Homework 5

Quiz, 15 questions

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1
point
</div>

1.

In Paxos, which of the following decisions *does not* require a quorum (majority)? (1 point)

○ Collecting OKs during the Election (first) phase in a round

○ Before deciding the ballot id in the Election phase

○ Deciding a value at the end of Bill (second) phase in a round

○ Acknowledgments after sending the decision in the Law (third) phase in a round

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2.

Someone tells you the consensus protocol discussed in lecture for synchronous systems is wrong because we do not know f (i.e., the number of failures in a group of processes). Your response is: (1 point)
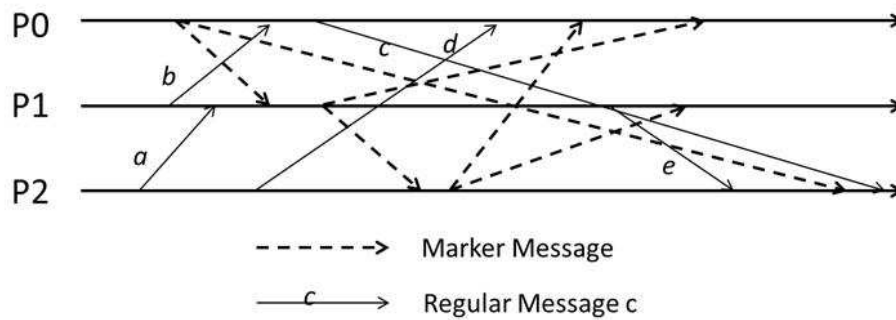
○ You can always set f=N, and the discussed algorithm would then be correct for synchronous systems.

○ You can always set f=1, and the discussed algorithm would then be correct for synchronous systems.

○ This is a hard problem, and an unsolved one.

○ Yes, the algorithm discussed in lecture is incorrect if we don't know f.

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3.

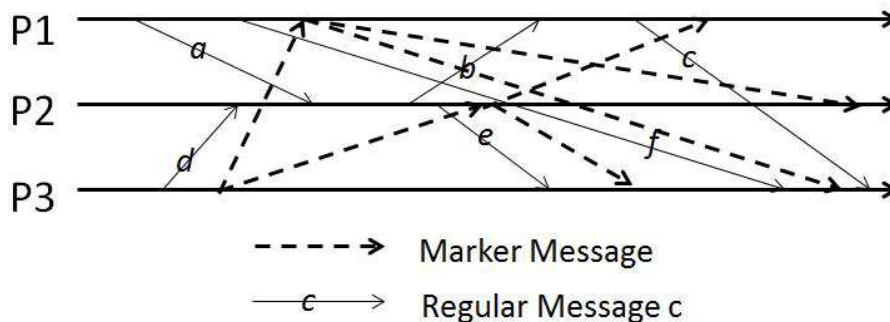# Homework 5

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For the run of the Chandy-Lamport algorithm, answer the following question. Wherever you have to write your answer as a list, give a comma-separated list in alphabetical order. (1 point)

- The list of all messages (among a-e) captured by the snapshot as a part of channel states is:

b,c

1
point

4.

For the run of the Chandy-Lamport algorithm, answer the following question. (1 point)

- Consider all messages such that both its send and receive events are present as part of the state of some process captured by the snapshot. The number of such messages is:
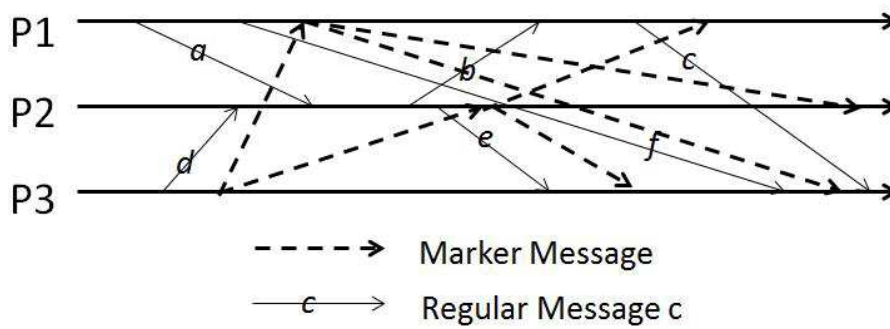
2

1
point

5.

