Homework #2

Software Modeling and Design (COMP 3700 Spring 2021)
Maximum points: 100

(Individual Assignment)

Assignment Goals:

1. Understanding state and activity diagrams and what makes them different from each other.

2. Understanding the use cases diagram and use case scenario.

3. Understanding Sequence diagrams.

4. Being able to convert written descriptions into a UML state or activity diagrams and vise versa.

Requirements:

* Work on the homework on your own and don't share your answers with any students.

* Use any UML tool of your choice. No handwritten (even with tablets) or scanned drawing, or taken by camera! are allowed. Make sure the drawings are readable; for example, use proper sizes. Use the export function to convert to images.

* Submit a single pdf file (.pdf) to Canvas before the due date. This should be the only file you should submit to Canvas.

The file should be named {USERNAME}_HW{NUMBER}.pdf
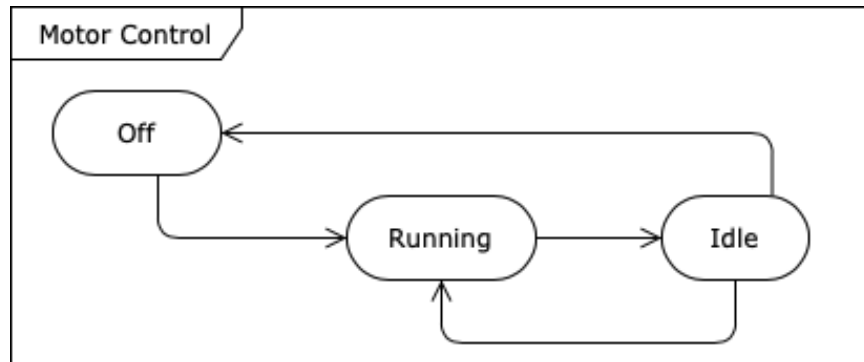
USERNAME is your auburn email without "@auburn.edu"

E.g. abc0003_HW2.pdf

* ⚠️ No homework will be accepted after the due date, so make sure to start as early
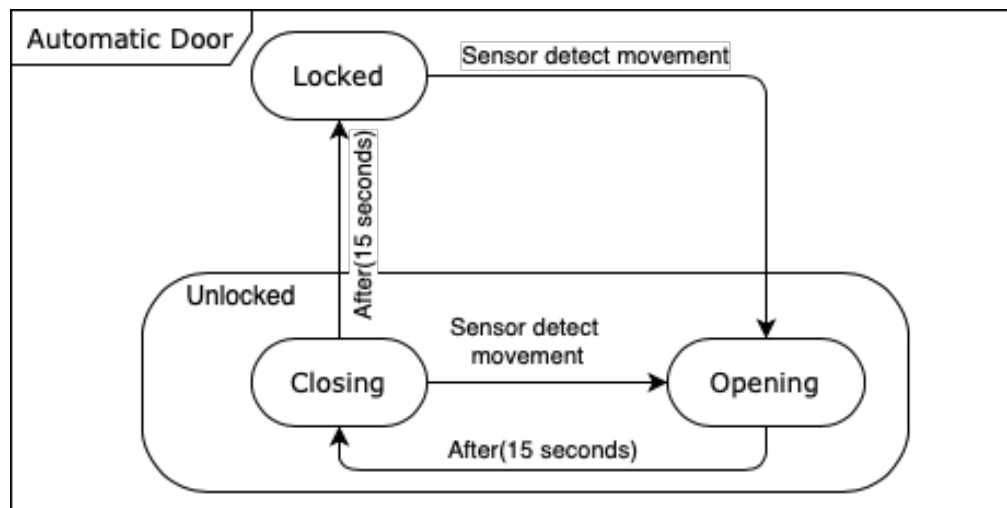
as you can.

Question #1 (5+5 =10Points):

