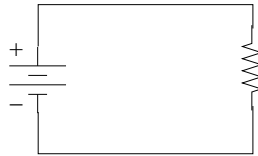


CSC101 Spring 2013
Introduction to Computer Science

Circuits:

A circuit consists of a source of electro-motive force (voltage) and a pathway through which current may flow. Typically, a pathway must include a significant amount of resistance to avoid excessive current flow.

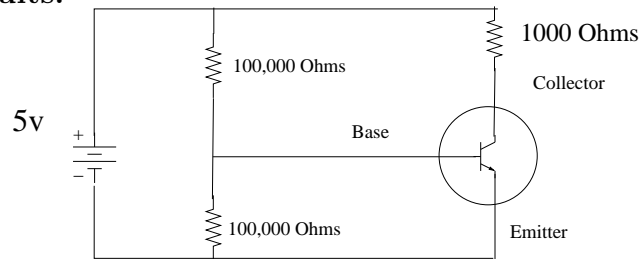


Ohm's Law:

$$V = IR$$

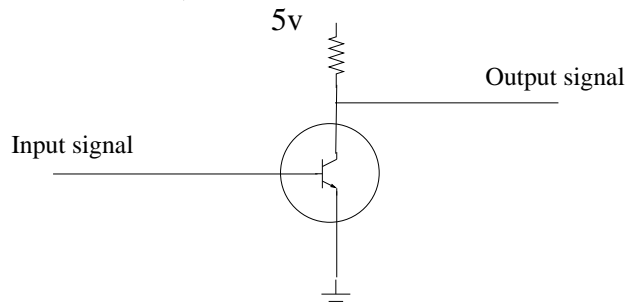
where V is electro-motive force (measured in volts), I is current (measured in amperes), and R is resistance (measured in Ohms).

Transistor Circuits:



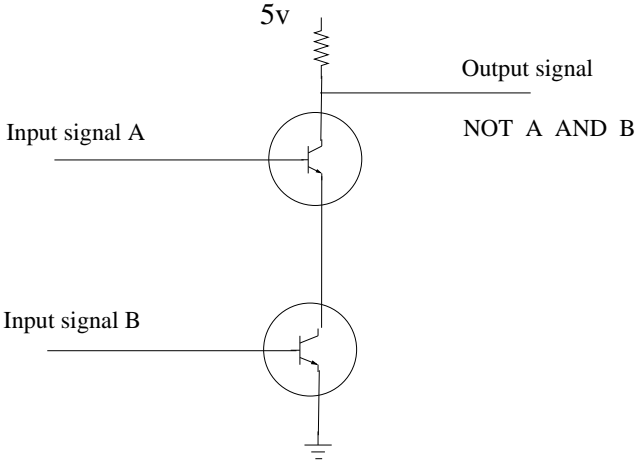
A small base-emitter current enables a large collector-emitter current.

If we view the base as the "input", then applying a voltage to the base puts the transistor in the "ON" (conducting) state. If there is 0 volts applied the base, then the transistor will be in the "OFF" (non-conducting) state.



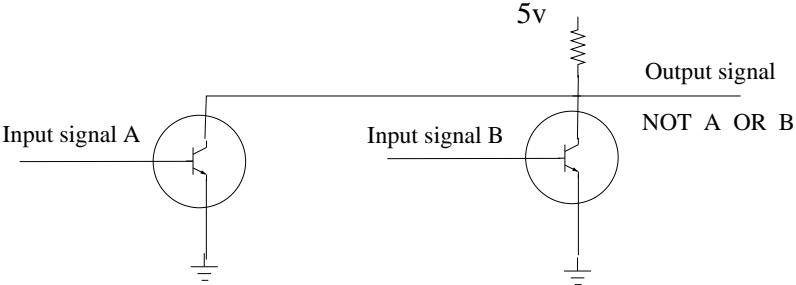
A Logical NOT Gate

Transistors can be used to compute the values of logic functions. Here is a circuit for the operation “NOT AND”, also called a “NAND” operation.



A Logical NAND Gate

By putting our transistors in parallel (instead of series), we can create a circuit for the “NOT OR” operation, also called a “NOR” operation.



A Logical NOR Gate