HOW TO MOSFET
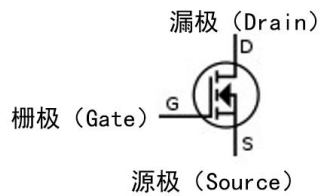
Here is some information about MOSFET, it will help you in your first and second homework.

There are three terminals, called drain, source and gate.
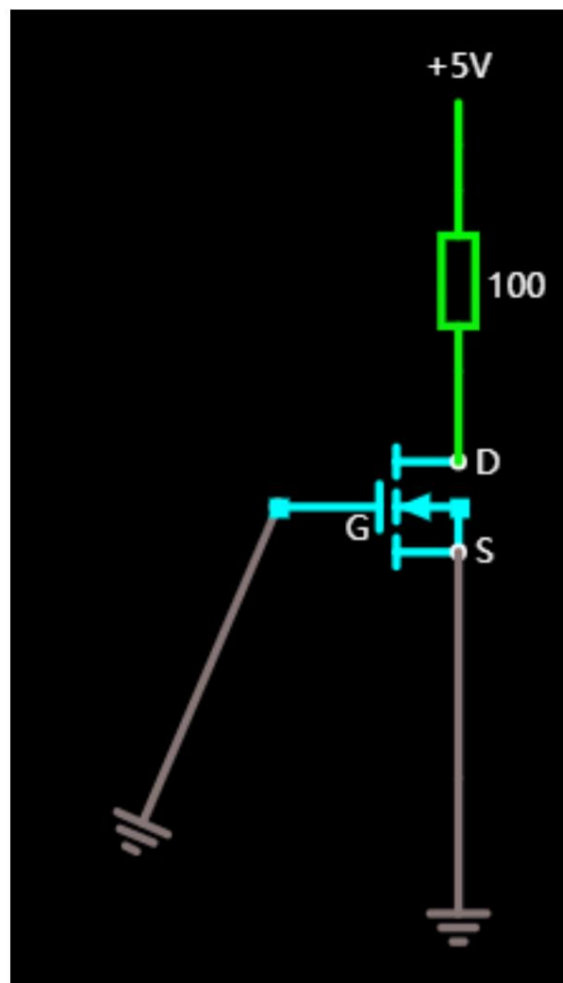
漏极（Drain）
D
栅极（Gate）— G
S
源极（Source）

When we say Vgs, we mean the voltage between gate and source. Vds is the voltage between drain and source, etc.

NMOS is a switch. Current **must** flow from drain to source. When the gate voltage is higher than source(S) voltage, it turns on, otherwise it turns off.

