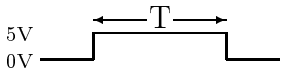
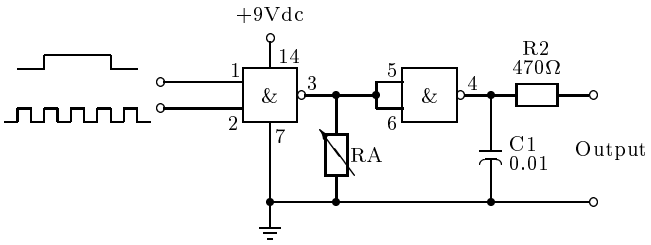
CLASSICAL AND QUANTUM COMPUTING
EXERCISE II

1. Write down the function table (truth table) for the two's complement. The number of inputs is four bits. The number of outputs is five bits. Four outputs are for the two's complement and the fifth indicates whether there was a carry in the process. Implement the function table as a circuit using only NAND gates.

2. The CMOS 4011 contains 4 NAND gates. Two of them can be used to build the following circuit. A dual monostable/astable multivibrator (for example 556) provides a monostable output pulse.



The pulse is fed into pin 1 of the NAND gate. The astable output of the multivibrator

is fed in pin 2 of the NAND gate. Discuss the circuit as a function of the gate input at 1 and the pressure sensor (resistor RA). Consider first RA=0 and RA=∞.