

CSE-220: Systems Fundamentals I

Assignment 1. Due on 16 March 2021

Solutions are to be scanned or photographed and submitted by email by 5:00PM of the due date. Diagrams should be drawn neatly.

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1. Using two's-complement notation in six bits, add each of the following pairs of numbers, and in each case determine whether or not overflow has occurred.

- 16 and 9
- 27 and 31
- -4 and 19
- 3 and -32
- -16 and -9
- -27 and -31

2. Give a CMOS transistor-level circuit for each of the following, using as few transistors as possible. With the aid of an ON/OFF table for the transistors, explain how the outputs are obtained from the inputs.

- (a) A four-input NAND gate.
- (b) A three-input OR gate

3. Consider the diagram given on the next page.

- (a) Give the transistor ON/OFF table.
- (b) Give the corresponding truth table.
- (c) In a single sentence of plain English, describe what the circuit does.

