Tentamen Computer Organisation 13-8-99

1　　　There exist several designs for computers to create the possibiliy to process several jobs more or less simultaneously.

a)　Describe the meaning of terms *batch jobs* and *time sharing*.

b)　Give a definition of the notion of *multi-programming*.

2　　　Telephone lines and data lines.

a)　If a telephone line is used for the transmission of data, **modulation** will be used. There are three types of modulation in use. Describe those types.

b)　What is a **dibit** line? What is meant by the **baud rate** of a line?

c)　What is the baud rate of a dibit lijn which uses time intervals of $833\mu sec$?

3　　　The centrale processor of every computer system contains large amounts of electronic gate circuits, like **and-gates**, **or-gates** and **inverters**.

a)　Draw a block circuit of an **exclusive-or-gate** which uses as blocks only gates of the types mentioned above.

b)　Draw a block circuit for a three input majority function. (You can use *and-*, *or-*, *exclusive-or- gates* and *inverters*.)

c)　Draw a block circuit for a three input parity function. (You can again use *and-*, *or-*, *exclusive-or- gates* and *inverters*.)

d)　What type of computational circuit contains exactly one subcircuit of each type mentioned in **b)** and **c)**?

4　　　In conventionele machine languages several **addresserings modes** are used.

a)　Give a short description of the following *addresserings modes*.
(1) **Direct mode**, (2) **Immediate** (3) **Register Indirect** (4) **Base Index Register**.

b)　What type of addressing mode do we use for **stack operaties**? Explain why.

5   Virtual memory and pageing.

a)   What is meant by the *physical address space*. and what is meant by the *virtual address space*, which is used by a program. In what way are those address spaces related?

b)   What is meant by the terms *demand paging* and *working set* in this respect.

c)   What is the meaning of the *page replacement policy*. Give the names of two different page replacement policies, and a short description of these two policies.

6   In this exercise we study the *linking loader* program for a simple machine with a linear address space.

a)   What is meant by the *relocation problem* and what is meant by the *external reference* problem?

b)   Give a short description of the working of a *linking loader*.

7   In a machine with several processors using the same central memory every processor can have its own private *cache*. For the synchronisation of the data there exists a *cache consistency protocol*.

a)   Give a short description of the *write through* protocol.

b)   Give a short description of the *write once* protocol.

RATING

1a 6 pt	**2c** 5 pt	**3d** 3 pt	**5b** 4 pt	**7a** 6 pt
1b 4 pt	**3a** 5 pt	**4a** 8 pt	**5c** 4 pt	**7b** 6 pt
2a 5 pt	**3b** 5 pt	**4b** 5 pt	**6a** 4 pt	
2b 5 pt	**3c** 5 pt	**5a** 4 pt	**6b** 6 pt	$MARK = \dfrac{SUM}{10} + 1.$