Introduction to Computer Engineering – EECS 203

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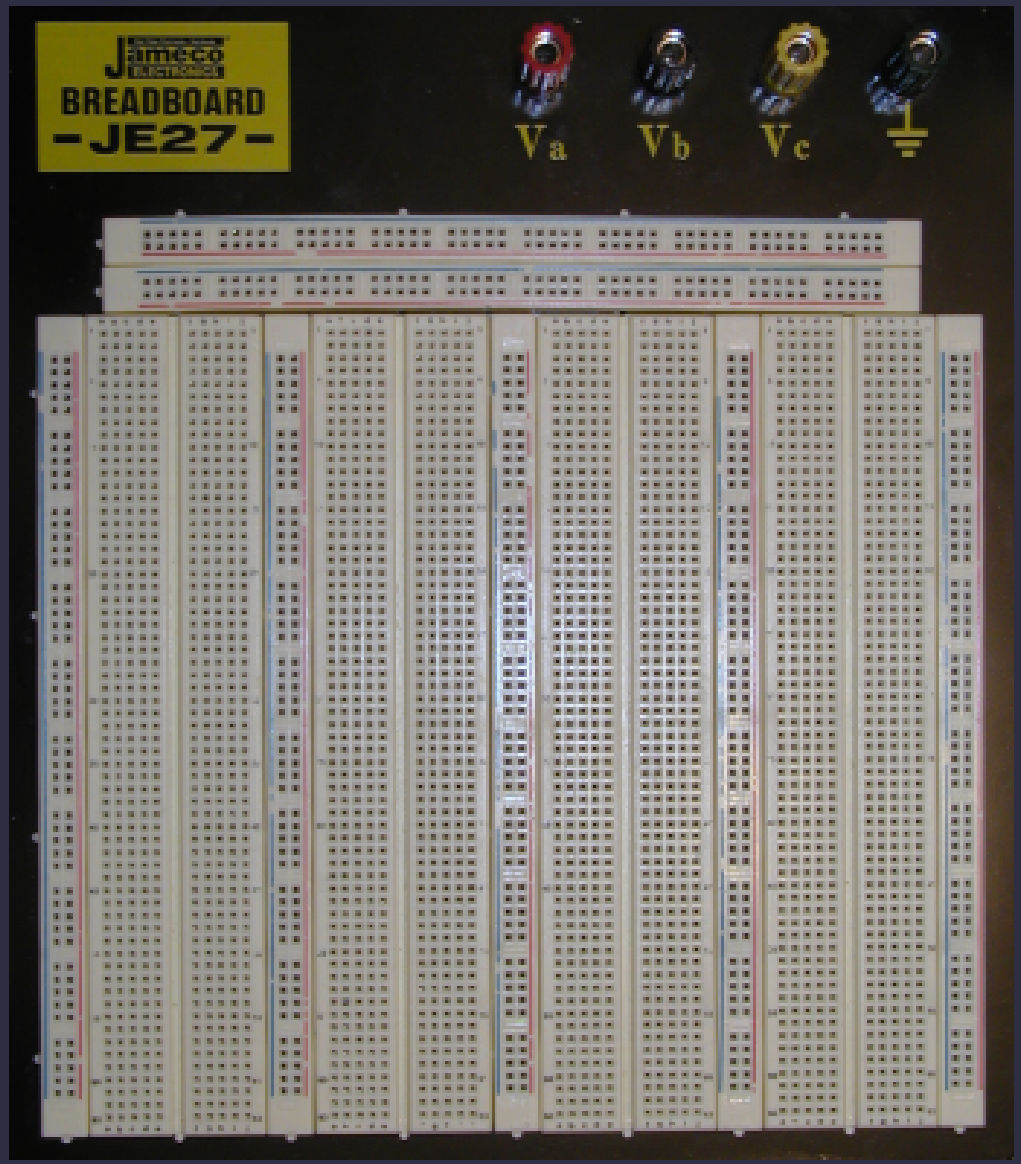
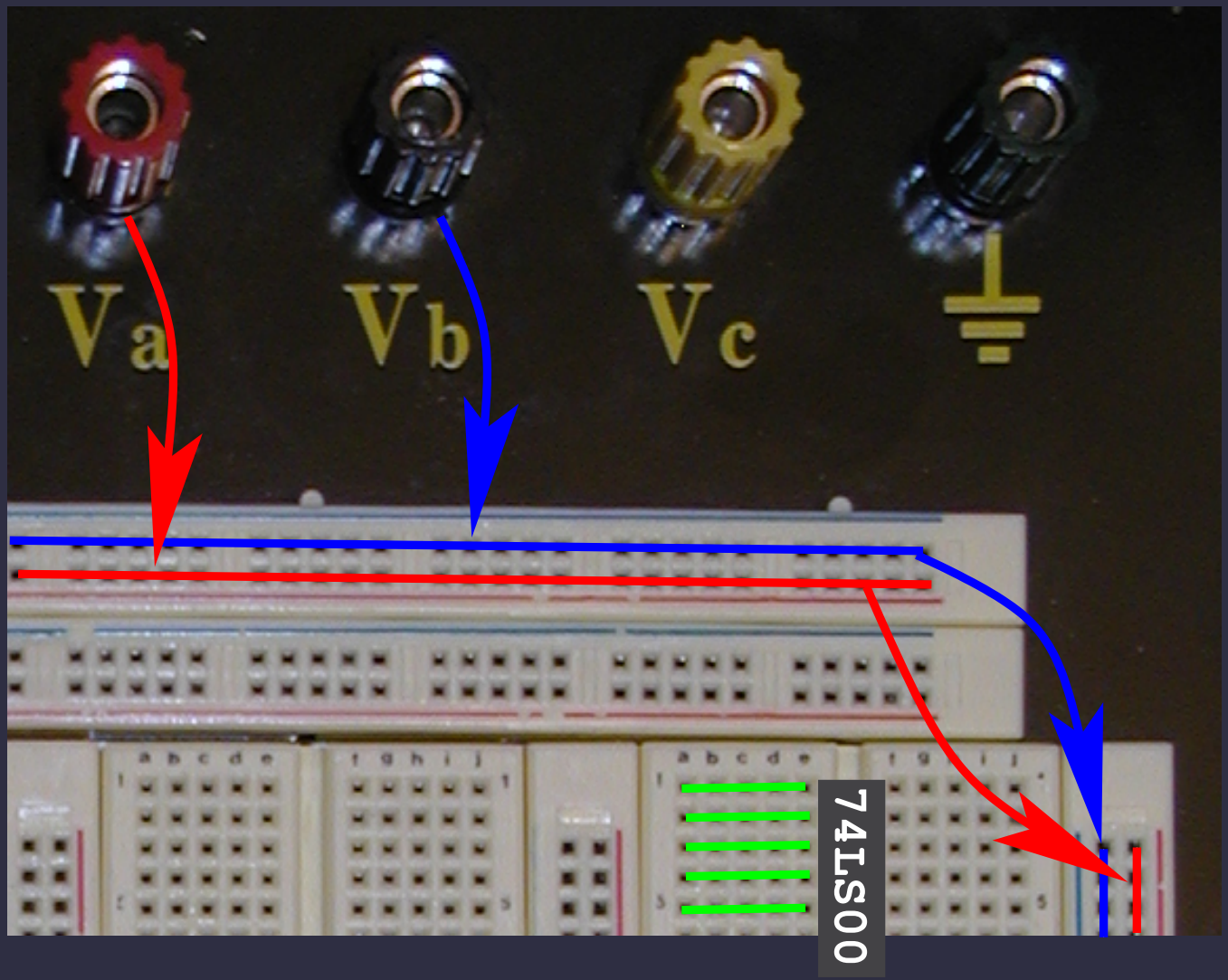
Outline

