BIL 101 – Introduction to Computer Science

HW 3

Due to 14.10.2015, 13:00

Submit your hardcopies to Nur Banu Albayrak (118). **Strictly no hardcopy will be accepted after 13:00!!!**

PART 1

1. Write the Linux commands to create a file "info.txt" with your and 10 of your relatives names in it. Each name will be in a new line.
2. What is the output of the following command for your info.txt file? Explain the command and the output.

   > head info.txt | grep a

PART 2

1. Convert each digit of your student number into a 4 bit binary representation.
2. Put these bits together one after another and form a single long bit sequence.
3. Consider these bits as ASCII encoded letters and decode them.

PART 3

1. Watch the video "How CPU Works". The link is given in the moodle page of the course.
2. Draw CPU-RAM figures for the read and write data processes showing whether the wires are on or off.
3. Draw an inside-CPU figure for the comparison instruction. Answer the following questions and draw figures if required.
   a. Which unit does the comparison?
   b. What happens to the result of the comparison?
   c. How the numbers to compare are transmitted to the related unit?
   d. How does the unit know which operation to perform?

PART 4

1. What is the difference between RISC and CISC instruction sets architectures?
2. Consider the Machine Language (instruction set architecture) in Appendix C of your book. Assume we have another machine language with a CISC instruction set. How would you implement the following CISC instruction with your RISC instruction set in appendix C?

   Op-Code: E

   Operand: MNKL

   Description: EXCLUSIVE OR (XOR) the bit patterns in memory cells MN and KL, and store the result in register 0. For example E112A EXCLUSIVE ORs the bit patterns in the memory cells 11 and 2A and stores the result in register 0.

PART 5

Consider the Machine language in Appendix C. What are the final states of the registers, the memory cells and the program counter after the program execution? Explain what happens step by step.

Registers:

0	
…	
5	
6	
7	
…	
F	

Memory Cells

00	1A00 (number)
…	
11	1000 (instruction)
12	15FF (instruction)
13	B515 (instruction)
14	C000 (instruction)
15	3500 (instruction)
…	
FF	5A00 (number)

Program Counter: 11