Your name:
Your student id:

SWE Midterm January 21 2019

Write clearly. If I cannot read it, I cannot give any points.

Question 1 [15 points] {15 minutes}

a. What is the main difference between Scrum and Kanban?

In Kanban we do not have a sprint, but we focus on the flow of stories

b. What is the main difference between Scrum and XP?

XP has more focus on software development best practices, while Scrum has more focus on project management

c. What is the main difference between Scrum and DevOps?

In Scrum we bring the business and software development together.
In DevOps we bring the business ,software development and operations together

Question 2 [5 points] {5 minutes}

Explain what use cases and user stories have in common.

For both you start with the user
They both give value to the user

Explain how use cases and user stories are different.

The scope of the user story is much smaller than the scope of a use case

Question 3 [5 points] {10 minutes}
Give 4 reasons why RUP is not very efficient as a software development process

- RUP is very document driven
- The iterations are very long
- Every team member has its own role and responsibilities
- RUP has a project manager instead of a self-managing team

Question 4 [10 points] {10 minutes}

Circle all statements that are **true**:

a. The Scrum master can change the priority of user stories in the product backlog at all times
b. The daily standup meeting in Scrum is timeboxed at 15 minutes
c. The goal of the sprint retrospective is that upper management gets to see the progress of the team
d. One task of the Product Owner is to assign tasks to the team members
e. An Epic is a large user story that needs to be split up at a certain time
f. All stories in the user story map contain acceptance criteria.
g. All stories in the user story map are as small as possible so that we can implement them in a few days or less.
h. The user story map is our product backlog
i. The user story map is our sprint backlog
j. We write at least one scenario for every user story

Question 5 [5 points] {5 minutes}

Give 4 reasons why it is not a good idea to write a large upfront requirements document that contains all requirements of a system.

- The business does not know all requirement details upfront.
- About 45% of functionality in systems is never used
- Requirements change very often
- Large documents are never read, and are hard to review and understand
- You are never done with requirements

Question 6 [5 points] {5 minutes}

What are the 6 characteristics of a good user story?.

- Independent
- Negotiable
- Valuable
- Estimable
- Small
- Testable

Question 7 [5 points] {5 minutes}

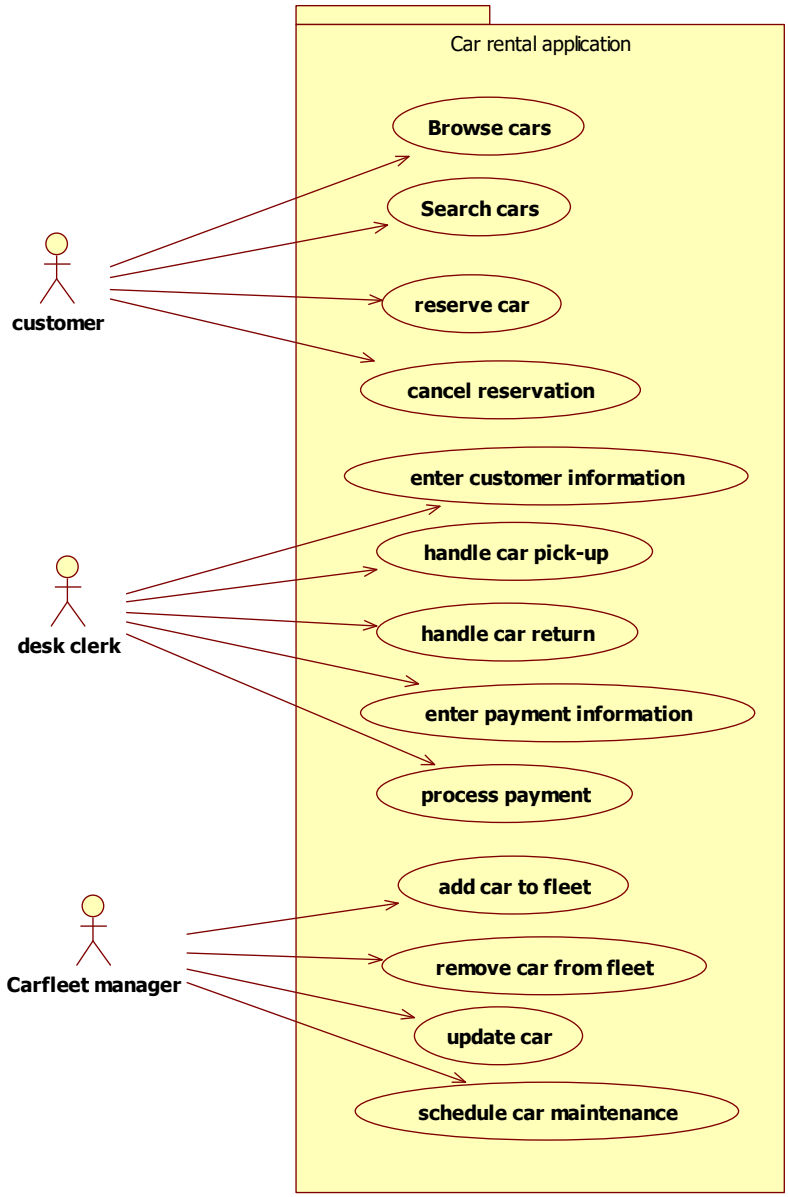
Explain the difference between an iteration in RUP and a sprint in Scrum.

