

The Tutebot 2

Creating a Simple Autonomous
Robot Brain





Topics

- Definitions
- The behaviour game
- The “brain” schematic
- The Virtues of Crossed Connections
- How it will work
- Hints on building it

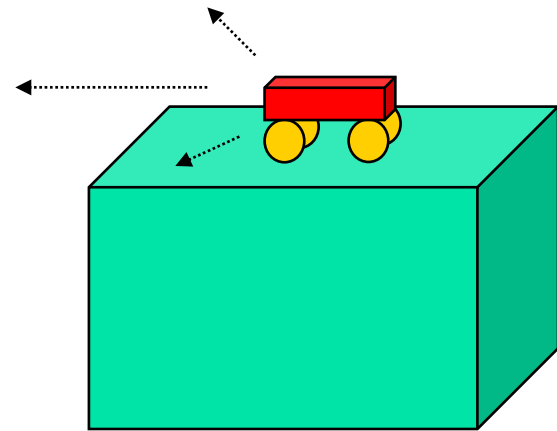


Definitions

- **Behaviour:** Anything that an entity does involving action and response to stimulation
- **Actuator:** A mechanical device for moving or controlling something
- **Brain:** The part of a system that does the responding to stimulation (more later)
- **fail-safe:** Automatically dealing with anticipated sources of failure

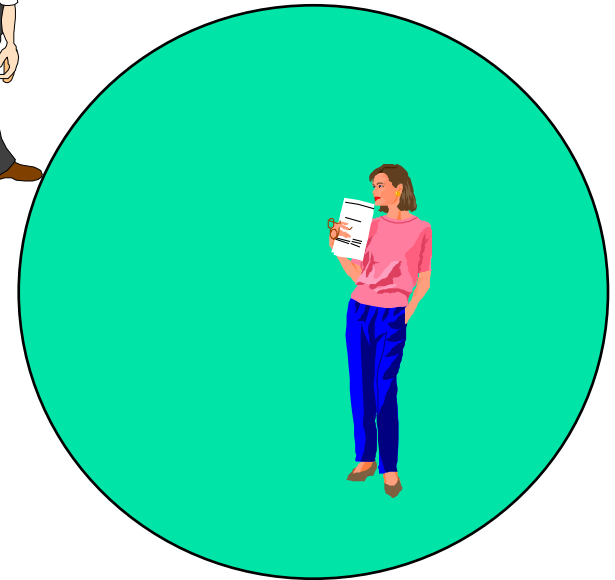
The Behaviour Game

- Our environment is a table top
- We will assume there are no obstacles
- We must remain in motion
- We cannot fall off the table
- We need some volunteers!



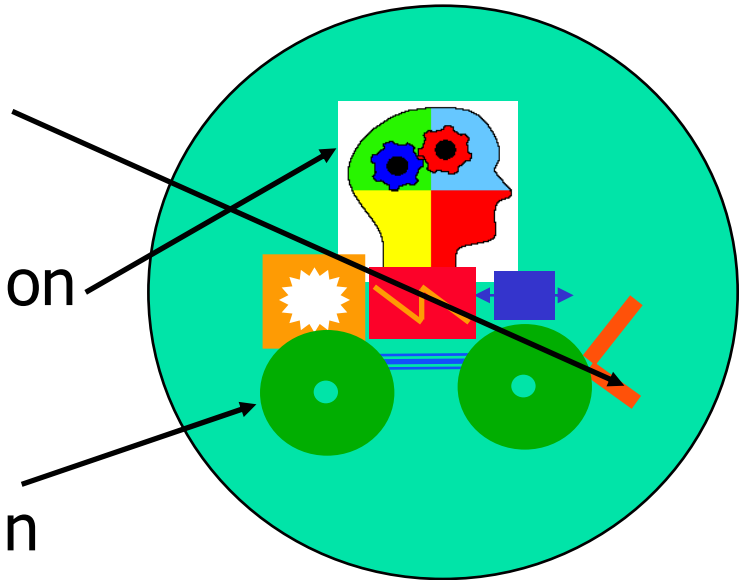
How about these questions

- Are you about to cross an edge?
 - Yes = "go left" or "go right"
- Is there an edge on your right (or left)
 - Yes = "go left" (or "go right")
 - Basically you need to detect an edge and do something about it.



