



### Försättsblad Prov Original

Kurskod	Provkod	Tentamensdatum
D T 0 1 7 A	T 1 0 3	2 0 1 8 - 0 8 - 2 7
Kursnamn	Datateknik AV, Distribuerade system I	
Provnamn	Tentamen	
Ort	Sundsvall	
Termin	H18	
Ämne	Datateknik	

Tingting Zhang  
tel: 0101428878

## **Examination of Distributed System 1, 2018**

**Time: 2018-08-27**

**Total: 100**

**A: 90**

**B: 80**

**C: 70**

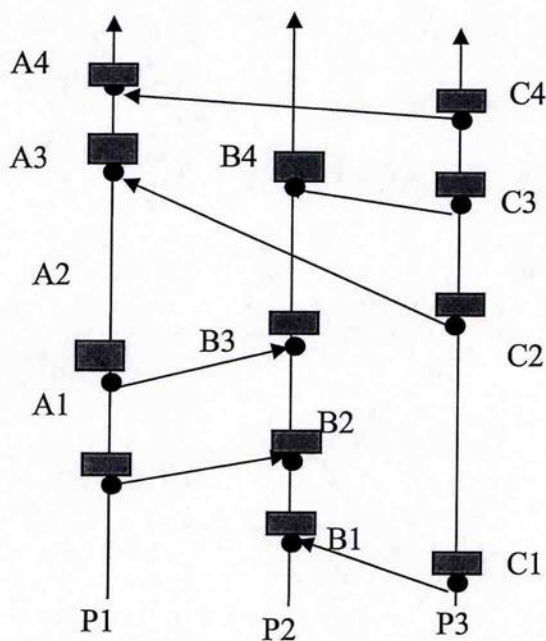
**D: 60**

**E: 50**

**Fail < 50**

**Good Luck**

1. (10 p) What is an open distributed system and what benefits does openness provide?
2. (10 p) What is R, RR and RRA protocols? What protocol(s) can be used to implement at most once semantics? Write an algorithm that uses the protocol to implement at least once semantics.
3. (5 p) What is persistent synchronize communication? What application systems use such communication? Give an example.
4. (10 p) An ATP server B receives server A's message at 08:40:20.100 bearing a timestamp 08:40:20.400 and replies to it. A receives the message at 08:41:00.600 bearing B's timestamp 08:41:00.700.
  - a) Use ATP method to estimate (1) the offset between B and A and (2) the accuracy of the estimate.
  - b) Using Christian algorithm to decide what time should the A device set its clock? Suppose that if the minimum round trip is 10 ms estimate the accuracy of this setting.
6. (15 p) For the distributed system shown in the figure below.

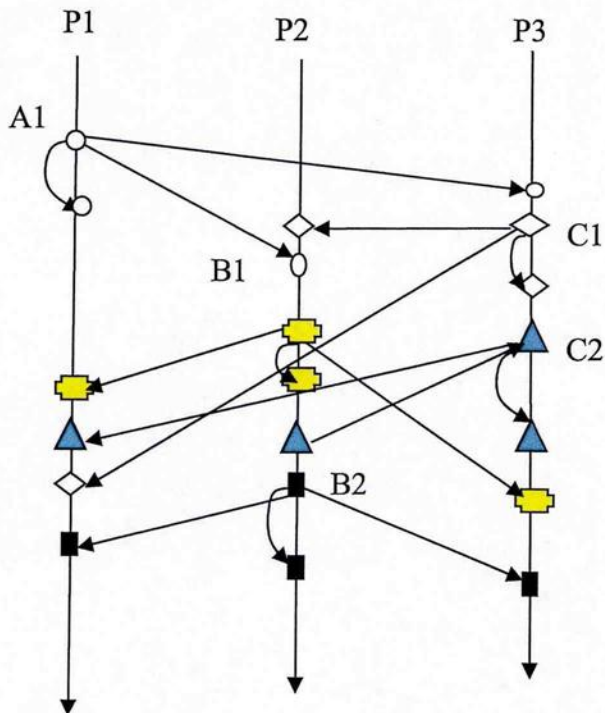


- 1) Provide logical time for all the events (A1, A2, A3, A4, B1, B2, B3, B4, C1, C2, C3, C4) using
  - a. Globale logical time and
  - b. Vector time
- 2) For each of the following global state, decide if it is consistent, transitless and strong consistent.
 

a) $\langle A1, B1, C2 \rangle$	b) $\langle A2, B3, C3 \rangle$	c) $\langle A2, B5, C3 \rangle$
---------------------------------	---------------------------------	---------------------------------



7. (10 p) Assume that up to two processes can enter a critical section simultaneously. Provide possible extensions to Lamport's algorithm and the simple token-ring-based algorithm.
8. (6 p) Compare strictly, sequentially and casually consistency, which one is most strong and which one is most weak.
  - If a system guarantees strictly consistency, does it also guarantee weak consistency?
  - If a system guarantees sequentially consistency, does it also guarantee weak consistency?
  - If a system guarantees casually consistency, does it also guarantee weak consistency?
9. (9 p) Which other name server addresses do DNS name servers hold by default, and why?
10. (10 p) Briefly describe two phase commit protocol. If two phase commit protocol is used, in which situation the processes can be blocked?
11. (9 p)
  - 1) Is there any pair of multicasts that is not causal but FIFO? If so, give an example.
  - 2) Is there any pair of multicast that is Causal order but not Total order? If so, give an example.
  - 3) Is there any pair of multicast that is Total order but not causal order? If so, give an example.
11. (6) Suppose that close group g include P1, P2 and P3.



- 1) From above multicast message-passing situation, find a pair of multicast from two different processes that satisfies causal order.
- 2) From above multicast message-passing situation, find a pair of multicast from two different processes that do not satisfies causal order.