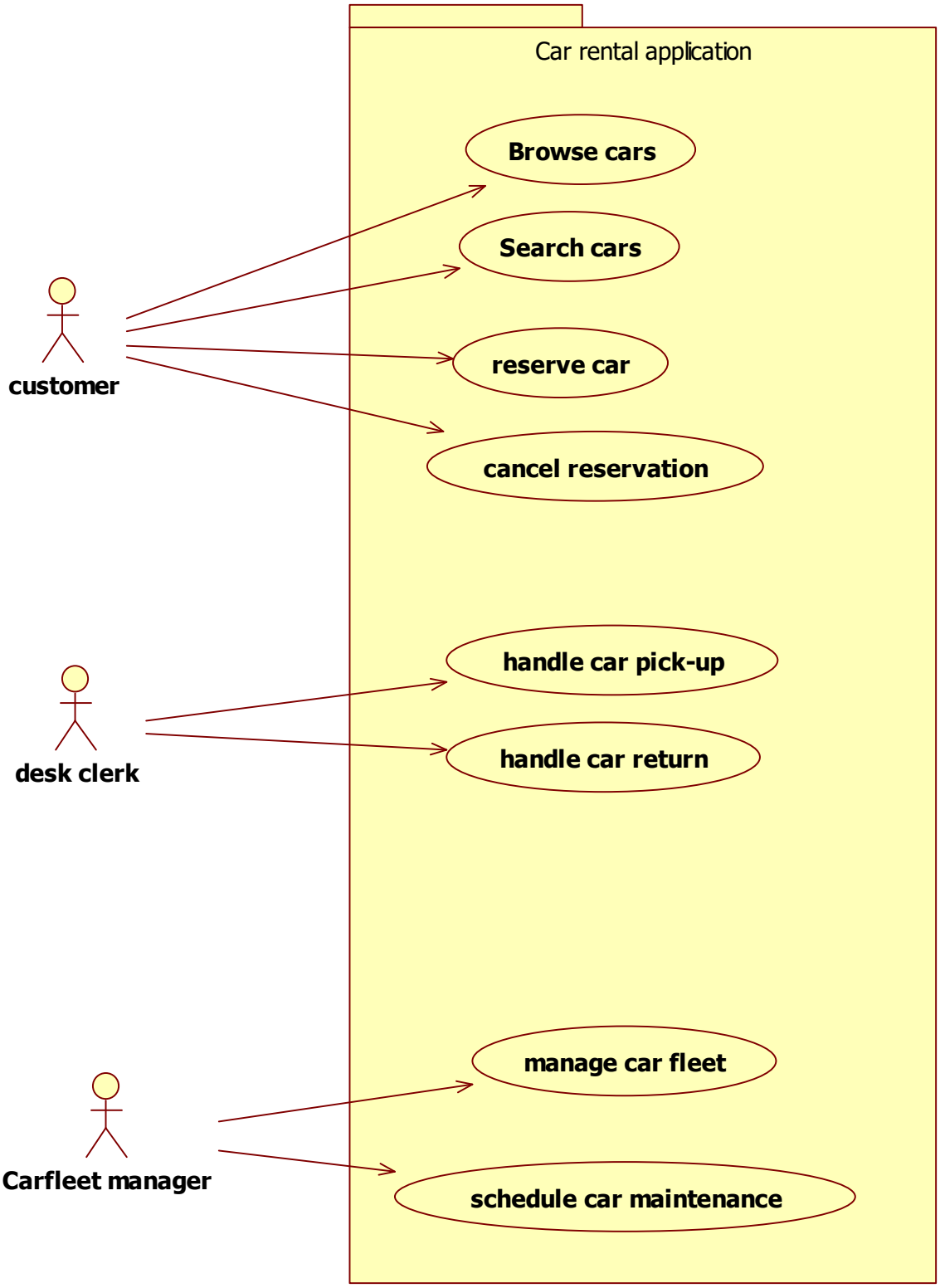
The iteration in Scrum is finished when the use case(s) are finished. Functionality is fixed, time is flexible

