COMPUTER SCIENCE & ENGINEERING
Göteborg
SAA

EXAMINATION
2008-08-21

HT-07
CTH-TDA596
GU-DIT240

DISTRIBUTED SYSTEMS, TDA596,595 - DIT240 - INN240

DAY: 21/8 - 08 TIME: 14 - 18 ROOMS: V

Responsible:	Sven-Arne Andreasson 1043
Results ready:	Estimated 4/9 -08 (see course home page for more information)
Grades:	GU: G 24p, VG 42p CTH: 3:a 24p, 4:a 36p, 5:a 48p of maximum 60 points.
Allowed aids:	Nothing except paper, pencil and English - xx dictionary.

NOTE:

- All questions **MUST** be answered in English only!
- Write clearly and use the pages in a clever way so it is easy to read.
- Each task should be started on a new sheet. Use only one side of each paper.
- When describing an algorithm (protocol) use numbered paragraphs in order to make it easier to read (and get right).
- All answers should be motivated!

Exercise 1) Computer Communication.

a) What is meant by *flow control*?

b) What are the main mechanisms when implementing *flow control*?

c) Explain "Saltzer's *End-To-End-Argument*".

(10 points)

Exercise 2) Assume that there are 4 processes *A*, *B*, *C,* and *D* that are connected by a computer network. The processes are cooperating using the resource allocation algorithm with logical clocks. Each process has its copy of a logical clock. Show how the clock values change and when resources can be used in the following scenario. Assume that the local clock values at the start are: *A* 6, *B* 9, *C* 10, *D* 11, and the resource queues are empty.

- *C* sends a request for a resource *R*.
- *C*:s request arrives at *D* (*D* sends acknowledgement).
- *B* sends a request for the same resource *R*.
- *C*:s request arrives at *B*
- *B*:s request arrives at *A*.
- *B*:s request arrives at *C*.
- *C*:s request arrives at *A*.
- *B*:s acknowledgement arrives at *C*.
- *B*:s request arrives at *D*.
- *C*:s acknowledgement arrives at *B*.
- *A*:s acknowledgement arrives atll *C*.
- *D*:s acknowledgement arrives at *C*.
- *D*:s acknowledgement arrives at *B*.
- *A*:s acknowledgement arrives at B.

(10 points)

Exercise 3) Describe two different algorithms for keeping physical clocks in processes synchronized by using a computer communication network. The algorithms should use different principles. What are the benefits and disadvantages of the two principles.

(10 points)

Exercise 4) Describe the Bully algorithm.

a) What are the presumptions.

b) Describe the protocol.

c) Give a small example.

(10 points)

Exercise 5) Describe the authentication protocol Kerberos.

(10 points)

Exercise 6) Describe the basic characteristics of the following distributed file systems:

- NFS (Suns's Network File System)
- AFS (Anderw File System) or DFS
- The LOCUS file system.

Describe the protocols for a sequence of open-read-write-close.

(10 points)