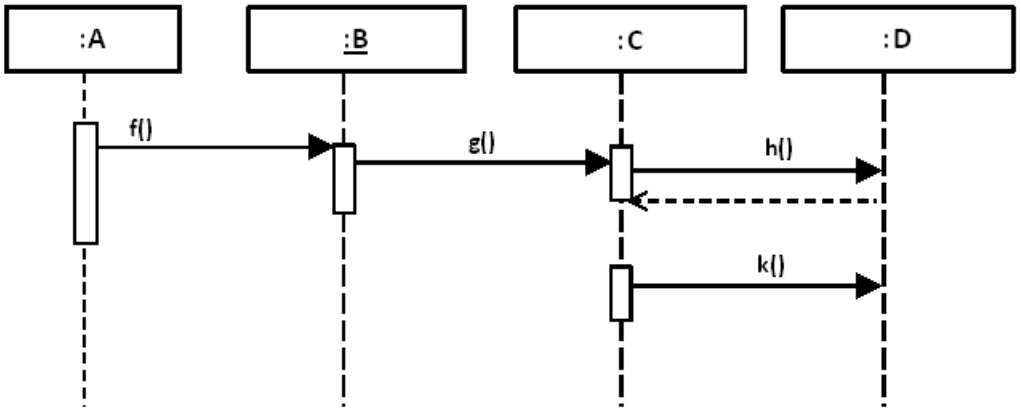
Object Oriented Analysis and Design: Assignment 7

Total Marks : 20

August 31, 2022

Question 1

Consider the following Sequence Diagram:



If this sequence diagram is converted to an equivalent communication diagram, what will be the sequence number of **k**?

Marks: 2 **MCQ**

a) 5

b) 1.2

c) 1.1.2

d) 2

Answer: d)
Explanation: As per the definition of sequence number in a communication diagram.

Question 2

Suppose that a method **findDetails** in a class **List** is defined as follows:

Marks: 2 **MCQ**

```
if (found > 0)
{
      for (i = 0; i <12; i++)
           name = item.findName();
}
```

Suppose that **item** is an object of class **Item** and the sequence number of the message **findDetails** from **:List** to **item:Item** in a communication Diagram is 2.
Which of the following is the proper sequence number for the message **findName** sent to **item:Item**?

a) 2.[found>0].1[i=0..11]*

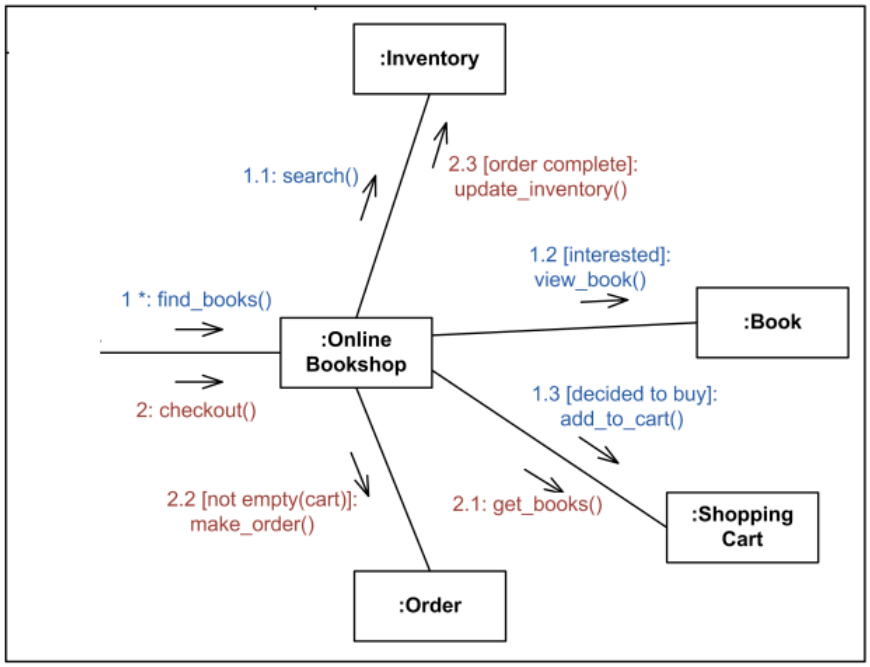
b) 2.[found>0].1*[i=0..11]

c) 2[found>0].1*[i=0..11]

d) 2.[found>0]*[i=0..11]