Breadboard

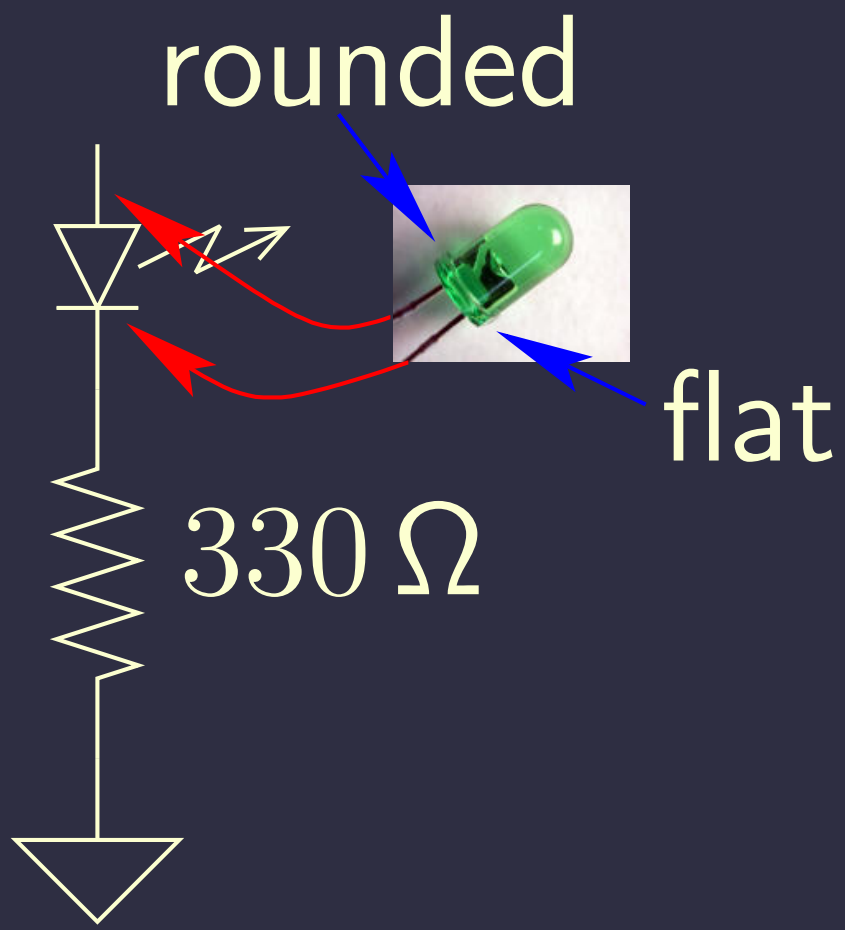


Breadboard



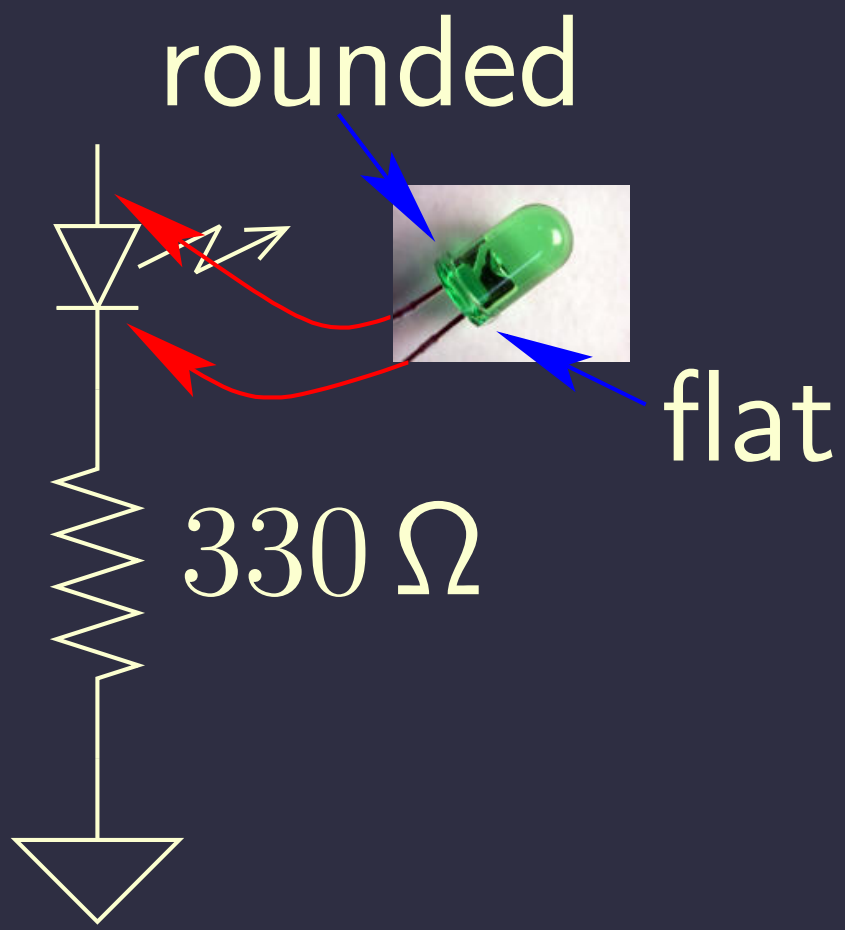
Logic probe

Light emitting diodes (LEDs)



Never drive an LED without a series current-limiting resistor!

Light emitting diodes (LEDs)



Never drive an LED without a series current-limiting resistor!

Resistors

- Color code sheet in your orange box
- Colored bands indicate numbers
- Black (0), brown (1), red (2), orange (3), yellow (4), etc.
- What is Orange, Orange, Black?
- What about Orange, Orange, Brown?

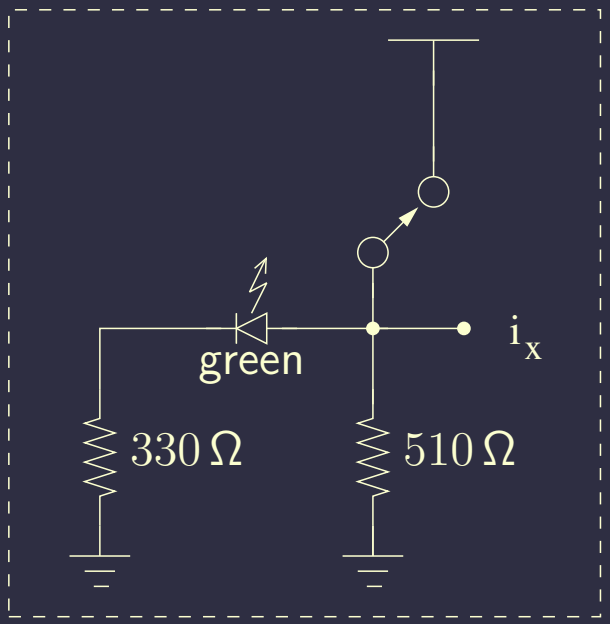