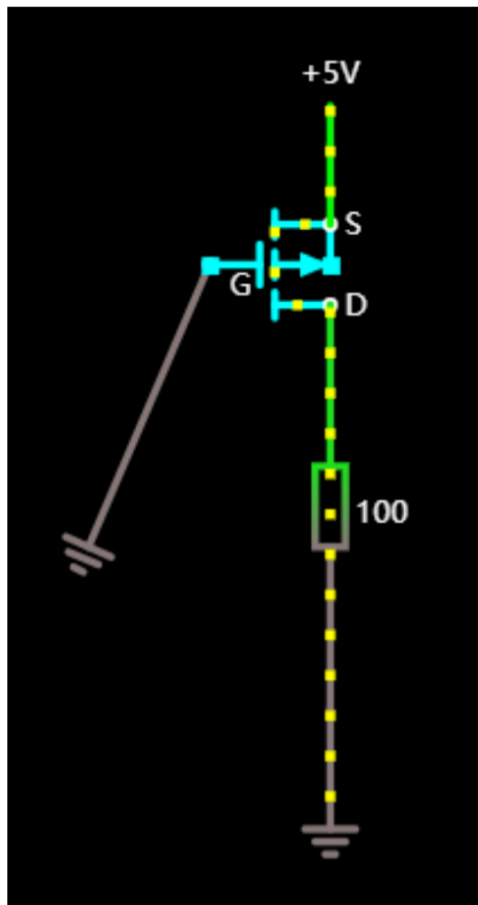In digital circuits we call high voltage 1 and low voltage 0.
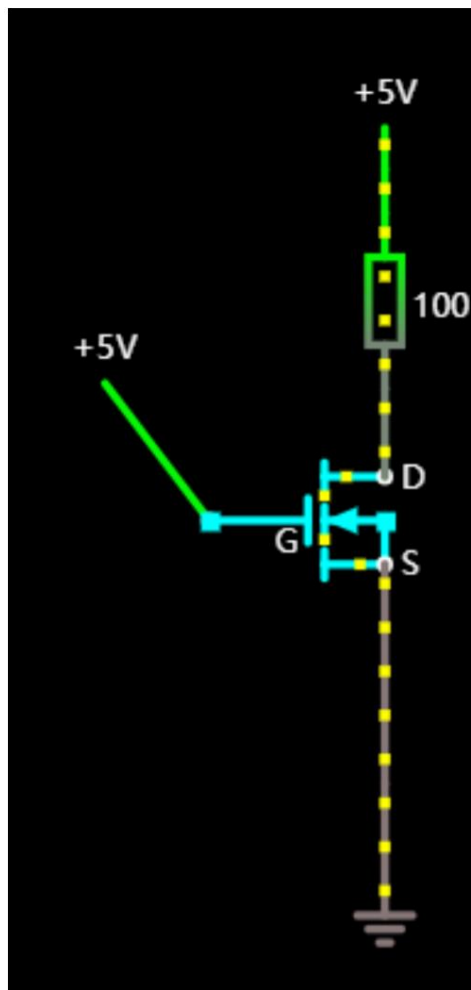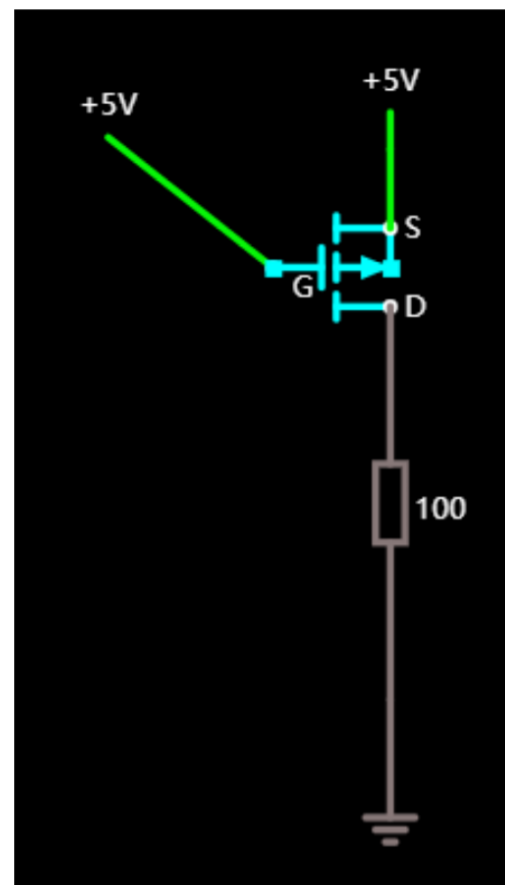
NMOS on   **NMOS off**

