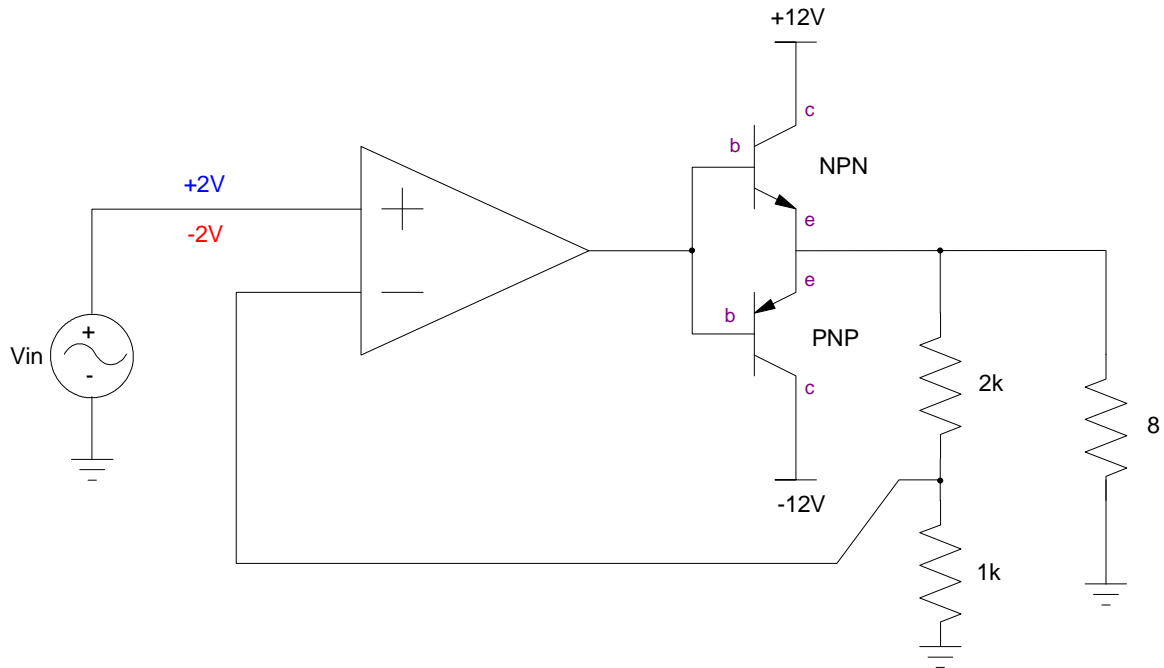# ECE 321: Handout #3
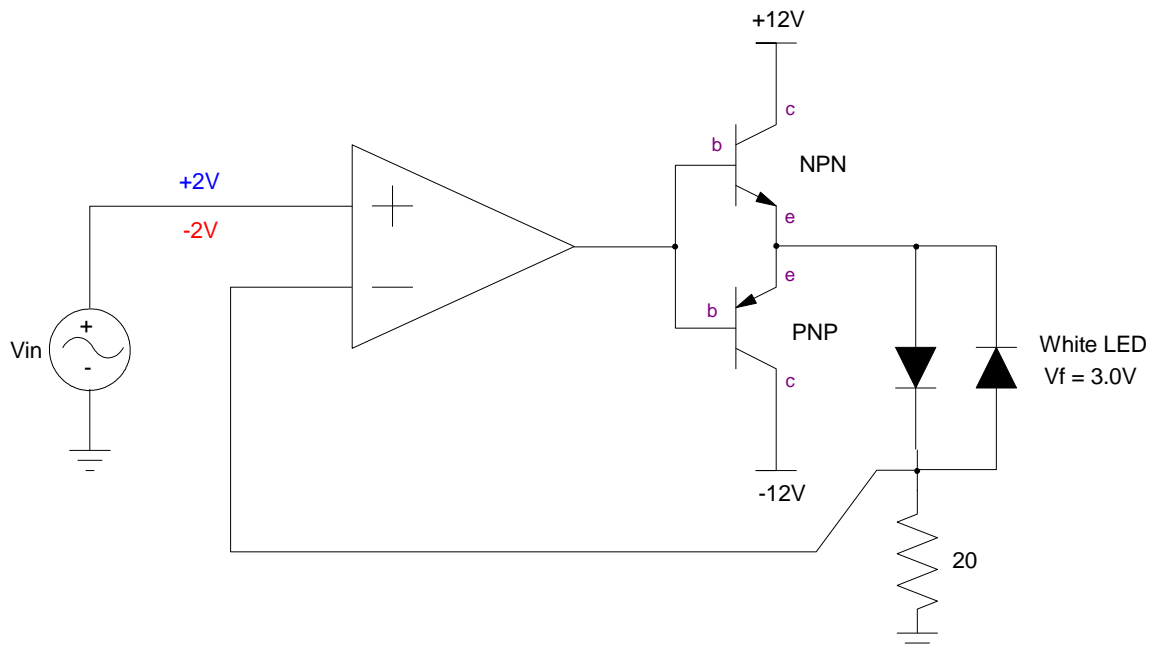
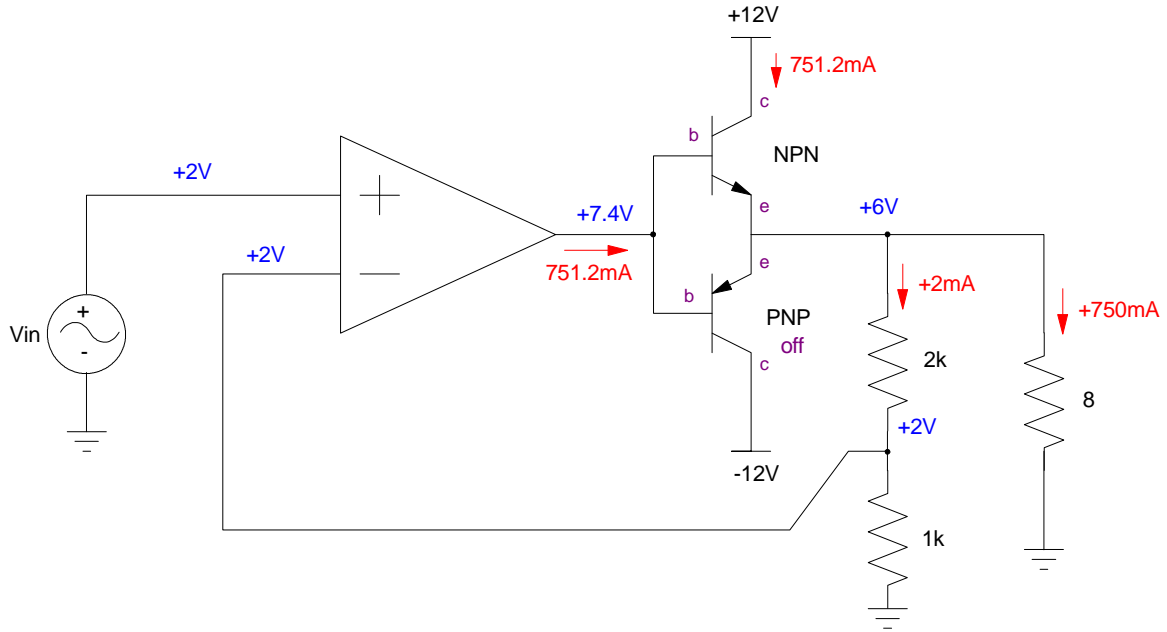Push-Pull Amplifiers

