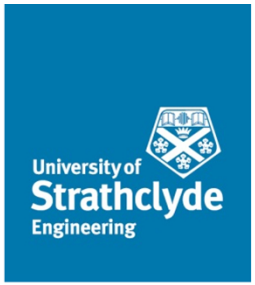


Lecture 2
Part 2 – LEDs

EE579 Advanced Microcontroller Applications

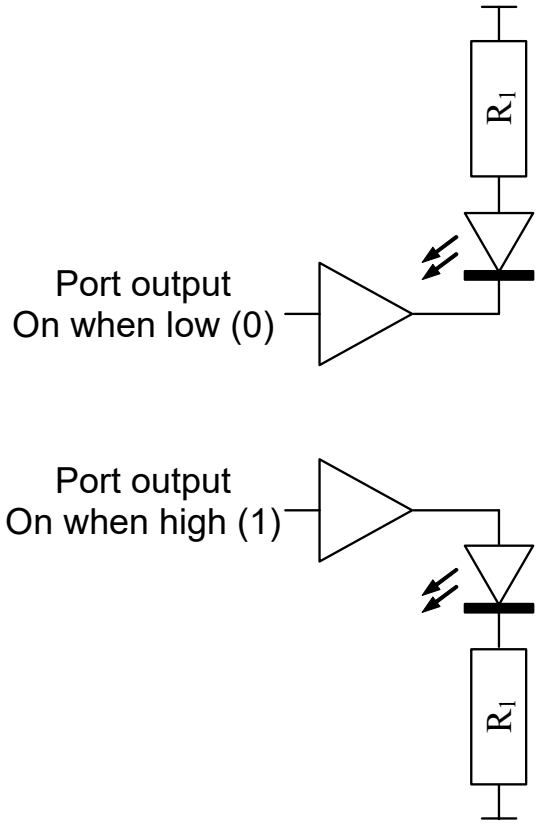
Dr James Irvine, EEE

DEPARTMENT OF ELECTRONIC & ELECTRICAL ENGINEERING

LED Connections

- Most micros can directly drive an LED
- Most common arrangement
  - Micros can often sink more current than they can source
  - Negative logic (0 for on)

