

# TRANSISTOR-TRANSISTOR LOGIC

## TRANSISTOR SWITCH IN DIGITAL LOGIC

---

*prepared by:*

**Gyro A. Madrona**

Electronics Engineer

# TOPIC OUTLINE

The Transistor Switch

7404 TTL Inverter

7432 TTL OR Gate

7408 TTL AND Gate



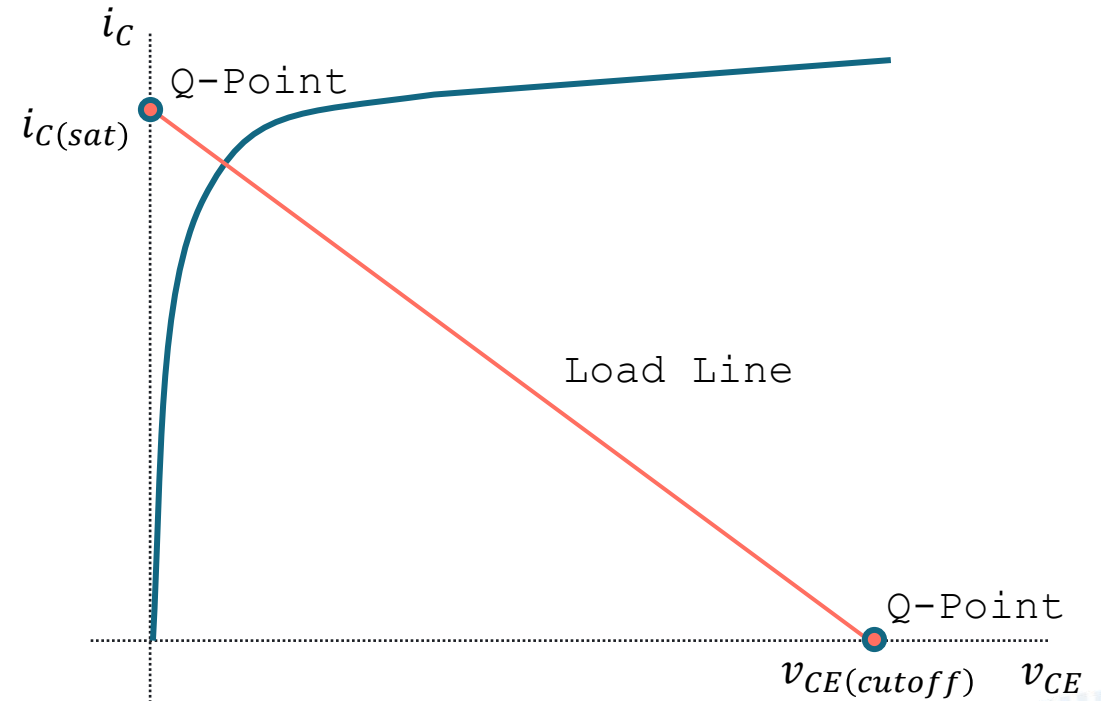
# THE TRANSISTOR SWITCH



# TTL INTEGRATED CIRCUIT

Transistor-Transistor Logic (TTL) is one of the most widely used integrated-circuit technologies. TTL integrated circuits use a combination of several transistors, diodes, and resistors integrated together in a single package.

