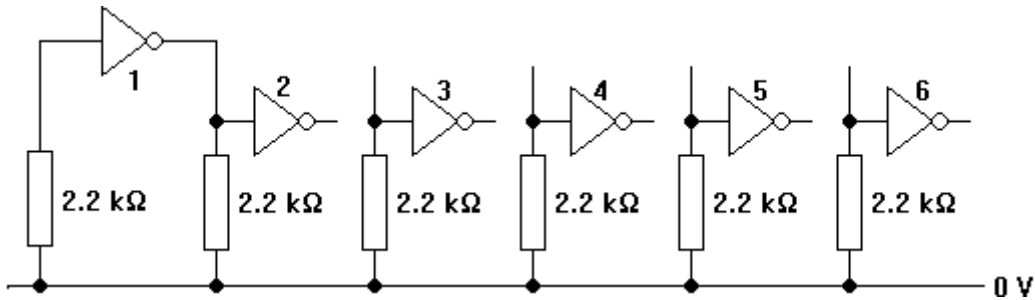
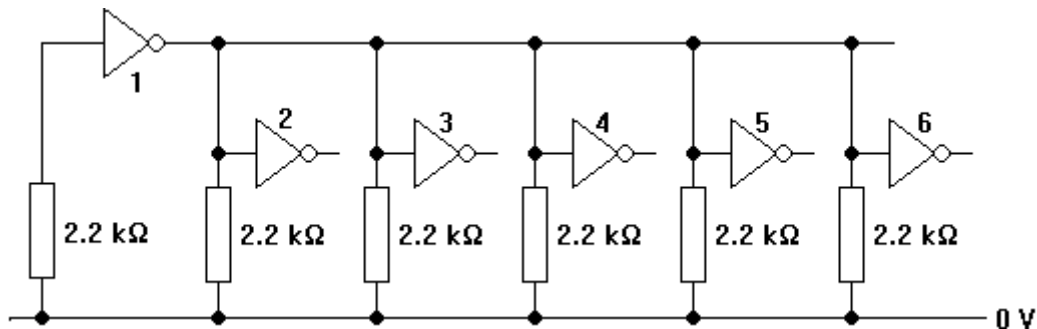


Measuring fanout

1. Place a 4069 NOT gate i.c. on your breadboard. Number the gates from 1 to 6.
2. Use six 2.2 k Ω pull-down resistors to hold the inputs of the gates low. Connect the output of gate 1 to the input of gate 2.



3. Use a double-beam CRO to look at the outputs of gates 1 and 2.
4. Record the voltages on the CRO screen as the inputs to gates 3, 4, 5 and 6 are connected to the output of gate 1, **one after the other**, until all four are connected as shown below.



5. On the same set of axes, plot graphs to show how the input and output voltages of gate 2 depend on the number of inputs connected to the output of gate 1.
6. Use the graphs to determine the fanout of CMOS gates whose inputs are pulled low by 2.2 k Ω resistors.
7. Investigate the effect of replacing the pull-down resistors with 4.7 k Ω and 1.0 k Ω resistors in turn.