The iteration in Scrum is finished after 1-4 weeks (timeboxed). Time is fixed, functionality is flexible

Question 8 [10 points] {10 minutes}

Given is the following use case diagram for a car rental application. The basic idea is that the customer reserves a car online, and then goes to the pickup location. At the pickup location, the desk clerk handles your car pick-up. When you return the car, the desk clerk handles the car return. It can also happen that a customer did not reserve a car, but just shows up at the pickup location to pick-up a car. The carfleet manager is responsible for managing the carfleet, including maintenance. Is this a good use case diagram, and if not, how would you change it to make it a better use case diagram. Draw your better version of the use case diagram.




Car rental application
Browse cars
Search cars
reserve car
cancel reservation
customer
handle car pick-up
handle car return
desk clerk
manage car fleet
schedule car maintenance
Carfleet manager

Question 9 [35 points] {55 minutes}

We have to specify the requirements of an "Order Tracking System" or simply called OTS. The idea behind OTS is that it tracks the state of all orders from employees of a company.

The OTS system has 2 important goals:

1. Register all orders we place at different suppliers, which orders did we receive, which orders did we pay, etc. This allows us to track the state of all orders we placed.
2. Simplify the ordering process for the employees.

Employees can place orders in OTS. An employee first needs to know which products she wants to order. This can be done in different ways like looking at a webshop or using a paper catalog. OTS does not know about products. OTS does know all preferred suppliers. So the employee selects the preferred supplier, and then enters the product(s) she wants to order.

In this system, all orders below $500 need to be reviewed by the manager of the employee that places the order. All order above $500 need to be reviewed by 2 managers. For example, if the employee enters an order of $700, the manager of that employee automatically receives an email with the request to approve or reject the order. The manager will then first search the order in the system, and then approve or reject the order. Because this order is more than $500 and the manager approves, the manager of that manager automatically receives an email with the request to approve or reject the order.

If all mangers have approved, then the accountant automatically receives an email with the request to approve or reject the order regarding budget. The manager checks if the project of the particular employee has enough budget, and then the account approves or rejects the order. The accountant has its own budget system, so the OTS system knows nothing about budgets.

If the accountant approves the order, then the purchaser of this organization will order the products that the employee needs. The purchaser uses its own way of purchasing the products (by phone, internet, etc.). You cannot purchase products with OTS. The purchaser will register in OTS if an order is placed by the supplier.

The employee can login to the system at any time to see the status of the order. OTS will not only show the current status of an order, but also the whole history of status transitions.