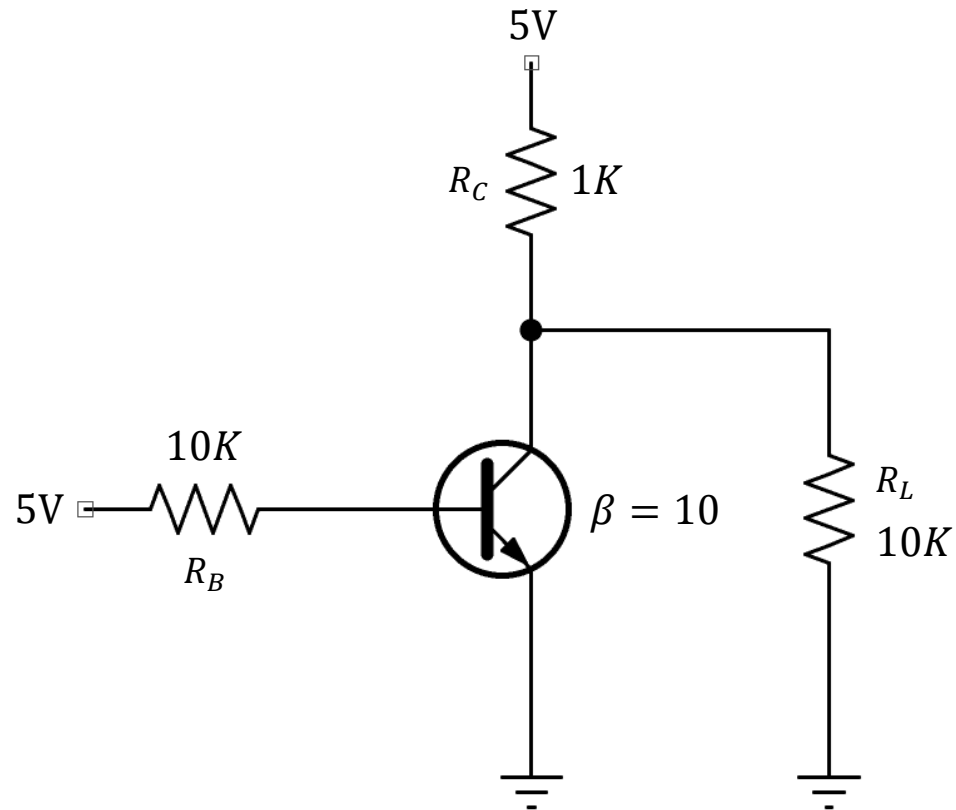
## Transistor as a switch



# INVERTER

## The 10:1 Design Rule

The transistor is in hard saturation when  $V_{BB} = V_{CC}$   
then  $R_B = 10R_C$ .



Base current

Collector current

Collector-Emitter voltage

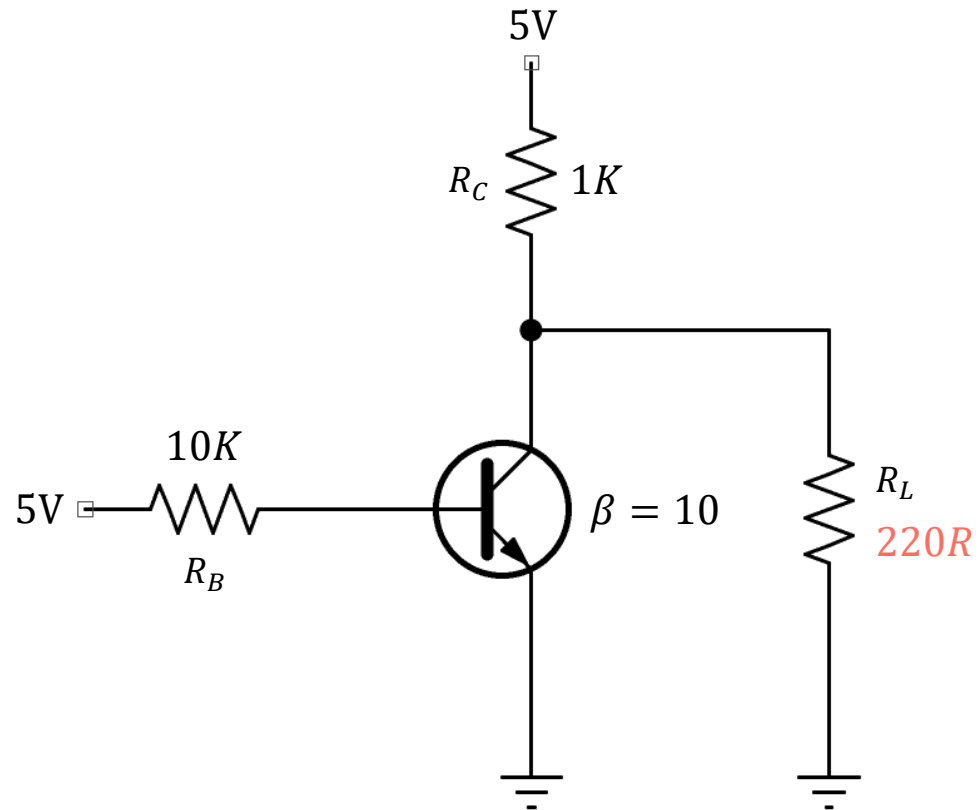


# INVERTER

## The 10:1 Design Rule

The transistor is in hard saturation when  $V_{BB} = V_{CC}$   
then  $R_B = 10R_C$ .