PMOS is also a switch. Current **must** flow from source to drain. When the gate voltage is lower than source voltage, it turns on, otherwise it turns off.
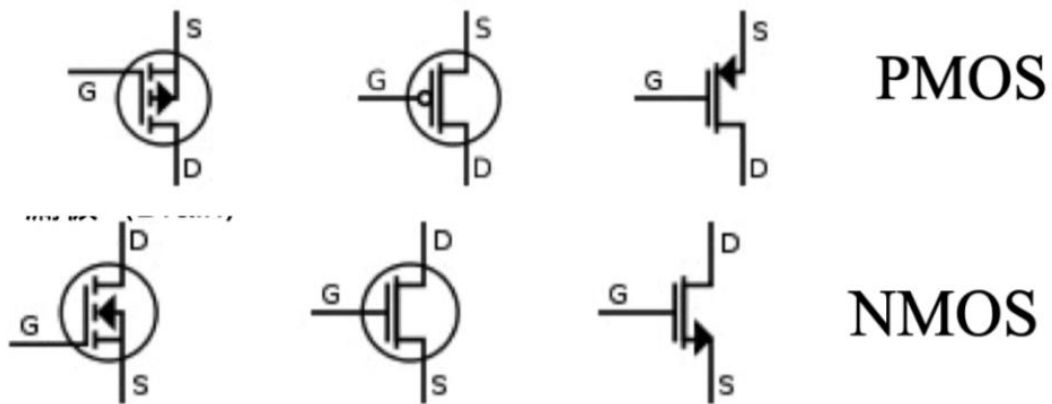


PMOS on   **PMOS off**

If MOSFET is connected reversely (Vds < 0 for NMOS and Vds > 0 for PMOS), it's just a diode. Don't do that

HOW TO CMOS

There are different ways to draw a MOS in different situations, but for now you can regard them as the same. Pay attention to the direction of the arrows.

The C in CMOS stands for complementary. Use NMOS to pull down (connect to ground) the output and use PMOS to pull up (connect to VCC) the output. NOT gate in CMOS looks something like this (Green stand of high voltage/1 and grey stand for low voltage/0) :
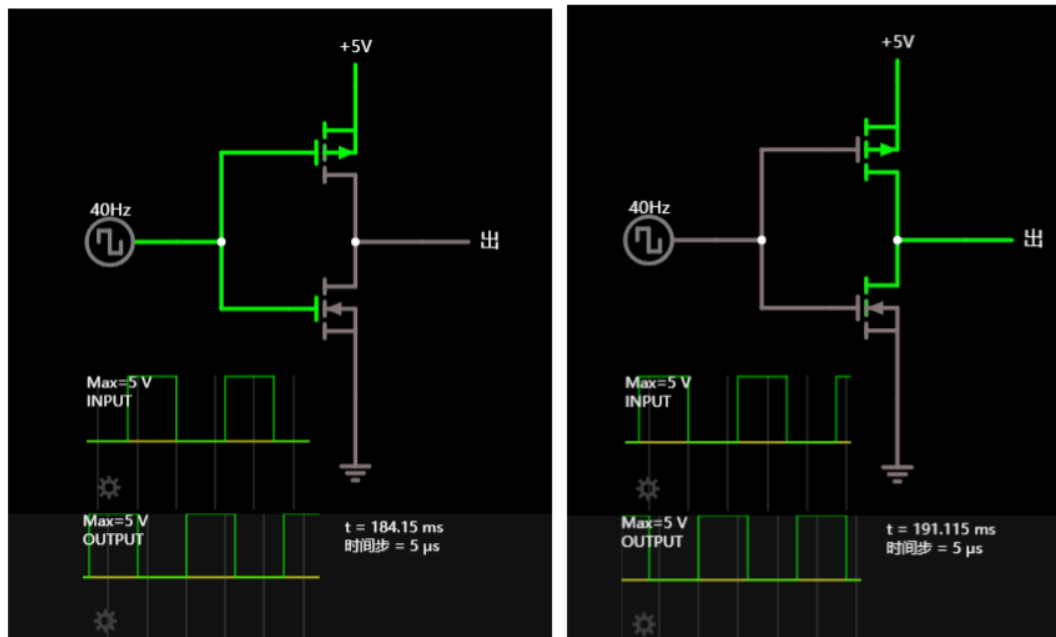
MOSFET is not an ideal switch. Its maximum current is related to Vgs and threshold voltage. You can find more information about MOSFET in:

Adel S. Sedra, Kenneth C. Smith - Microelectronic Circuits-Oxford University Press (2014)