Briefly describe the behavior of the following state diagrams.
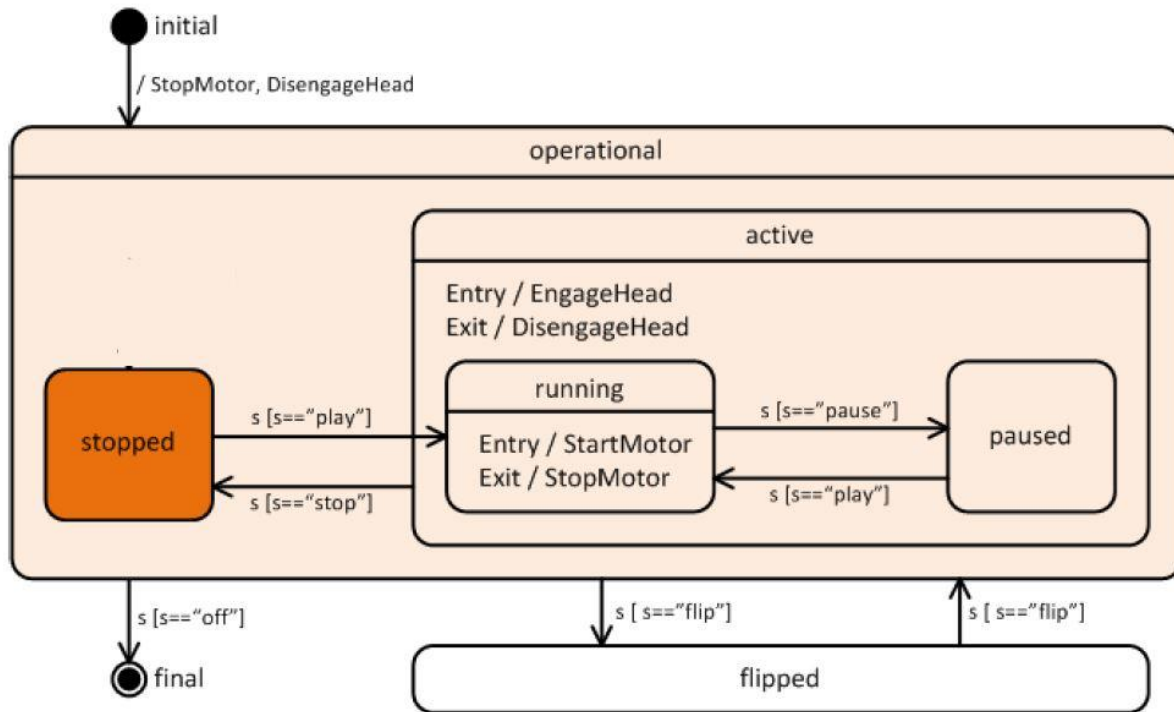
A.

B.

Question #2 (10 Points):

The state diagram above belongs to a controller for a cassette player. Given the previous state diagram, describe the state "running" by filling this "Characterization of a state" card:

State: running
Description:
Event sequence that produces the state:

Condition that characterizes the state:

Events accepted in the state:

Event	Response	Next state

Question #3 (20Points):

Draw a **State Diagram** for the states that a cell phone status can be in, using the description provided below.

A customer goes to a cell phone store to purchase a cell phone. The salesman creates a cell phone application for the customer, including the cell phone identifier and the customer application information. The cell phone status is set to pending credit check and the phone remains inactive until the salesman has established the credit rating of the potential customer. If their credit rating is satisfactory, the salesman submits an activation request to the switching department, and the status of the cell phone is set to pending activation. If the credit rating is unsatisfactory, the cell phone purchase is cancelled, and the status is adjusted accordingly. The switching department then activates the cell phone that is pending activation by adding it to the list of valid cell phones on the cell phone system, assigning it a status of active. Now, the cell phone is active. When the customer makes their first phone call following activation, the cell phone status is set to in service and the start date of service is established. If the customer tries to use the cell phone, and the cell phone is not active or in service, the call is refused. The customer can cancel their cell phone account at any time and the cell phone status is set to cancelled.

Question #4 (15Points):

Draw an **activity diagram** for processing an order, which involves several tasks as follows.

Once an order is received, the customer is sent an invoice, as well as associates work on the refill order. Once the order is ready, if a rush order is requested, the order is sent by overnight delivery, otherwise, it is sent by regular delivery. Customer receives invoice and eventually makes a payment. So, once the payment is received, processing for order is considered complete, and order will be closed.

Question #5 (10+5+15+15 = 45 Points) (Four parts #4a-d):

Consider the following required functionality of a print-on-demand service:

The print-on-demand service provides customers the possibility to print posters, flyers, or books on demand. The customer should be able to select a type of product (poster, flyer, or book), a desired quantity, and a paper type. In case a book has to be printed, additionally the customer can choose between hard cover and soft cover. Finally, the customer needs to provide a PDF file containing the desired content.

In order for the customer to be able to place an order, he or she must have an account. The customer can create an account by choosing a username/password combination. Furthermore, his or her address and credit card number can be linked to the account, which is required information when placing an order. Once a customer has provided the information for an order, the system checks if all required information is there, either given in the order (type of product, quantity, etc.), or in the account (address and payment information). If any information is lacking, the system will inform the customer that it needs to be added before the order can be placed. Once all information is in place, the order is placed, and the credit card information is sent to the bank for approval. If the bank approves the card, the order is finalized.

A printing agent is in charge of actually performing the printing. He or she inspects the provided PDF files of finalized orders. If a file does not meet the quality requirements, the customer will be informed about this, and the order is temporarily put on hold until the customer has provided a new PDF file.

Finally, the administrator monitors if at all times, sufficient paper and ink stock is present. Whenever the amount of paper or ink is running low, an order must be placed at the appropriate supplier (either the paper or ink supplier).

#5a (10 points): Create a Use Case Diagram for the print-on-demand service. Identify all use cases, actors, and link them, as appropriate. Identify any relationships among use cases.