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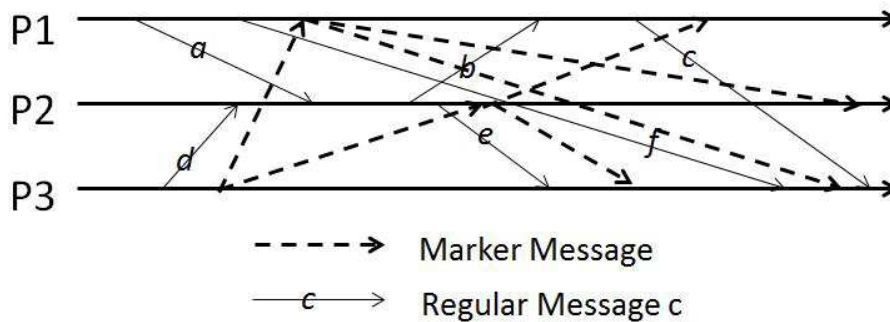- - - - → Marker Message

——c——→ Regular Message c

For the run of the Chandy-Lamport algorithm, answer the following question. (1 point)

- The number of messages such that both its send and receive happen causally after the snapshot is:

1

1 point

6.

- - - - → Marker Message

——c——→ Regular Message c

For the run of the Chandy-Lamport algorithm, answer the following question. (1 point)

- The number of messages such that its send happens causally after the snapshot but its receive is before the snapshot is:
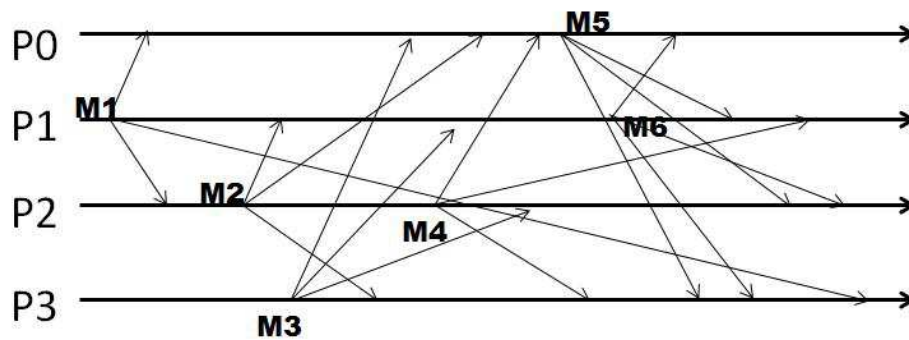
0

1 point

7.

A group of four processes P0-P3 sends out multicasts in a run as shown

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below. The group is using FIFO ordering for multicasts. All sequence
numbers start with zeros.

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Answer the following question. (1 point)

* The sequence vector at the end of the run at P0, as a comma-separated
  list (without the brackets), is:

```
1,2,2,1
```

1
point

8.

A group of four processes P0-P3 sends out multicasts in a run as shown
below. The group is using FIFO ordering for multicasts. All sequence
numbers start with zeros.

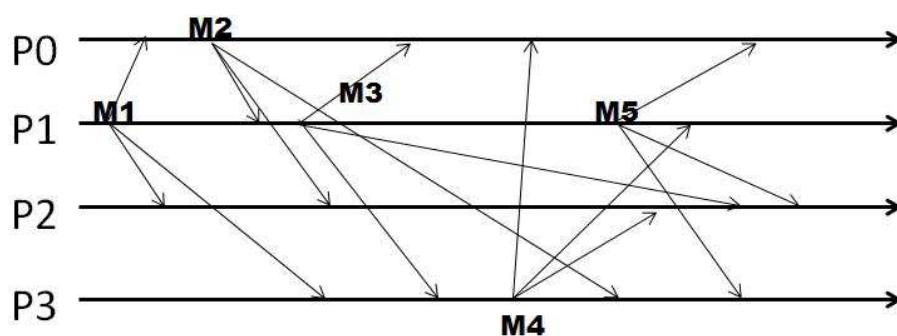Answer the following question. (1 point)

