Chalmers Techniska Högskola	CTH TDA295
Datavetenskap	GU INN290

Distribuerade system fk

Tentamen 2000-05-26

Dag, *Tid, Sal*: May 26th 2000, 8:45-12:45, MG

***Kursansvarig*:** Philippas Tsigas (Tel: 772 5409, h. 7117763)

***Hjälpmedel*:** Inga

Totalt *Poängtal*: 60

***Betygsgränser*:**

CTH: 3:a 24 p, 4:a 36 p, 5:a 48 p

GU: Godkänd 28p, Väl godkänd 48 p

Instructions

- Please answer in English, if possible.
  If you have very big difficulty with that, though, you may answer in Swedish.
- **Do not forget to write your personal number and if you are a GU or CTH student and at which "linje"**
- Please start answering each assignment on a new page; number the pages and use only one side of each sheet of paper.
- Please write in a tidy manner and explain (briefly) your answers.

LYCKA TILL !!!!

1. *16 marks*

   The two-phase commit protocol gives the means to different processes on the network to atomically perform a transaction.

   (a) Describe the two-phase commit protocol.

   (b) Does this protocol work when there are undetectable message loses on the network?

   (c) How does this protocol respond to a failure of the Coordinator.

   (d) Prove the impossibility result for the two generals problem. What does this result say to the people that are looking for protocols that will allow them to perform atomic transactions on distributed systems with undetectable message loses?

2. *8 marks*

   Give an implementation of a distributed replicated stack. The stack should be implemented on top of 3 replicas and should tolerate 1 process crash for both *push* and *pop* operations.

3. *12 marks*

   (a) Describe the Chandy Misra Algorithm for the resourse allocation problem.

   (b) What is the time and the communication complexity of this algorithm; give an informal proof.

4. *12 marks*

   Prove the impossibility to solve the Byzantine Generals problem in a system with three processes, one of which is faulty.

5. *12 marks*

   (a) Describe Ivy's dynamic distributed manager scheme.

   (b) In this scheme what steps are taken to minimise the number of lookups necessary to find a page?

   (c) Describe an advantage and a disadvantage of the following consistency models: i) Strict consistency, ii) eager release consistency, iii) lazy release consistency.