Answer: c)
Explanation: According to the syntax of sequence expression, a sequence expression is a dot separated list of sequence terms. Each term represents a level of procedural nesting.
Each term has a label (an integer or a name) and an optional iteration expression.
An iteration expression represents an iteration or a guard condition. This message is the second message in the activation of message 2 for a guard condition. Hence, option (c) is correct.

Questions 3 and 4 are based on the following communication diagram.



Question 3

As per the communication diagram, how many methods are to be defined in the classes **OnlineBookshop** and **Book** respectively?

Marks: 2 **MCQ**

a) 4, 0

b) 4, 1

c) 3, 1

d) 2, 1

Answer: d)
Explanation: Objects of the class **:OnlineBookshop** receive 2 messages. So, this class has to implement 2 methods.
Objects of the class **Book** receive 1 method. So, this class has to implement 1 method only.
Hence, option (d) is correct.

Question 4

As per the communication diagram, how many methods are invoked in response to the calls **checkout** and **viewbook** respectively?

Marks: 2 **MCQ**

a) 2, 0

b) 3, 0

c) 2, 1

d) 3, 1

Answer: b)
Explanation: Messages sent during the same call have the same decimal prefix, but suffixes of 1, 2, etc. according to when they occur.
Hence, option (b) is correct.

Question 5

Consider the following table:

Sl. No.	Column A	Sl. No.	Column B
1.	2.3 *[i=1..12]: draw()	a)	draw() will be executed 12 times, one after another
2.	2.3 ||*[i=1..12]: draw()	b)	12 draw() messages will be sent concurrently
3.	2.3 *||[i=1..12]: draw()	c)	Incorrect syntax

Identify the correct match between the entries of Column A and the entries of Column B.

Marks: 2 **MCQ**

a) 1-a, 2-b, 3-c

b) 1-c, 2-a, 3-b

c) 1-b, 2-c, 3-b

d) 1-a, 2-c, 3-b

Answer: d)
Explanation: The * iteration notation specifies that the messages in the iteration will be executed sequentially.
The $*||$ (star followed by a double vertical line) iteration notation specifies concurrent (parallel) execution of messages.
Refer to Module 31, slide 15. Hence, option (d) is correct.

Answer Questions 6 and 7 based on the following paragraph.
Consider the following passage which describes a process for order management.

"When a customer wants to put an order, she first checks with an order management software whether the items are available. If all items are available, she fills up an order form that contains her personal details, postal address, codes of items and quantity or amount of those items. The software system sends the order form to the order management department of an enlisted seller. While the order management department of the seller prepares for shipment of the items ordered, the accounting department of the seller makes an invoice and asks the customer to make the payment based on that invoice. Once the payment is accepted by accounting department and the order management department is ready with the shipment, the order management department ships the order. Then, the order management software sends a tracking message to the customer. Once, the shipment is received by the customer within 7 days, the order is closed. However, if the customer does not receive the shipment within 7 days, the order is cancelled."

Question 6

In the activity diagram that models the above process correctly, how many objects (at the minimum) and swimlanes respectively are necessary?