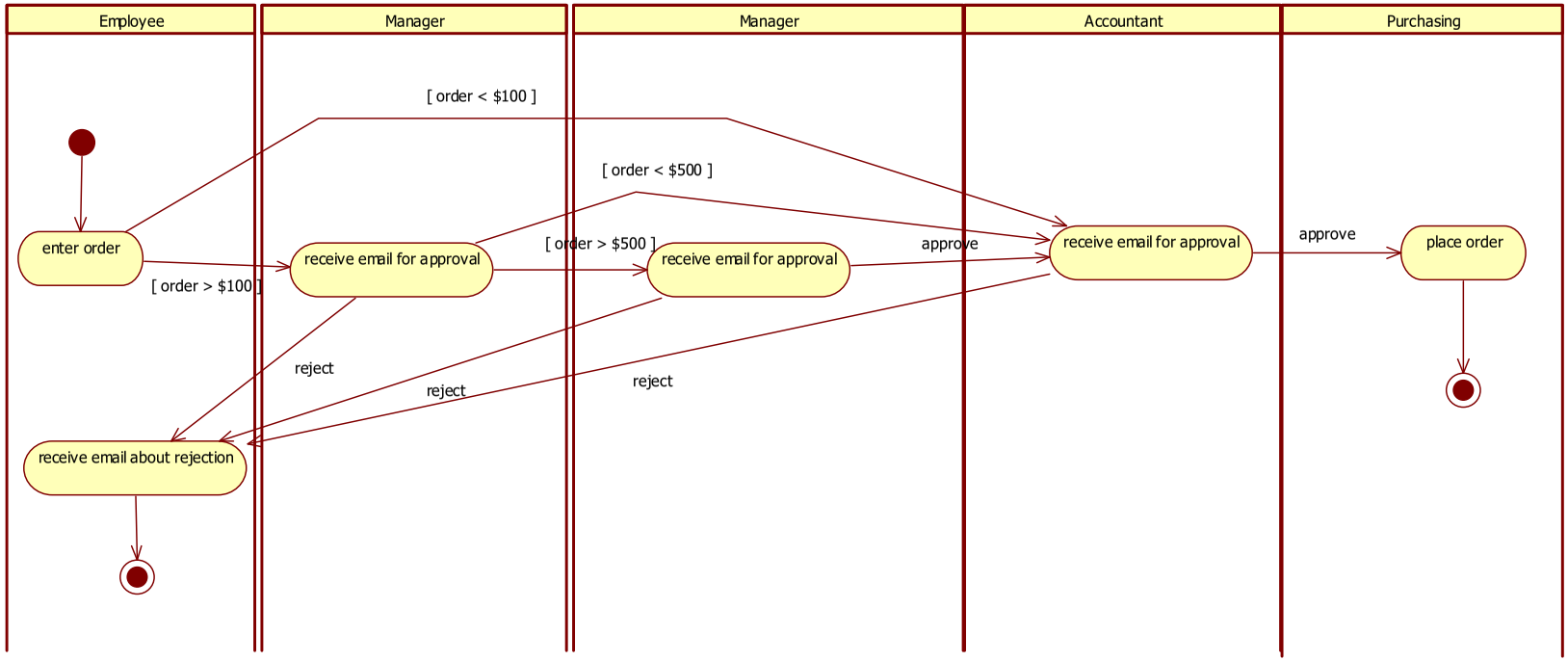
At a particular time, the mailroom will receive a package with the ordered products. The mailroom employee will register in OTS that the order has been received. The mailroom employee will contact the employee who placed the order in OTS. It can happen that the employee who ordered the products is not happy with the order, and asks the mailroom employee to return the order. The mailroom employee will register in OTS if the order was accepted or returned to the supplier.

