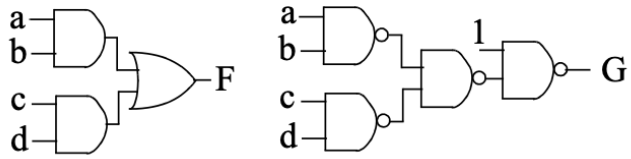
CSE232_2023_HW1

1) A school has three classrooms, each with a motion sensor (a, b, and c) that outputs 1 when motion is detected. At night, the only person in the school is one security guard who walks from room to room.

   A) Create a circuit that sounds an alarm (by setting an output A to 1) if motion is ever detected in more than one room at a time (i.e., in two or three classrooms), meaning there must be one or more intruders in the school. Start with a truth table (30 points)
   B) Implement the circuit by using only the NAND gates (20 points)

2) Determine whether the two circuits in the following figure are equivalent circuits using: (a) algebraic manipulation, and (b) truth tables. (30 points)



3) You are expected to create a circuit with four inputs (a, b, c and d) which detect if an even number of inputs are 1s. Use only 2-inputs XOR gates on your design (20 Points).