Marks: 2 **MCQ**

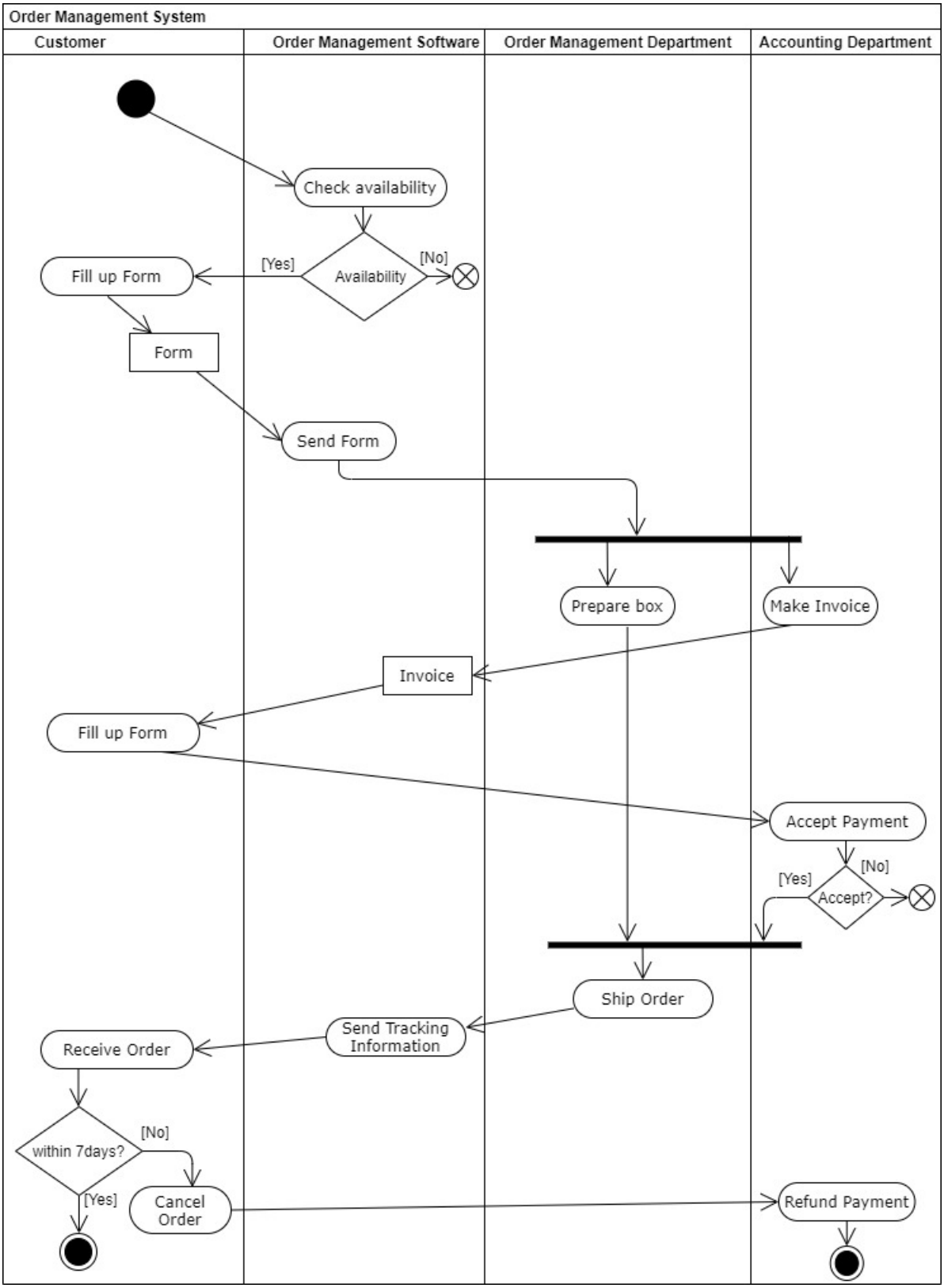
a) 1, 4

b) 2, 3

c) 2, 3

d) 2, 4

Answer: d)
Explanation: Please see the activity diagram. According to the diagram, option (d) is correct.


Order Management System
Customer
Order Management Software
Order Management Department
Accounting Department
Check availability
Availability
[Yes]
[No]
Fill up Form
Form
Send Form
Prepare box
Make Invoice
Invoice
Fill up Form
Accept Payment
Accept?
[Yes]
[No]
Ship Order
Send Tracking Information
Receive Order
within 7days?
[No]
[Yes]
Cancel Order
Refund Payment

Question 7

Consider the passage mentioned before Question 6 which describes a process to manage an order.

In the activity diagram that models the above process correctly, how many fork nodes and merge nodes respectively are necessary?

