OBSTACLES AVOIDANCE
Naive Approach

Stop

Turn

Go Straight

Turn

Go Straight

Turn and Continue Line Following

Go Straight Continue until you see line
Potential Problems

Wall on One Side

Table Edge on One Side

Need to detect walls and edges, and change direction
Potential Problems

- Obstacle Wider than Expected
  - Less likely to be a problem (...they usually have only one type of obstacle)
  - Can program robot to detect if it hits the obstacle and go further around

- Obstacle Longer than Expected
Which Sensor To Use?

**Touch**
- **Good**
  - Detect touch across the entire front of the robot (use a bumper)
- **Bad**
  - May push obstacle away
  - Takes up more space and may obstruct other mechanism

**Ultrasonic**
- **Good**
  - Non-contact
  - Easier to fit into robot
  - Provide range
- **Bad**
  - Detects in a cone
  - Cannot cover the entire width of robot

Bumper with Touch Sensor
Which Sensor To Use? (Advanced)

**Brick Button**

**Good**
- Same benefits as touch sensor
- Don’t need to use a port

**Bad**
- Same drawbacks as touch sensor
- Very difficult to build mechanism
- Less sensitive than touch sensor
Which Sensor To Use? (Advanced)

**Color Sensor**

**Good**
- Can detect color

**Bad**
- Very short range
- Difficult to detect black
- May be affected by surrounding lights
Which Sensor To Use? (Advanced)

No Sensors!
(Detect motor stall...)

How?!
- Detect stall (...motor unable to turn)

Good
- No sensor or parts needed

Bad
- Cannot detect light obstacles (...robot will just push them away)
- Need to use unregulated motors blocks
- May have false positives with ramps
Tips

- Start with the naive approach, using either a touch or ultrasonic sensor!
- Write and test the obstacle avoidance program by itself; don’t integrate it into your main program at first
- When successful, make it into a My Block
- If you have time, improve it to detect walls and table edges