Saturation Region



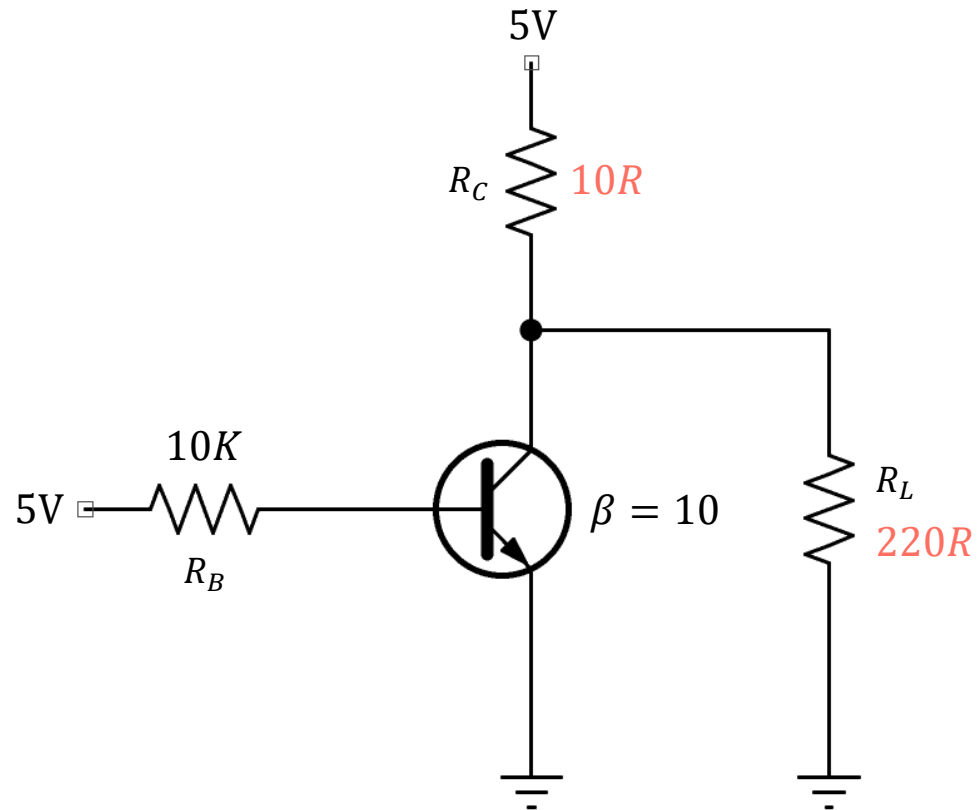
Cutoff Region

# INVERTER

## The 10:1 Design Rule

The transistor is in hard saturation when  $V_{BB} = V_{CC}$   
then  $R_B = 10R_C$ .

