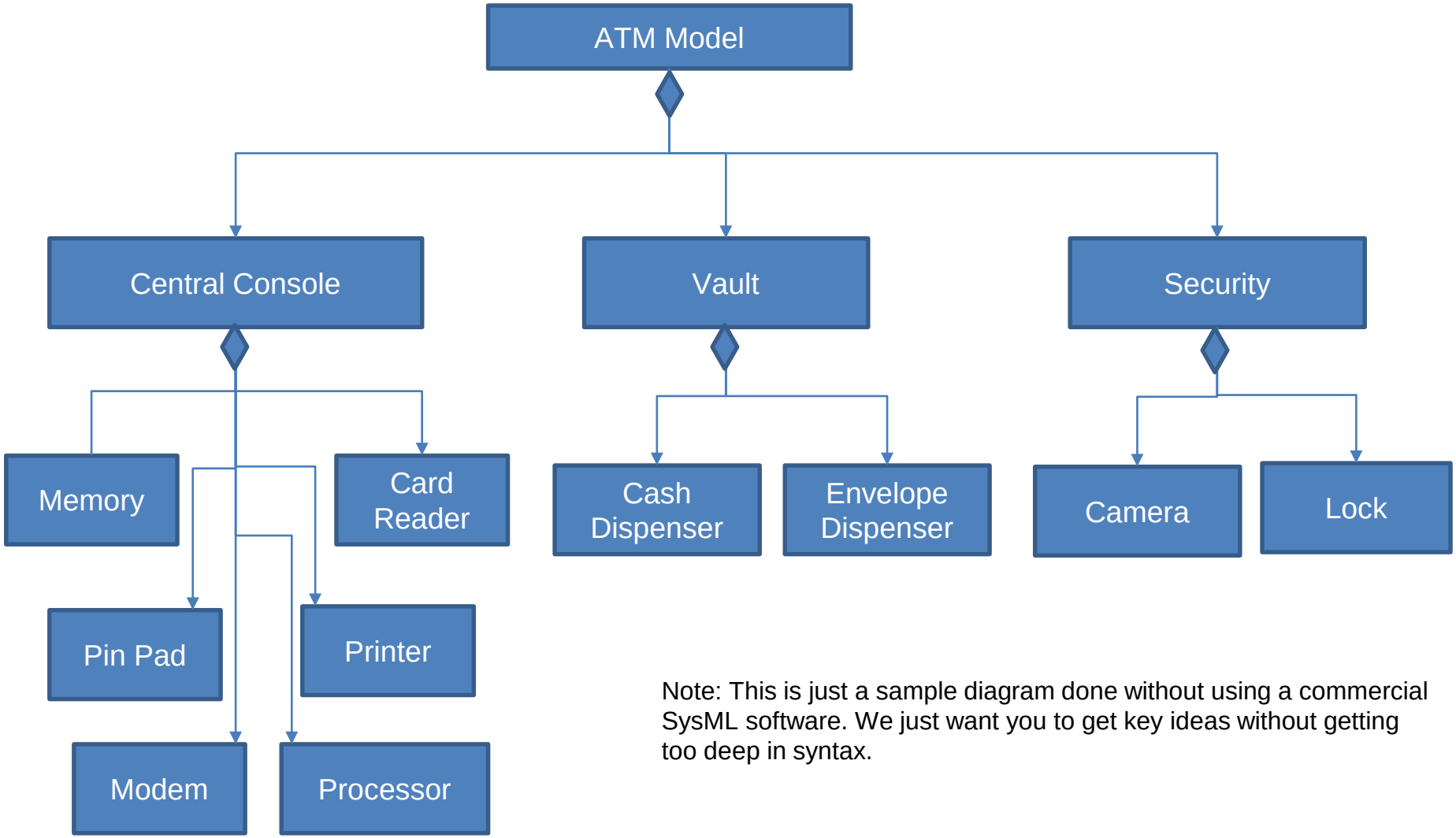
Here, we provide a sample package diagram for an ATM system. This is a basic high level package structure. You can elaborate upon it to match your model/needs.



Note: This is just a sample diagram done without using a commercial SysML software. We just want you to get key ideas without getting too deep into syntax.

Step 4: Develop a ~~Behavior or~~ Structure Diagram

Here, we provide a another sample of structure diagram (block definition diagram) for an ATM system. Remember, you need to do only one structure diagram.



Note: This is just a sample diagram done without using a commercial SysML software. We just want you to get key ideas without getting too deep in syntax.

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Step 5: Submit and Self-Assess Your Project

Submit your completed Week 2 project file

- Note: The maximum file size that can be submitted is 10MB.

Assess your own Week 2 project

- A scoring rubric can be downloaded from the Week 2 Project Instructions page

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Scratch Page*

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