Transistor to transistor logic (TTL)

- Consumes more power than CMOS
- Generally more difficult to damage than CMOS (ESD)
- Inputs "float high"
- What does this imply?
- Why is it good for prototyping?

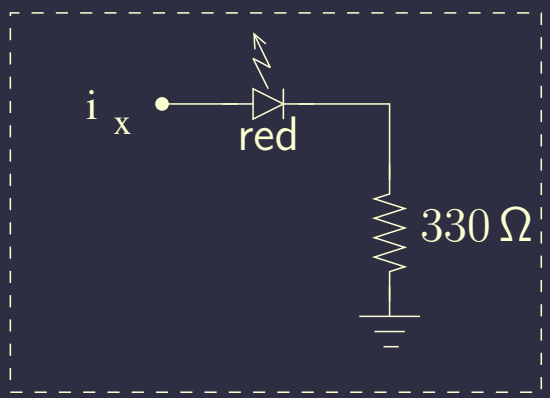
Guidelines

- Connect all inputs to some signal, best not to rely on floating
  - Good practice for CMOS, where it's essential
- Color-code wiring in complicated circuits
  - Learn how to strip wire
- Don't cross wire over chips
- Double-check V_{DD} and V_{SS} wiring
- Watch for hot chips
- Use current-limiting resistors on LEDs