- Positive logic
  - 0 for off
  - More intuitive, but less common



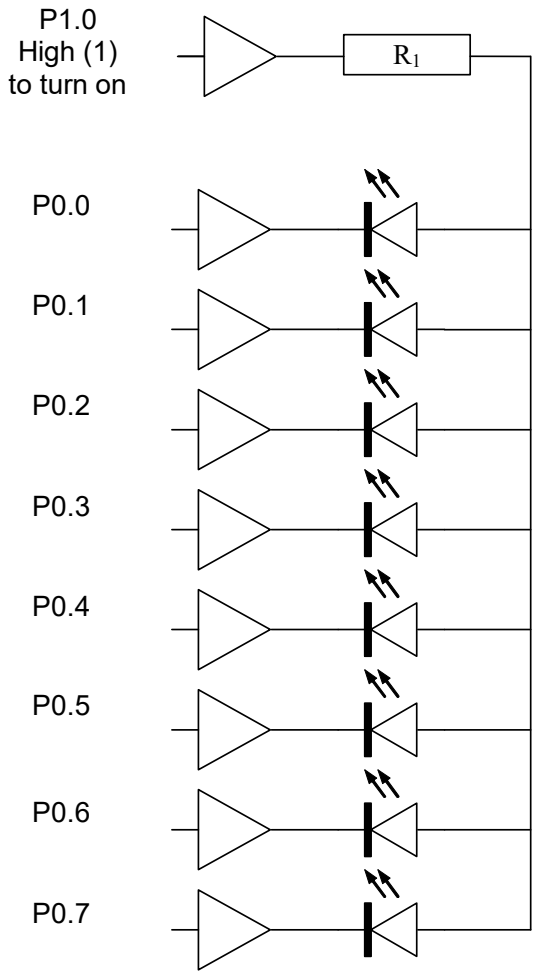
Multiplexed LED Connections

P1.0 high enables the LEDs

- 9 GPIOs for 8 LEDs ☹,

but

- 10 GPIOs for 16 LEDs ☺
- 8+n GPIOs for 8n LEDs ☺



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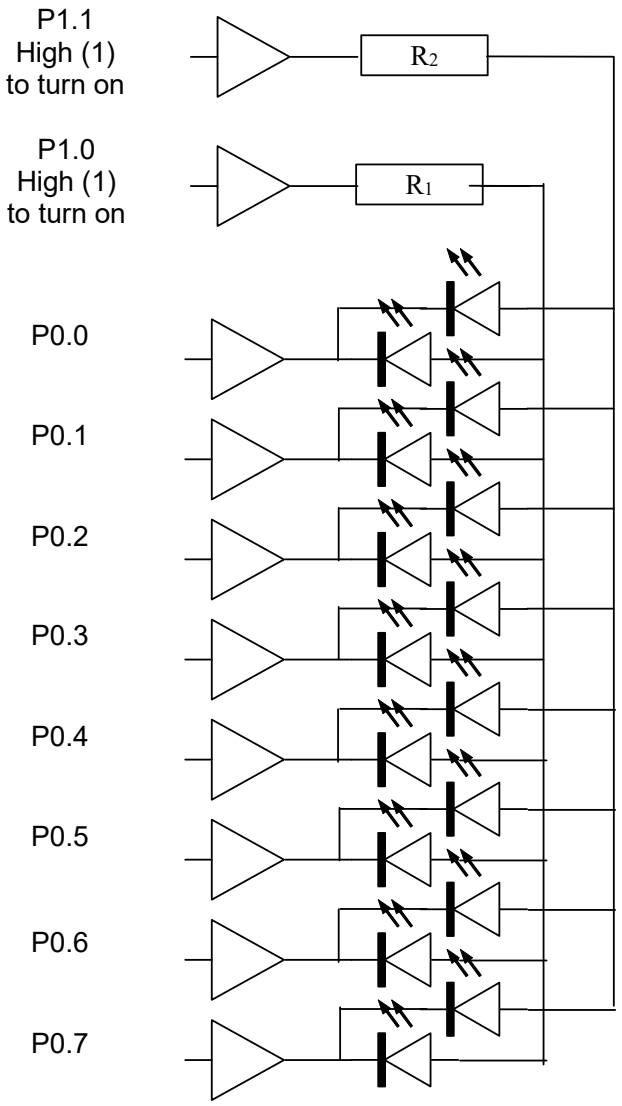

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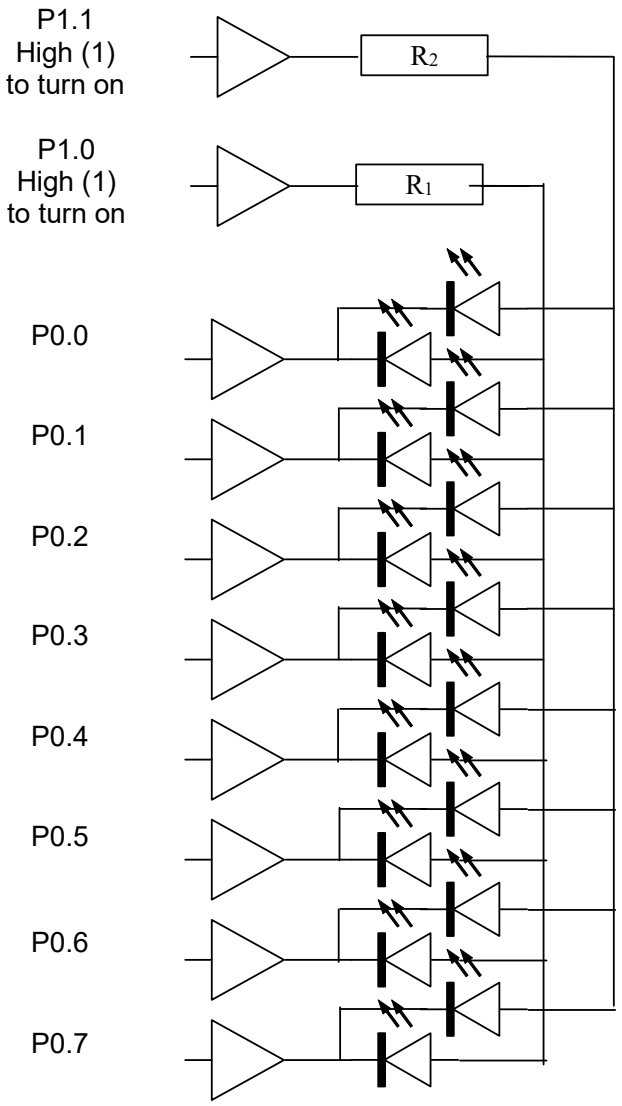
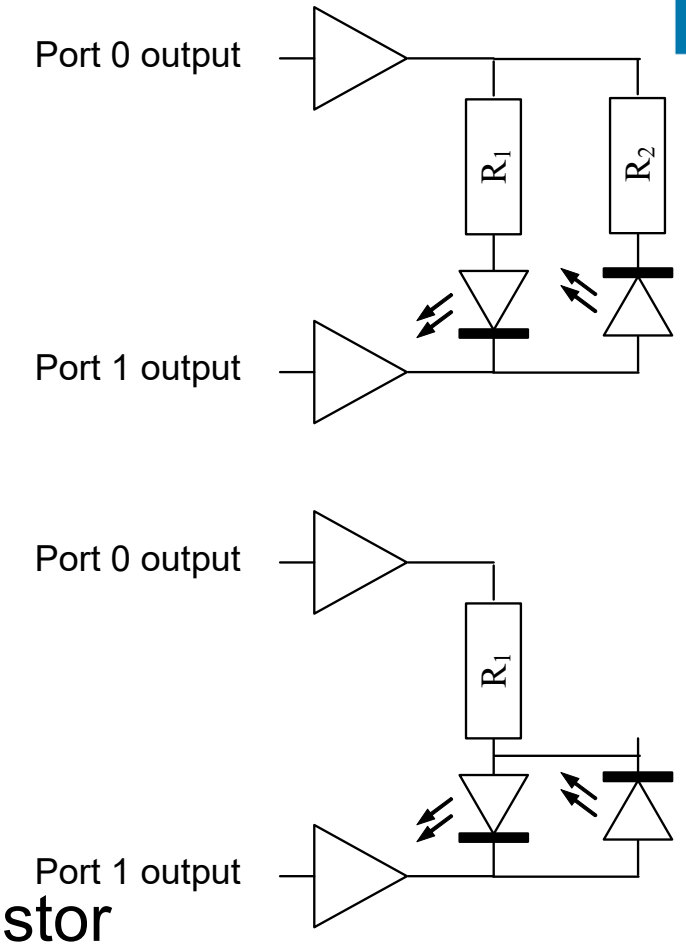


