10000 Introduction to Computer Science, Fall 2003 CCNY CUNY

Test 1, October 15 **Instructor: Yegor Bryukhov**

1. For each table identify name of operation it represents (AND,OR, etc):

A

Input 1	Input 2	Output
0	0	0
0	1	1
1	0	1
1	1	0

B

Input 1	Input 2	Output
0	0	0
0	1	1
1	0	1
1	1	1

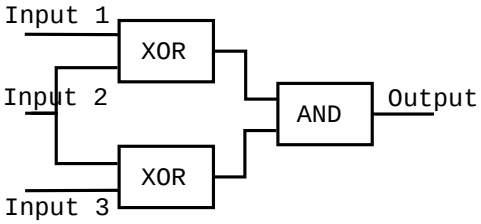
C

Input 1	Input 2	Output
0	0	0
0	1	0
1	0	0
1	1	1

D

Input	Output
0	1
1	0

2. Find the output of the following circuit for all possible inputs.



3. Convert decimal number 401 to its binary representation and then convert from binary to hexadecimal representation.

4. Convert hexadecimal BC to binary representation and then from binary to decimal.

5. Find 8-bit two's complement representation of -19.

6. Find sum of two binary numbers 01001101 and 11100111 (do it without converting to decimal representation).

7. You have 8-bit floating-point numbers, where left-most bit is used for sign, next 3 bits used for exponent and the rest 4 bits are used for mantissa.

   (a) Find what number is represented by 11101001

   (b) Find binary floating-point representation of $1\frac{1}{16}$. Is it exact or some truncation error happens, explain?

8. You are given binary pattern 010110010110. Using bit-wise AND, OR and XOR change it so that left-most 4 bits are invetrted (0 replaced with 1, 1 replaced with 0); next 4 bits are set to 0 and right-most 4 bits are set to 1. Hint: provide proper mask for each operation.

9. What will be the content of cell 00 when the machine halts if it was start with program counter set to 00 and the following contents of the main memory:

Address	Contents
00	1A
01	02
02	2B
03	02
04	9C
05	AB
06	3C
07	00
08	C0
09	00

10. Check the components of operating system that are considered to be main parts of kernel:

    - window manager
    - file manager
    - memory manager
    - device drivers
    - scheduler
    - shell
    - dispatcher

11. Which OS component provides virtual memory service?

12. Which protocol TCP or UDP uses "handshake" to establish network connection?