Assume TIP transistors: | Vbe | = 1.4V, β = 1000

Voltage Amplifier: Find the voltages and currents for Vin = { +2V, -2V }

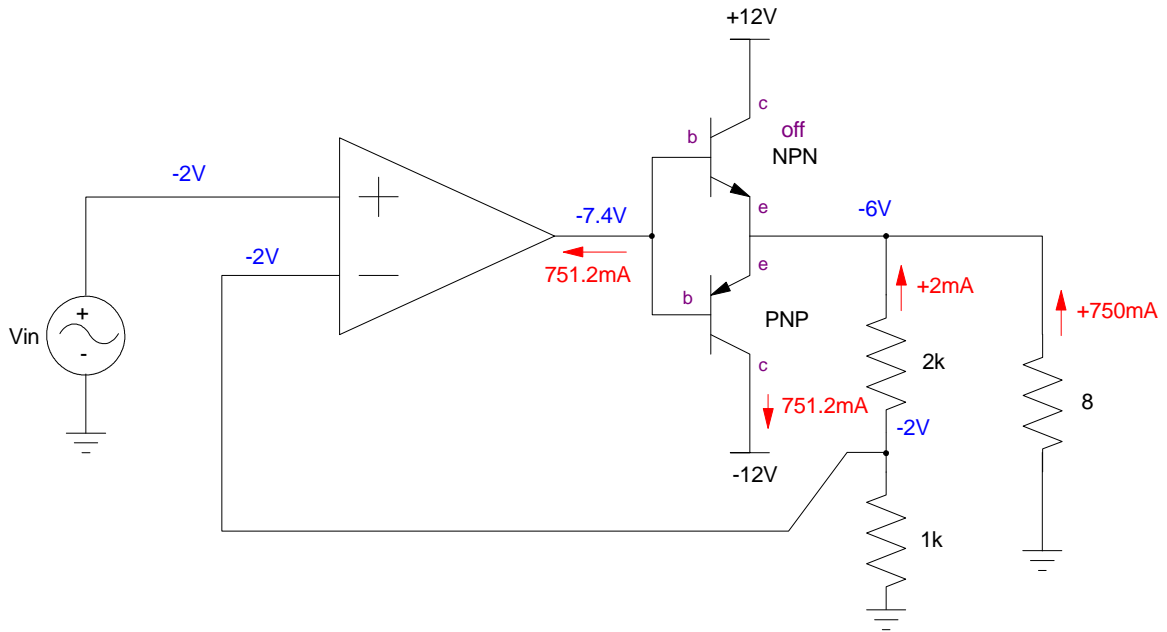**Current Amplifier:** Find the voltages and currents for Vin = { +2V, -2V }

Voltage Amplifier: Vin = +2V (push)

+12V

751.2mA

c

b

NPN

+7.4V

e

+6V

751.2mA

e

+2mA

+750mA

+2V

b

PNP
off

2k

8

c

-12V

+2V

Vin

+2V

+2V

1k

Voltage Amplfiier: Vin = -2V (pull)

+12V

c

off
NPN

b

-2V

e

-6V

-7.4V

e

+2mA

+750mA

751.2mA

b

PNP

-2V

2k

8

c

751.2mA

-2V

-12V

Vin

-2V

-2V

1k

Current Amplifier: Vin = +2V

+12V

+99.9mA

c

b

NPN

+2V

+6.4V

e

+5V

+2V

99.9uA

e

+100mA

b

off   PNP

White LED
Vf = 3.0V

Vin

c

off

+2V

-12V

20   +100mA

Current Amplifier: Vin = -2V

+12V

c

b

off   NPN

-2V

-6.4V

e

-5V

-2V

99.9uA

e

+100mA

b

PNP   off

Vin

White LED
Vf = 3.0V

c

+99.9mA

-2V

-12V

20   +100mA