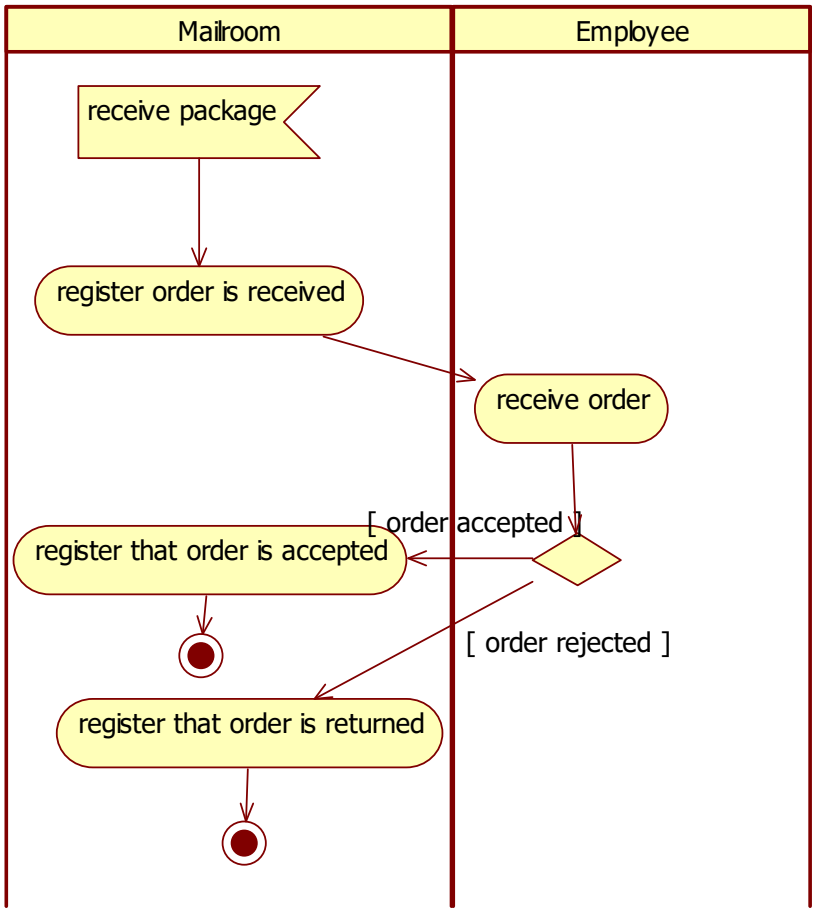
At a particular time, the accountant receives an invoice from the supplier about the order. The accountant will register in OTS that the invoice is received. At the last day of the month, the accountant goes through all invoices received that month and pays all invoices through online

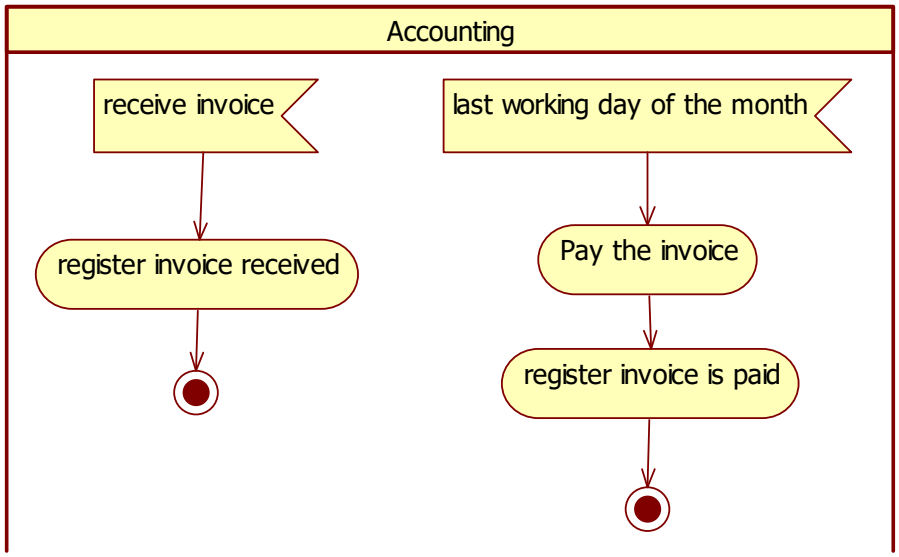
banking. The accountant registers in OTS that the invoice is paid. You cannot pay with OTS, you can only register that you have paid the invoice.