* The sequence vector associated with the send event of the only multicast
  that P3 sends out, as a comma-separated list (without the brackets), is:
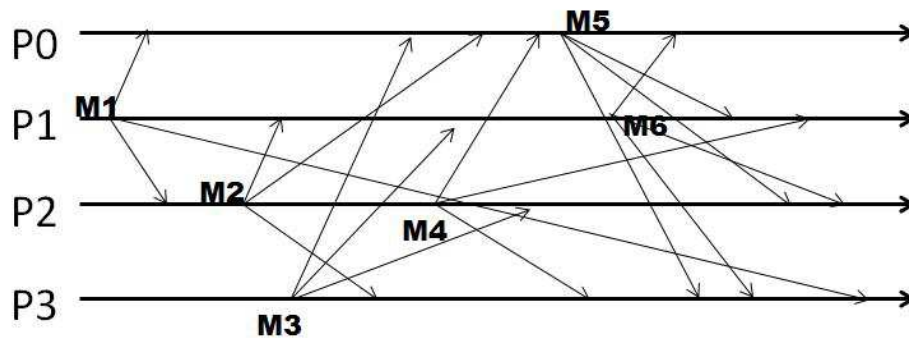
```
0,2,0,1
```

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1 point

9.

A group of four processes P0-P3 sends out multicasts in a run as shown below. The group is using FIFO ordering for multicasts. All sequence numbers start with zeros.

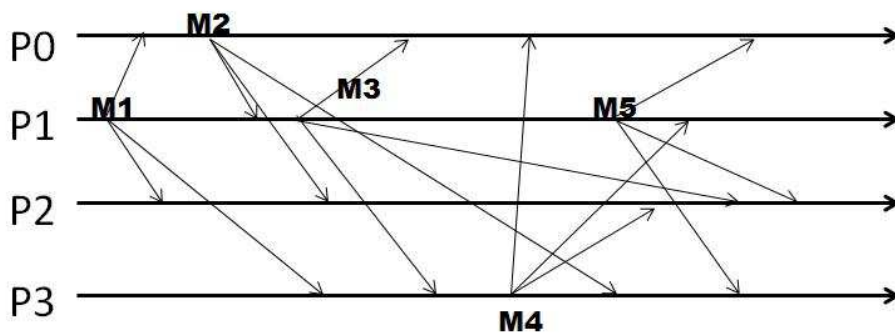Answer the following question. (1 point)

- The sequence vector at the end of the run at P2, as a comma-separated list (without the brackets), is:

    1,2,2,1

1 point

10.

A group of four processes P0-P3 sends out multicasts in a run as shown below. The group is using FIFO ordering for multicasts. All sequence numbers start with zeros.

Answer the following question. (1 point)

- The total number of multicasts that are buffered across all processes in this entire run is:
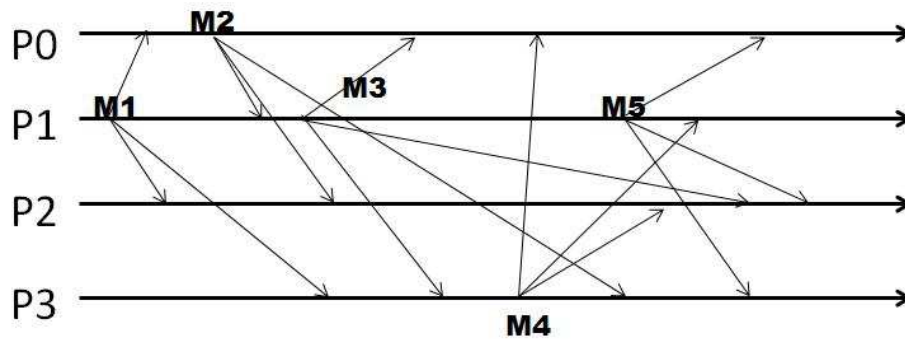
0

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1
point

11.

A group of four processes P0-P3 sends out multicasts in a run as shown below. The group is using causal ordering for multicasts. All sequence numbers start with zeros.

Answer the following question. (1 point)

- The vector of sequence numbers for the only multicast that P0 sends out, as a comma-separated list (without the brackets), is:
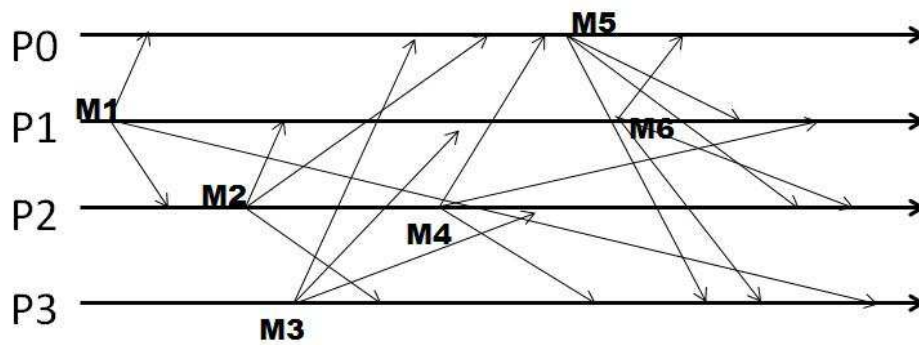
1,1,0,0

1
point

12.