Saturation Region



Cutoff Region

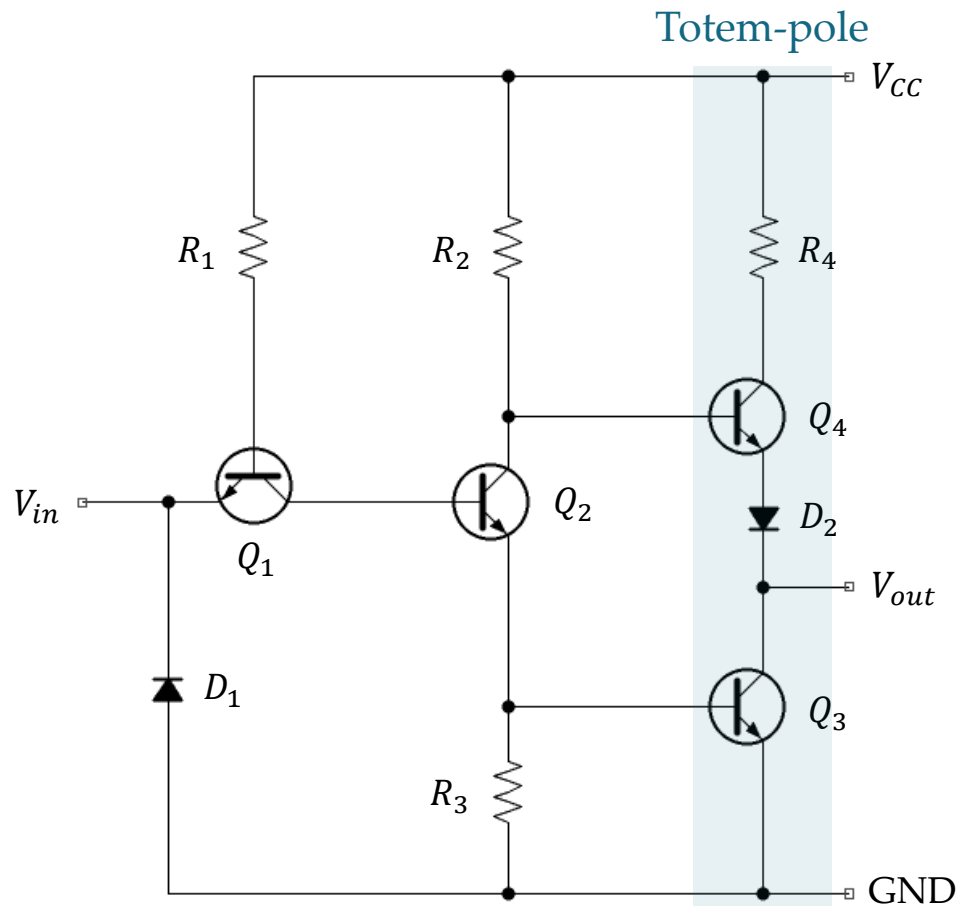


# 74' TTL SERIES





# TOTEM-POLE ARRANGEMENT

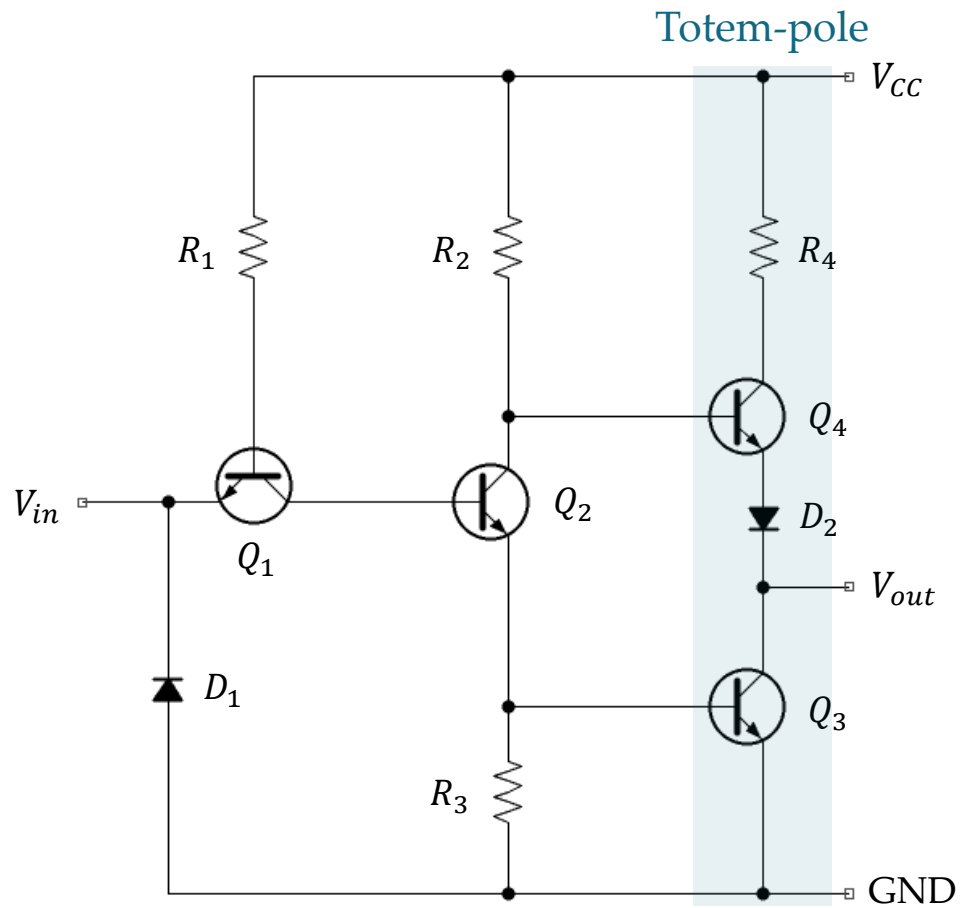


A totem-pole arrangement is a type of output stage in TTL (Transistor-Transistor-Logic) circuits, where two transistors are connected in a stacked configuration to actively drive the output.

In this arrangement, when one transistor is ON, the other is OFF, ensuring that the output is either strongly pulled high or low, but never both simultaneously.