Marks: 2 **MCQ**

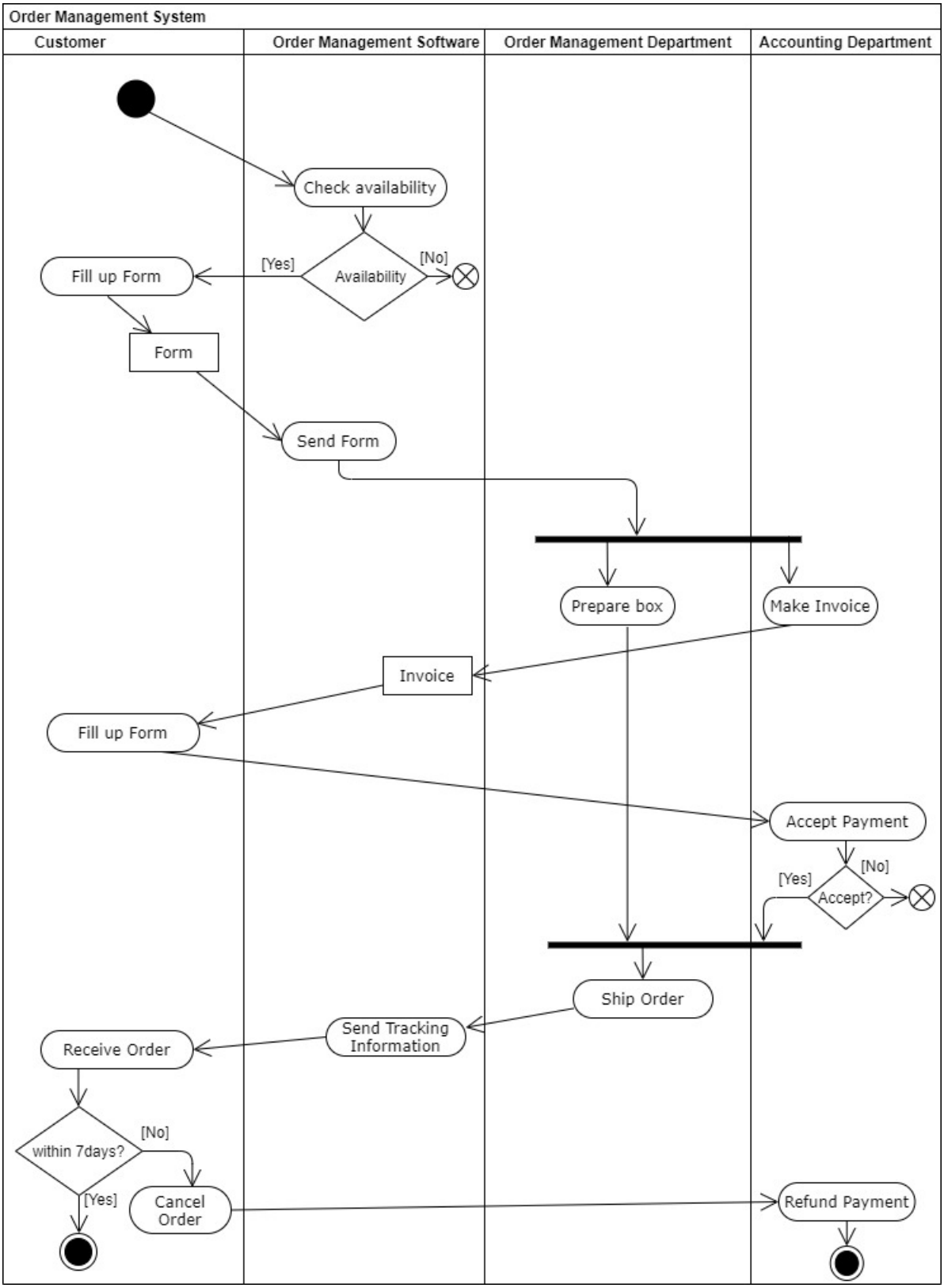
a) 0, 0

b) 1, 0

c) 1, 1

d) 2, 1

Answer: b)
Explanation: Please see the activity diagram. According to the diagram, option (b) is correct.