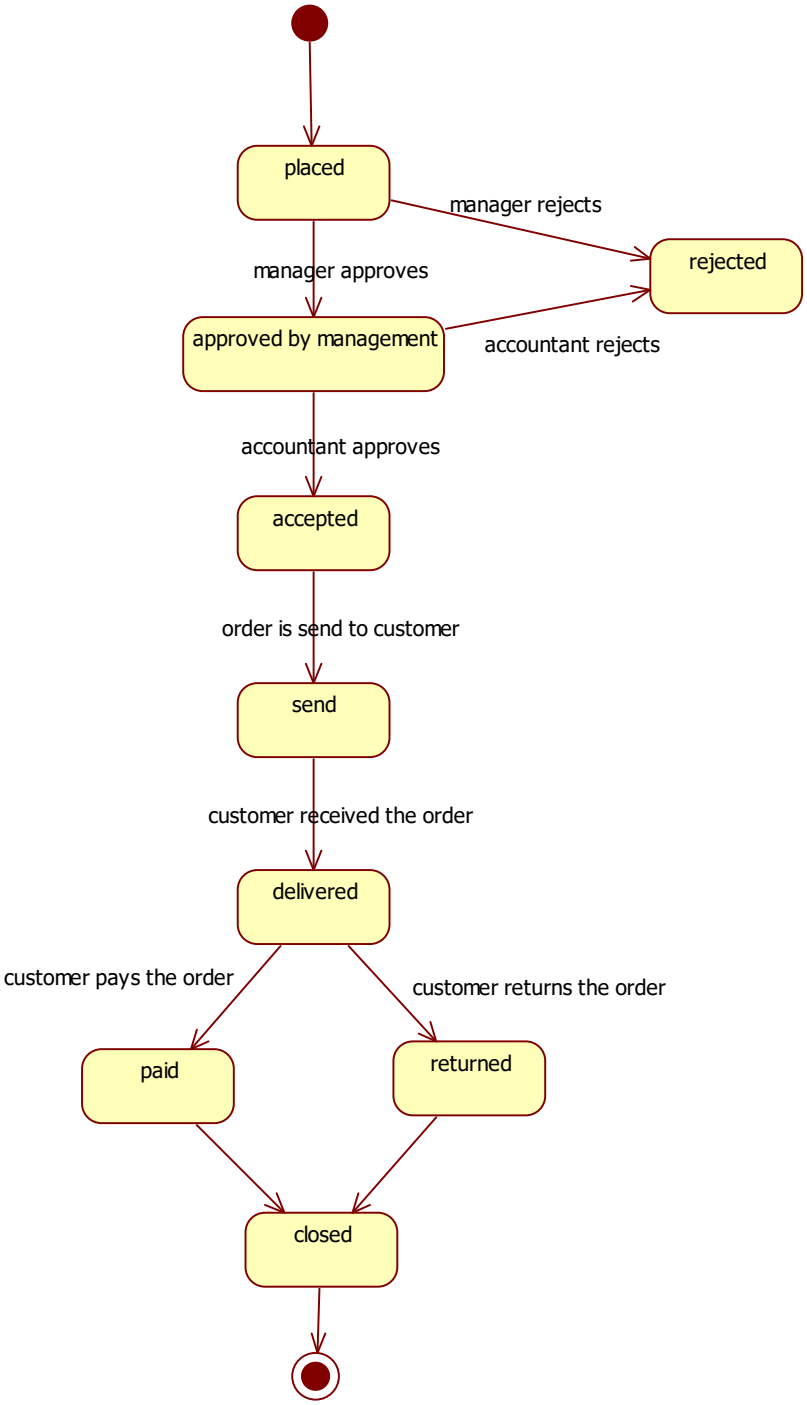
A. Draw the activity diagram(s) that explain the process of ordering products with OTS
B. Draw the state diagram of all the states of an order in OTS.
C. Draw the use case diagram of OTS.
D. Write the main scenario (or happy day scenario) of 3 use cases of your choice that deal with **order approval** or **registering something** in OTS
E. Give at least 1 business rule that needs to be implemented in OTS

For this question, you cannot make your own assumptions. You have to follow the given requirements in the given text. If you need information that is not given in the text, but you really need this information, then as an exception you can make your own assumption, but write this assumption clearly on your paper.


Employee
Manager
Manager
Accountant
Purchasing
[order < $100]
[order < $500]
enter order
receive email for approval
[order > $500]
receive email for approval
approve
receive email for approval
approve
place order
[order > $100]
reject
reject
reject
receive email about rejection


Mailroom
Employee
receive package
register order is received
receive order
[order accepted]
register that order is accepted
[order rejected]
register that order is returned


Accounting
receive invoice
last working day of the month
register invoice received
Pay the invoice
register invoice is paid


placed
manager rejects
rejected
manager approves
approved by management
accountant rejects
accountant approves
accepted
order is send to customer
send
customer received the order
delivered
customer pays the order
customer returns the order
paid
returned
closed