Multiplexed LED Connections

- Bidirectional LED or two LEDs
- Port 0 high, port 1 low
  - LED1 switches on (LED2 off)
- Port 1 high, port 2 low
  - LED2 switches on (LED1 off)
- Port 0 = Port 1
  - Both LEDs off

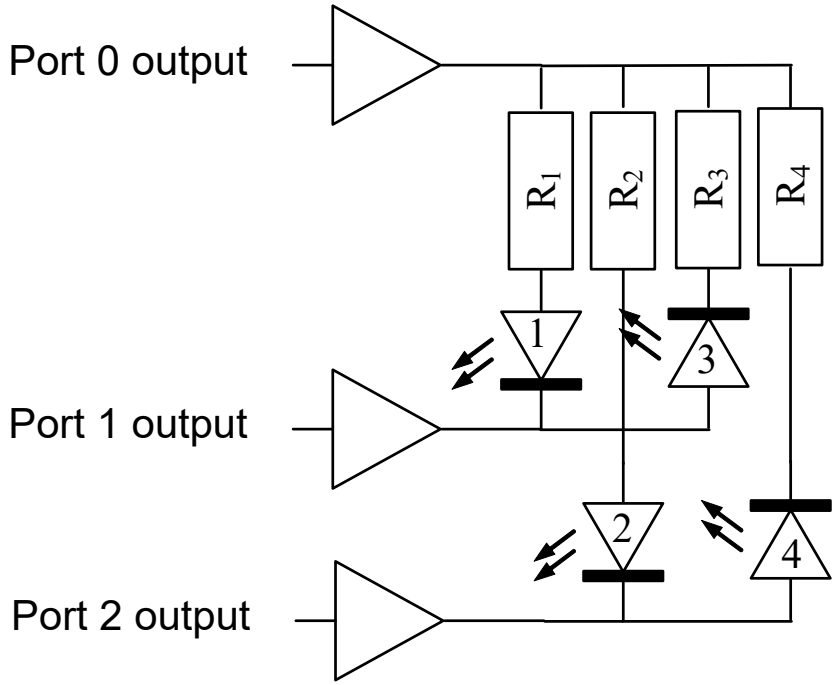
- If LEDs are the same (or a single bidirectional one), we can save a resistor



Multiplexed LED Connections

- Switch port 0 off (input)
- For LED1 on, take Port 1 low
- For LED2 on, take Port 2 low
- Switch port 0 high
- Switch port 0 off (input)
- For LED3 on, take Port 1 high
- For LED4 on, take Port 2 high
- Switch port 0 low

- Repeat



Multiplexed LED Connections from the EE312 development system