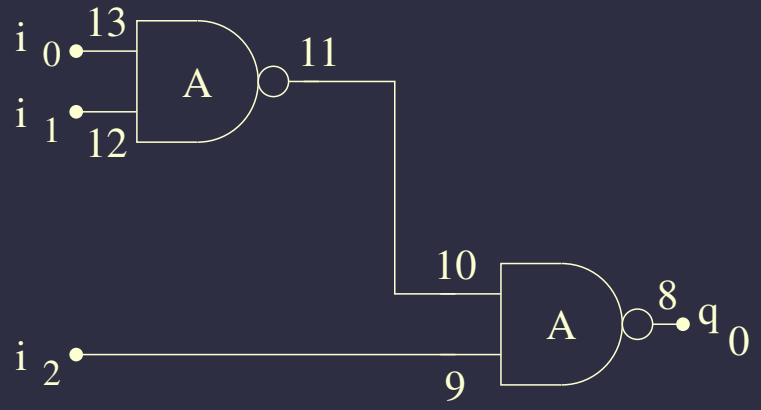
Circuit diagram example



input circuit

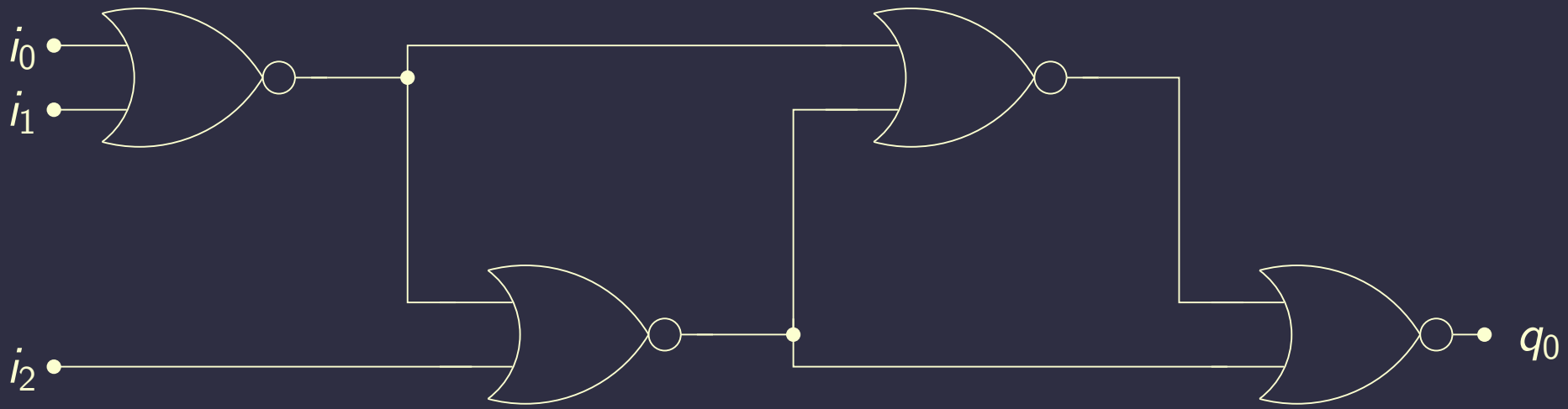


output circuit



(A) 74LS00

Incomplete circuit diagram example



Summary

- Demo to put prototyping in context
- Breadboarding lecture and demo

Prototypeing trends

- Surface mount
- FPGAs
- Virtual prototypeing

Outline

Computer geek culture references

- http://www.digikey.com
- http://www.mouser.com
- http://www.jameco.com