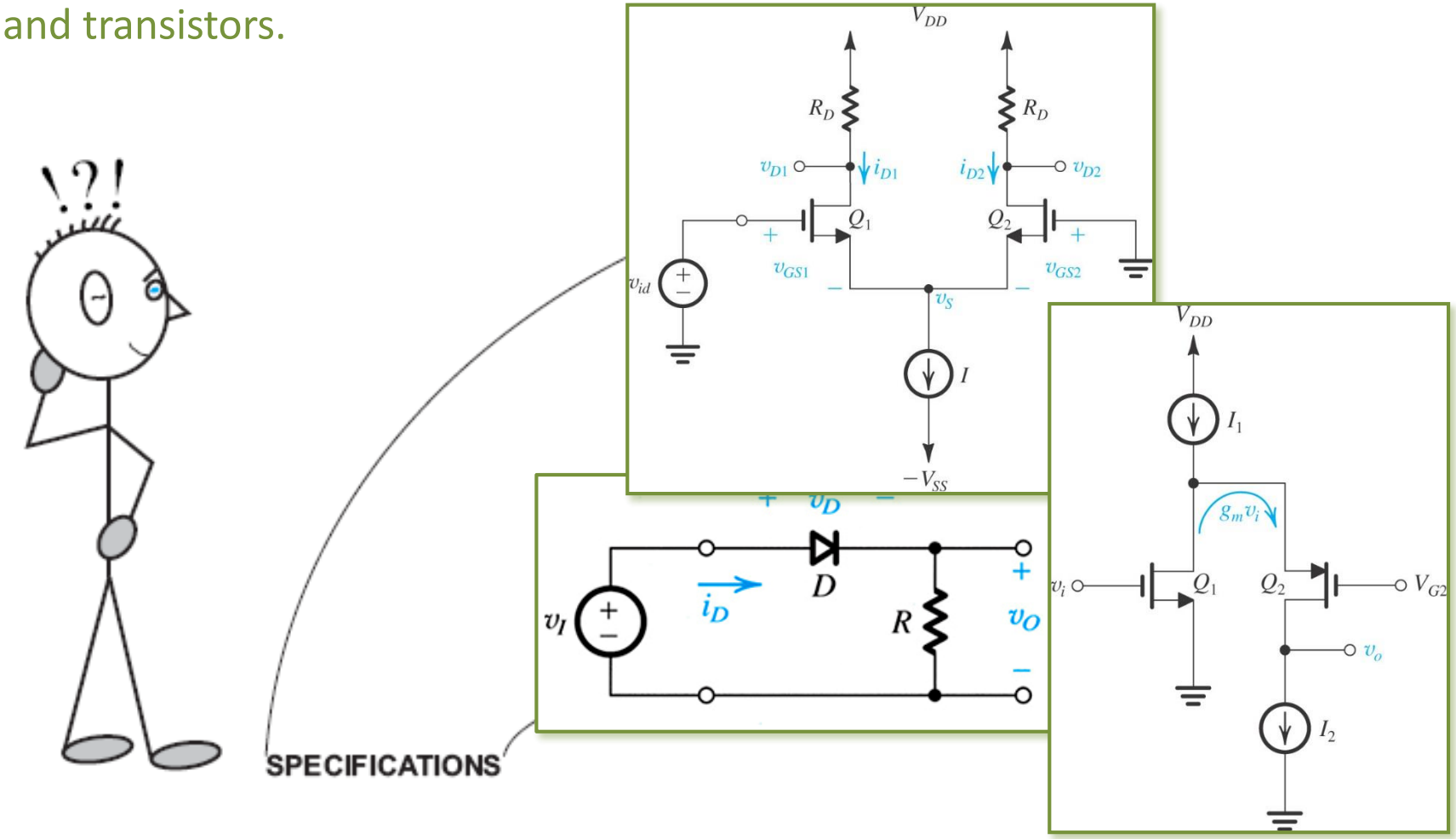
Course Objectives

This course teaches analysis techniques of basic electronic circuits with diodes and transistors.



Electronic Systems → Chapter #1

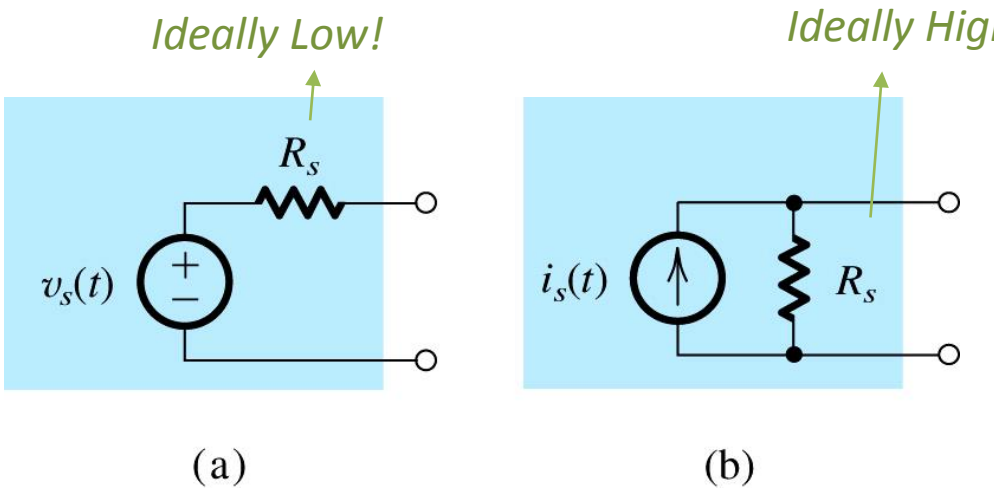
- **Signal -** contains information
- **Transducer –** device which converts signal from non-electrical to electrical form
- **Process –** an operation which allow an observer to understand this information from a signal

Process the electrical signals received from the transducer in some predetermine manner.