#5b (5 points): Give a detailed description of a scenario of the use case for "place an order". Use the following card as a template.

Use case: Place an Order
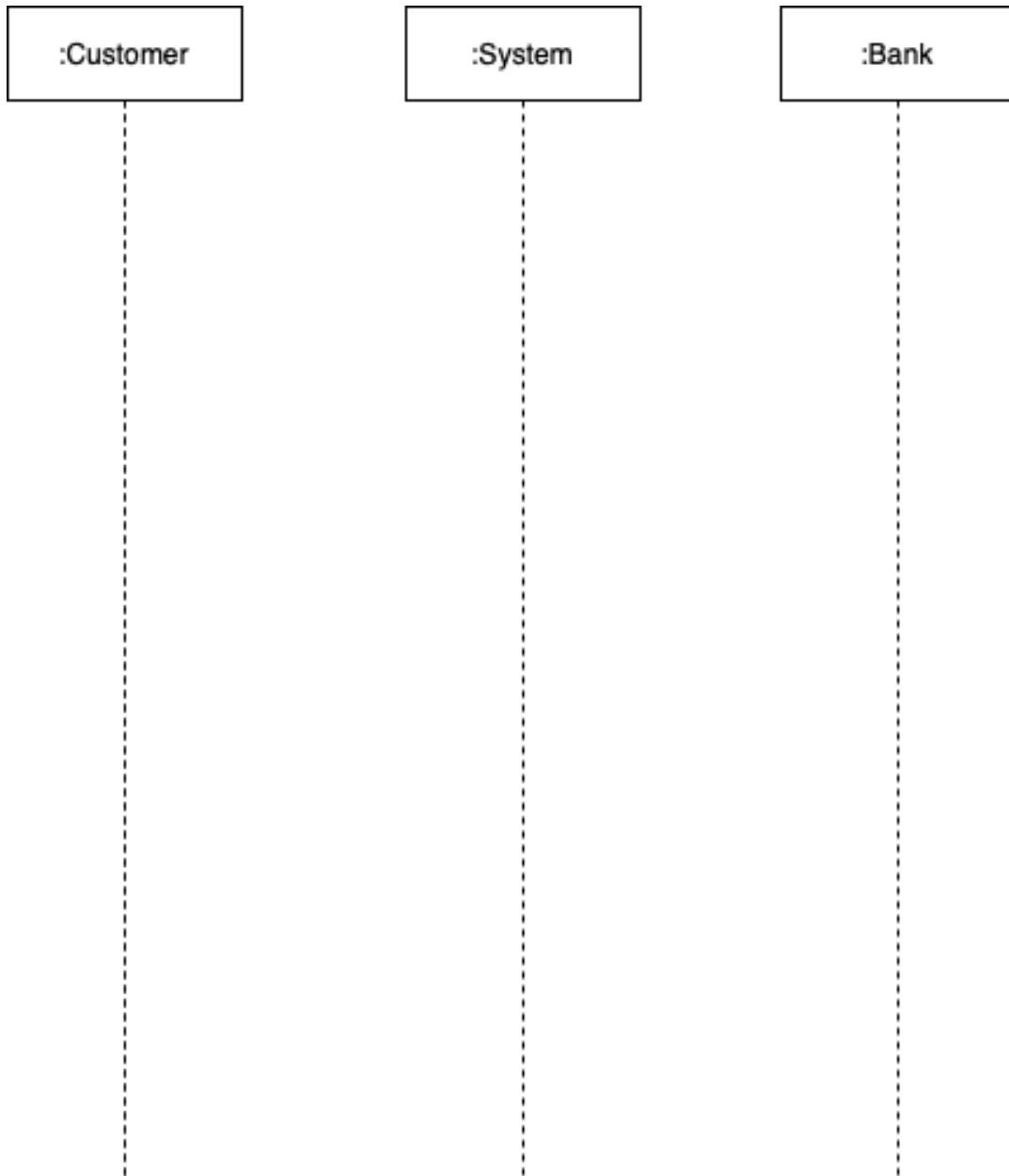**Pre:** User has account
Trigger:
Guarantee:

Main:

Alternatives:

#5c (15 points): Based on the scenario description of use case for "place an order", create a Sequence Diagram. Complete the diagram bellow.

:Customer	:System	:Bank

#5d (15 points): Create an Activity Diagram for processing an order – Once an order has been finalized, four parties are involved in processing it: Online Sales, Accounting, Shipping, and Printing. Online Sales sends the order to Printing, where the associated PDF file is inspected. If the file is not suitable, a new file is requested from the customer. Once the file is suitable, Accounting is informed to charge the credit card. While this is done, Printing carries out the actual printing, and sends the result to Shipping. When Shipping has both received the printed products and confirmation from Accounting that payment was successful, the products are shipped to the customer. Complete the diagram bellow.