Order Management System
Customer
Order Management Software
Order Management Department
Accounting Department
Check availability
Availability
[Yes]
[No]
Fill up Form
Form
Send Form
Prepare box
Make Invoice
Invoice
Fill up Form
Accept Payment
Accept?
[Yes]
[No]
Ship Order
Send Tracking Information
Receive Order
within 7days?
[No]
[Yes]
Cancel Order
Refund Payment

Question 8

Consider the following statements about a simple **join node** and **merge node** in an **activity diagram**.

Marks: 2 **MCQ**

1) A **Join node** has multiple incoming flows and one outgoing flow.

2) A **Merge node** has multiple incoming flows and one outgoing flow.

3) If a decision is used after a fork, the two flows coming out of the decision need to be merged into one before going to a join.

4) A **Merge node** is a blocking node for flow of control.

Identify the correct option for which the given above statements is/are **TRUE**.

a) 1), 2), 3), 4)

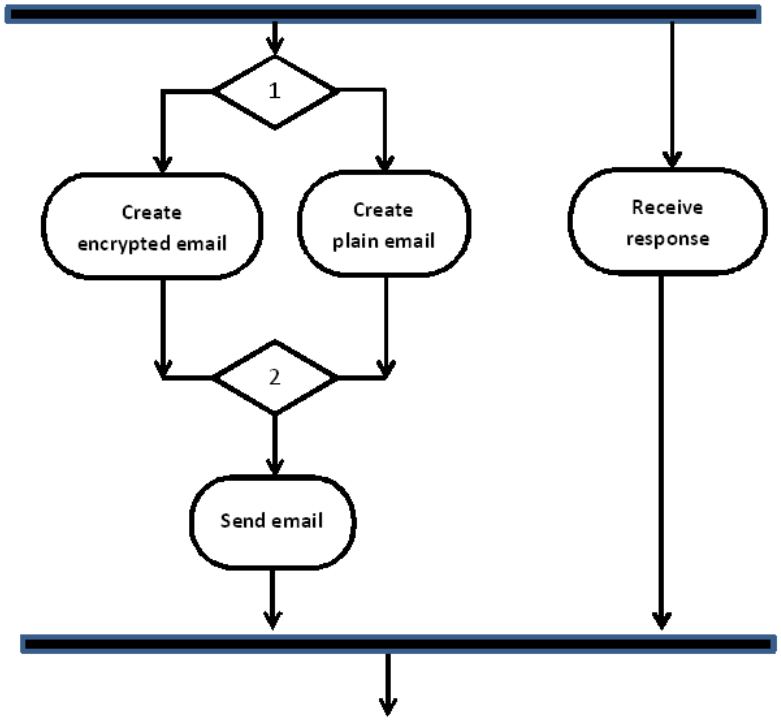
b) 1), 2), 3)

c) 2), 3), 4)

d) 1), 2), 4)

Answer: b)
Explanation: Both **Join node** and **Merge Node** are control nodes that have multiple incoming edges and one outgoing edge.
If a decision is used after a fork, the two flows coming out of the decision need to be merged into one before going to a join. Otherwise, the join will wait for both flows.
Join node a blocking node for flow of control.
Hence, option (b) is correct.

Questions 9 and 10 are based on the following **activity diagram**.



Question 9

Identify the activities which may be concurrently performed given the **activity diagram**.

Marks: 2 **MSQ**

a) **Receive response**, **Send email**

b) **Send email**, **Create plain email**, and **Receive response**

c) **Send email**, **Create encrypted email**, and **Receive response**

d) **Create plain email**, **Receive response**

Answer: a), d)
Explanation: Send email cannot be started before one of **Create plain email** and **Create encrypted email** is completed. Hence, options (b) and (c) are incorrect.
Receive response can run concurrently with **Send email** or **Create plain email** or **Create encrypted email**. Hence, option (a) and (d) are correct.

Question 10

Identify the merge node and the decision node from the **activity diagram** shown before question 9. *Marks: 2* **MCQ**

a) 1, 1

b) 2, 2

c) 2, 1

d) 1, 2

Answer: c)
Explanation: According to syntax and semantics of UML Diagram, option (c) is correct.