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A group of four processes P0-P3 sends out multicasts in a run as shown below. The group is using causal ordering for multicasts. All sequence numbers start with zeros.

Answer the following question. (1 point)

- The sequence vector at the end of the run at P2, as a comma-separated list (without the brackets), is:

0,2,0,1

1
point

13.

A group of four processes P0-P3 sends out multicasts in a run as shown below. The group is using causal ordering for multicasts. All sequence numbers start with zeros.

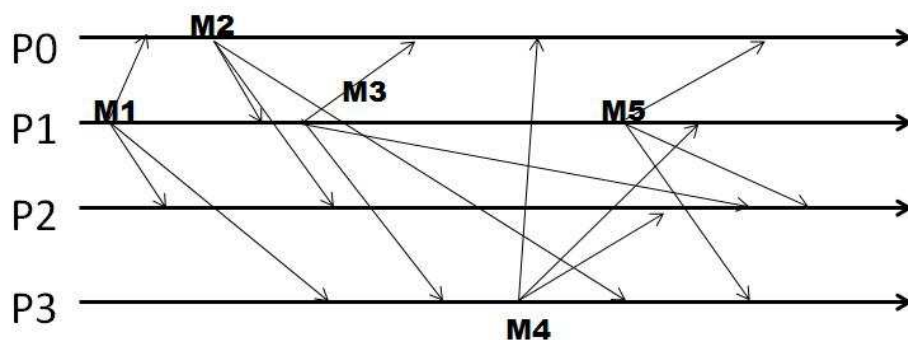Answer the following question. (1 point)

- The sequence vector associated with the send event of the last (i.e., third) multicast that P1 sends out, as a comma-separated list (without the brackets), is:
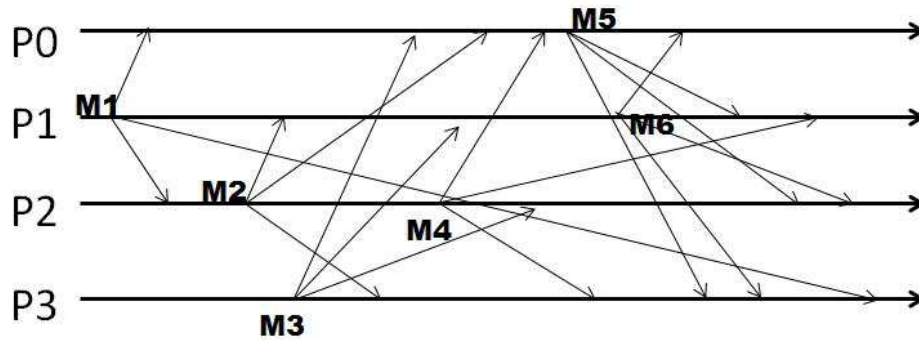
1,3,0,0

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1 point

14.

A group of four processes P0-P3 sends out multicasts in a run as shown below. The group is using causal ordering for multicasts. All sequence numbers start with zeros.

Answer the following question. (1 point)

- The total number of multicasts that are buffered across all processes in this entire run is:

4

1 point

15.

A group of 3 processes, P1 through P3, is running virtual synchrony. In this run, initially all three processes have the view {P1,P2,P3}. In this view a single multicast M is sent by process P2. Following this, P2 crashes, and thereafter P1 and P3 deliver a new view containing only {P1,P3}. Which of the following scenarios DO NOT satisfy virtual synchrony? **Please select all correct answers, as there are multiple correct answers.** (1 point)

- [ ] M is delivered by both P1 and P3 in the view {P1,P2,P3}.

- [ ] M is delivered by both P1 and P3 in the view {P1,P3}.

- [ ] M is delivered by P3 in the view {P1,P2,P3} and by P1 in the view {P1,P3}.

- [ ] M is never delivered by P1 or P3.

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