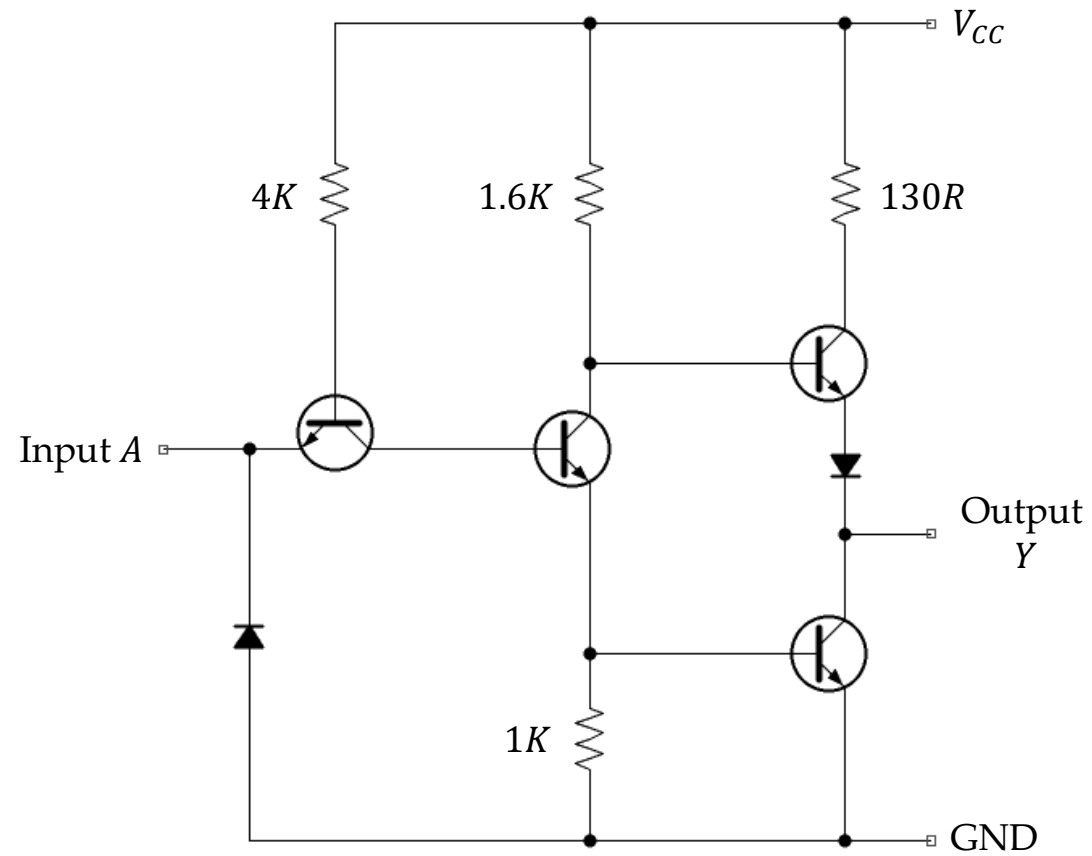


# TOTEM-POLE ARRANGEMENT

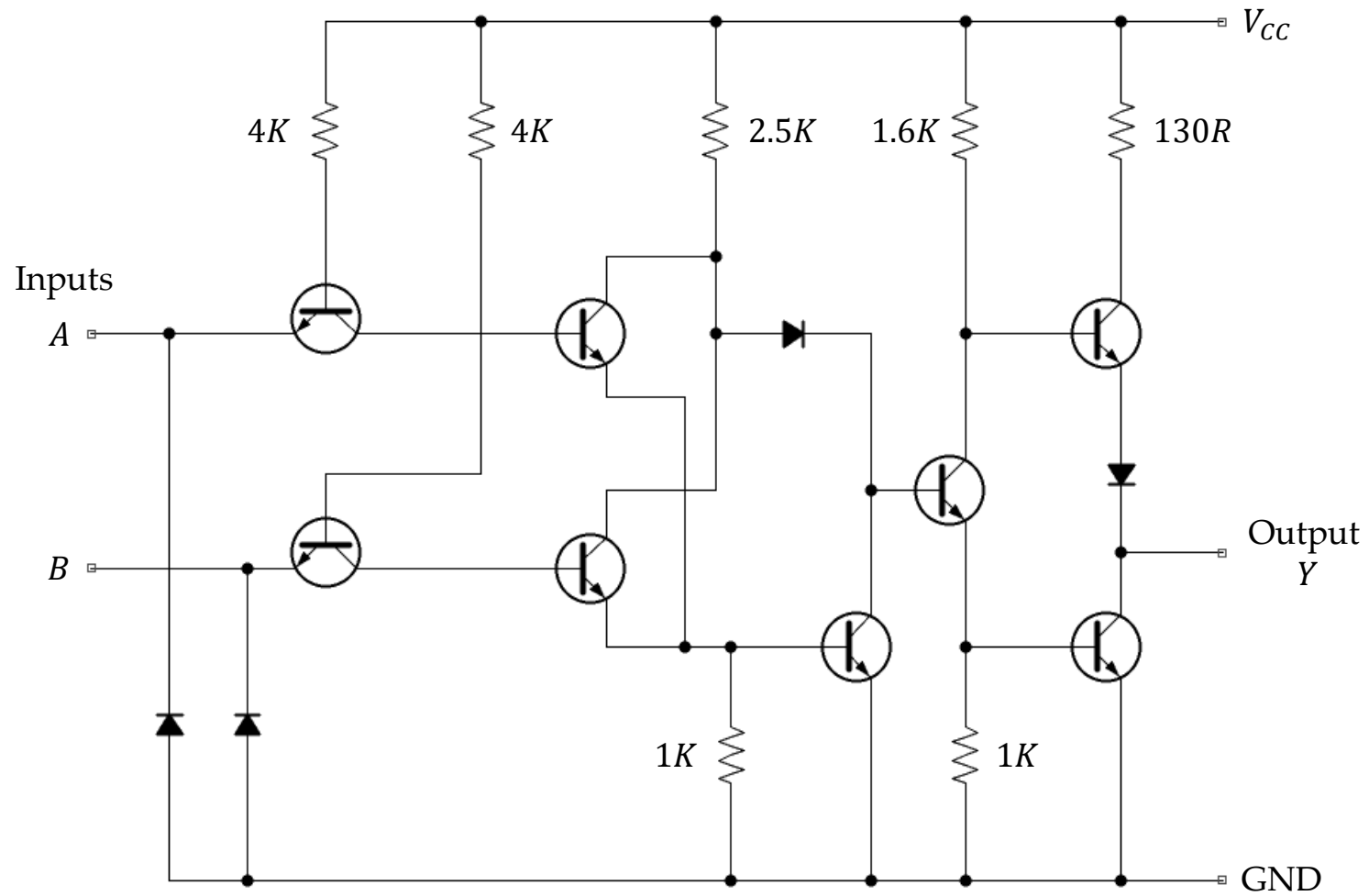


Totem-pole serves as public monuments symbolizing family heritage, social status, and cultural identity.