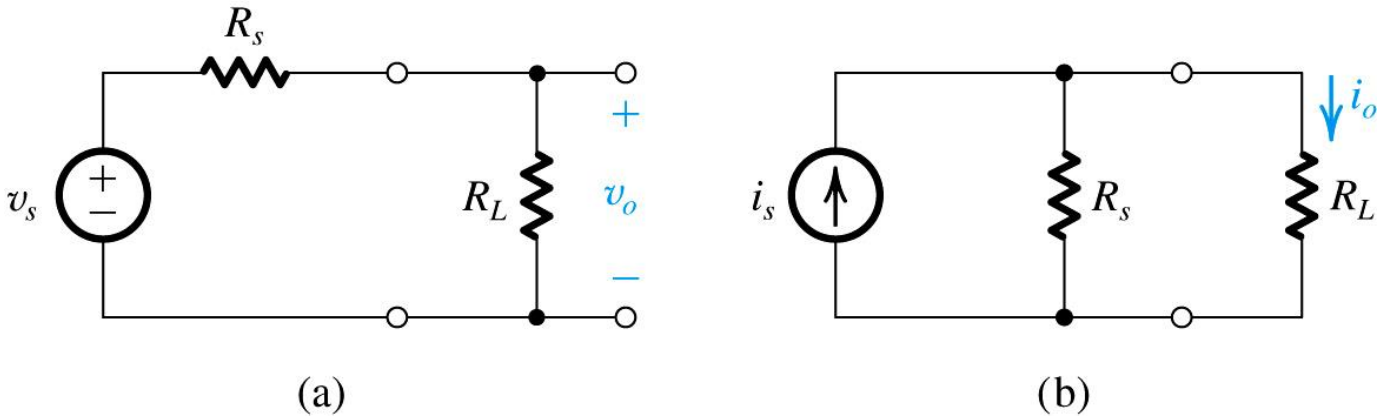
Electrical Signal Representation

a) **Thevenin Form** – *voltage source $v_s(t)$* with series resistance R_s

b) **Norton Form** – *current source $i_s(t)$* with parallel resistance R_s



Basic Circuit Analysis → Example 1.1

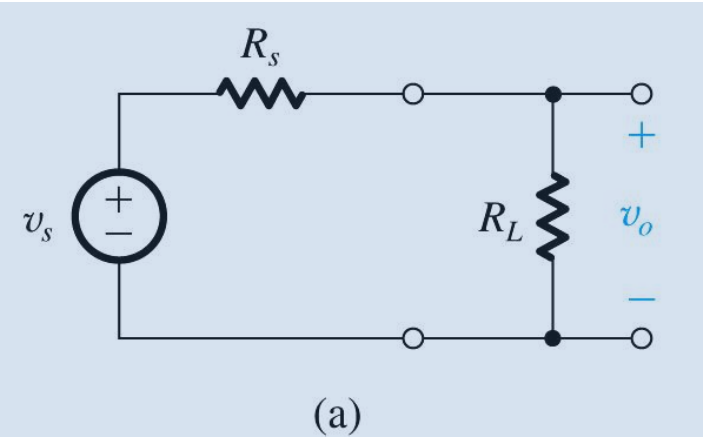


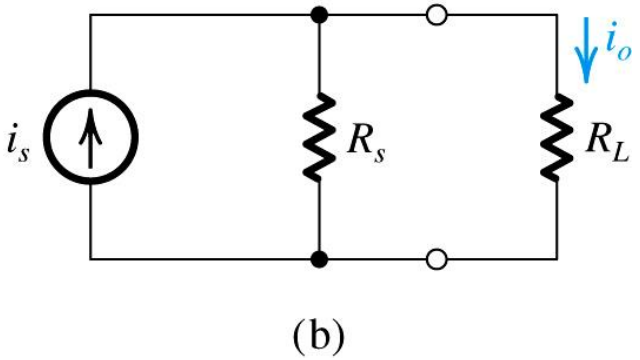
a) How the output resistance of a source (R_s) **limits it ability to deliver a signal** at full strength?

b) What is the relationship between the source and output when **maximum power** is delivered?

Concepts: ***Power, Efficiency, Maxim Power Transfer***

Basic Circuit Analysis → Example 1.1





Application: maximum power transfer for solar cells

- ***Power*** $P_L = V_0 \cdot I_L = \frac{R_L}{(R_L + R_S)^2} V_s^2$
- ***Efficiency*** $\eta = \frac{P_L}{P_{supply}} = \frac{R_L}{R_L + R_S}$
- ***Maximum Power***

$$\frac{\partial P_L}{\partial R_L} = 0 \quad @ \; R_L = R_S$$