LUT University

Computational Engineering 2022-01-21

BM40A0202 Foundations of Computer Science

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Exercise 3 (week 5): Micro-programmable computer.

Tasks (1p/task)

1. Task in Moodle.
2. Logical circuit in Figure 1.
   (a) How does the circuit in Figure 1 work?
   (b) The feed s is a variable pulse train $0, 1, 0, 1, 0, \ldots$. How does the input s affect the output o?
   (c) What is the output o for the variable pulse train?

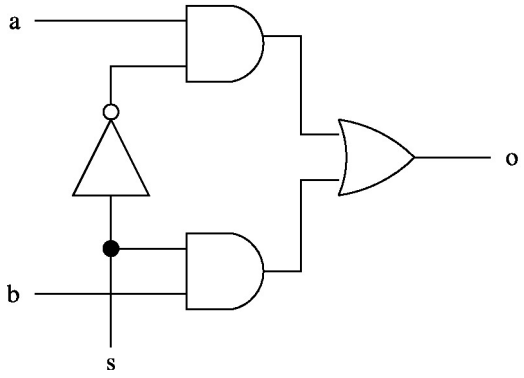

Figure 1: Logical circuit.

3. The micro-programmable computer presented in the course has four buses and a clock. Explain the meaning of each bus and each of the five steps of the clock.
4. Write a symbolic microprogram (program code that can be easily converted into microcode, i.e. 22-bit commands): place the value $A + 1$ in the register B, where A is the value of the register A.
   (a) Which microcode functions are needed to implement the symbolic microprogram you have written?
   (b) Write a symbolic microprogram and consider what microcode functions are needed to repeat the same calculation several times?
   (c) For example, if you want to calculate the sum $A = 1+2+3+4+5+6+7+8+9+10+11$, what microcode functions are needed to do this?

   This is not the time to write actual microcode, but to familiarise yourself with the micro-programmable computer.

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