Manager approval

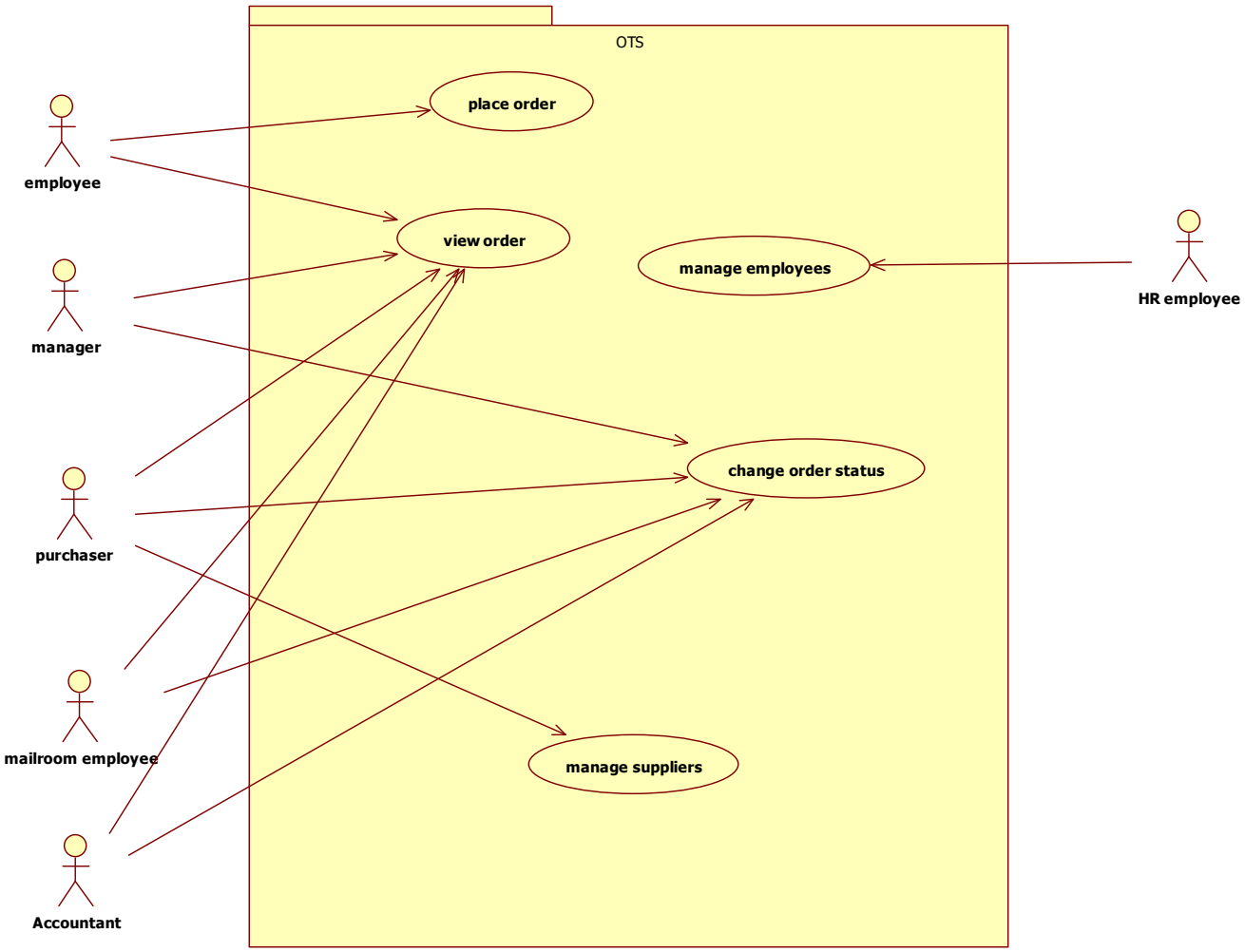
1. Manager receives email about approval
2. Manager searches the particular order
3. Manager approves the order

Accountant approval

1. Accountant receives email about approval
2. Accountant searches the particular order
3. Accountant approves the order

Mailroom employee registers order received

1. Mailroom employee searches the particular order
2. Mailroom employee registers that the order is received


OTS
place order
view order
manage employees
change order status
manage suppliers
employee
manager
purchaser
mailroom employee
Accountant
HR employee