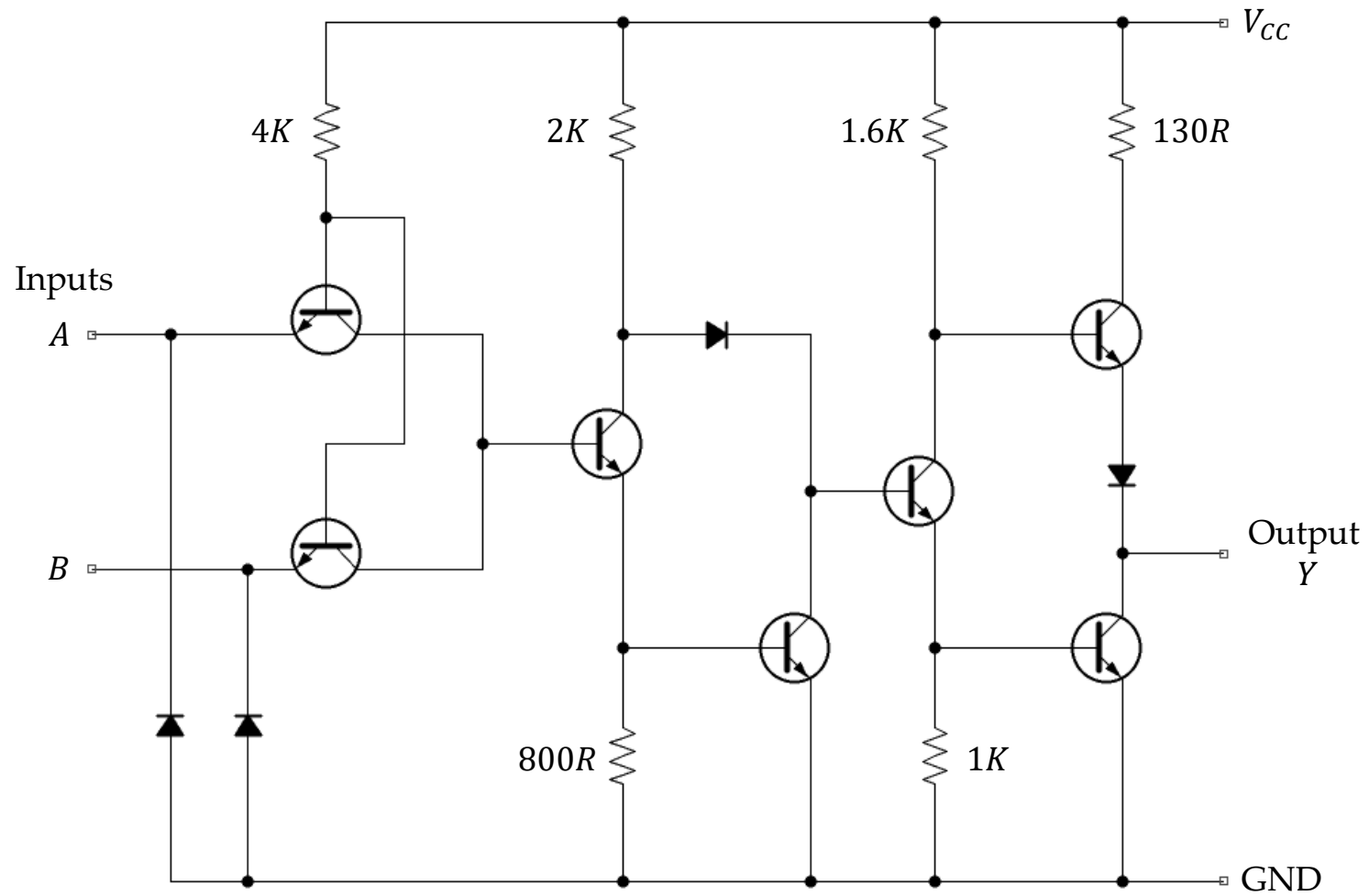
# 7404 TTL INVERTER



# 7432 TTL OR GATE



# 7408 TTL AND GATE



# LABORATORY

