Architecture: von Neumann; logic gates

COSC 208, Introduction to Computer Systems, 2022-03-08

Outline

- Warm-up
- von Neumann Architecture
- Hardware building blocks
- Logic gates

Warm-up

Assume you are given the following code:

```
struct account {
    int number; // Account number
    int balance; // Current account balance
};
struct account *open_account(int starting);
int close_account(struct account *acct);
```

Q1: *Write the* `open_account` *function, which creates a new account with a random account number and the specified* `starting` *balance.*

Q2: *Write the* `close_account` *function, which eliminates the account* `acct` *and returns the remaining balance.*

Logic gates

Q3: *Fill-in the truth tables for all six types of gates*

A	B	(A AND B)	(A OR B)	(NOT A)	(A NAND B)	(A NOR B)	(A XOR B)
0	0						
0	1						
1	0						
1	1						

🛑 **STOP HERE** after completing the above questions; if you have extra time take a few deep breaths to help reduce stress.

Building logic gates

Q4: *How do you use AND and NOT gates to create a NAND gate?*

Q5: *How do you use OR and NOT gates to create a NOR gate?*

Q6: *How do you use NAND gates to create a NOT gate?*

Q7: *How do you use NAND gates to create an AND gate?*