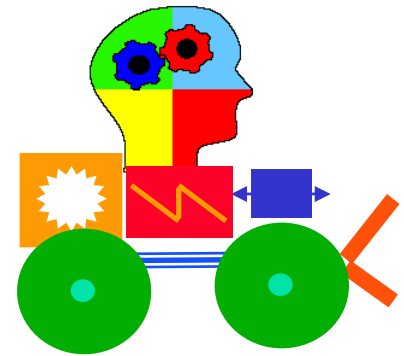
What you need is a “brain”

- AMR must detect the edge of the environment
 - The “sensor” must detect the condition
 - The “brain” must act on sensor activation
 - The actuators are controlled by the brain



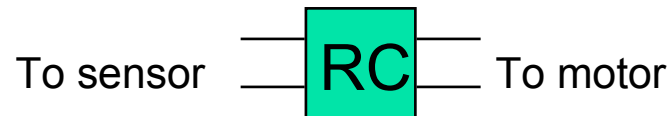
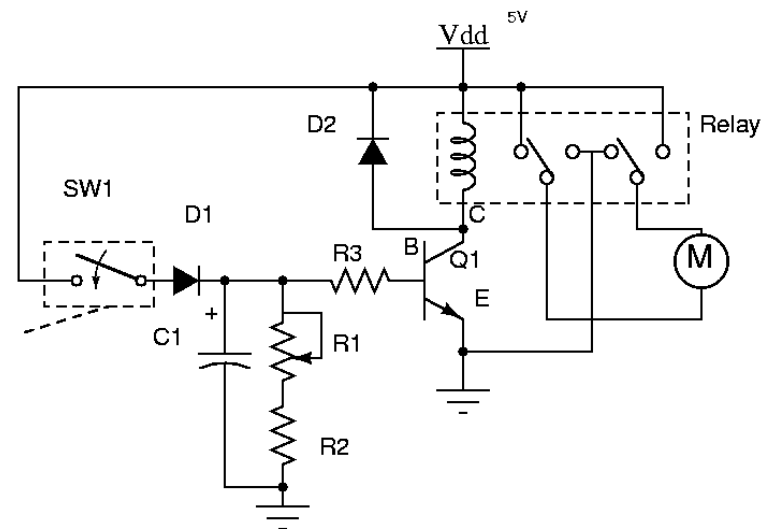
There are many other concerns

- How close or far from the edge is the robot when it detects it?
 - Is backing up an option?
 - What about turning radius?
- Can I detect an edge fast enough?
 - How fast do I want the robot to move?
- Does the robot need a “fail-safe” option?



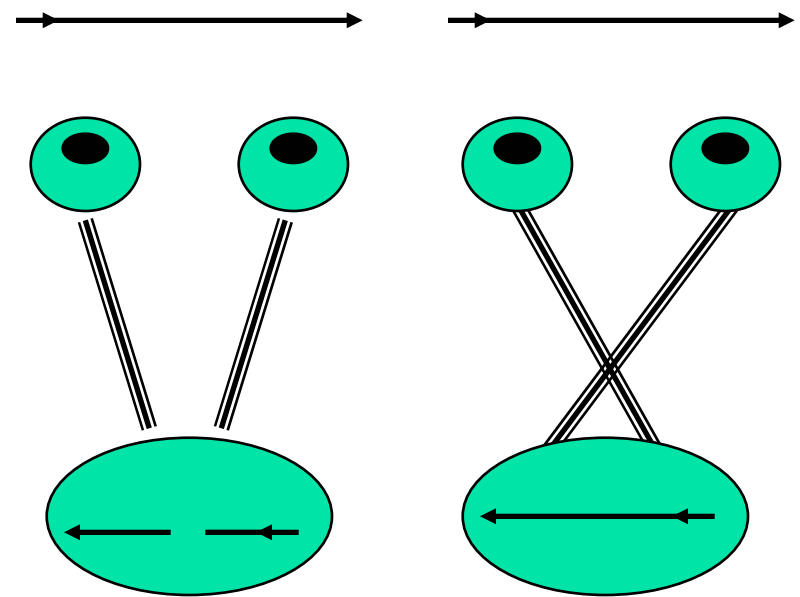
The Schematic

- Simple RC circuit as discussed in chapter 2 of course text.
 - On activation the circuit reverses the direction of the motor
- We will represent this circuit by...



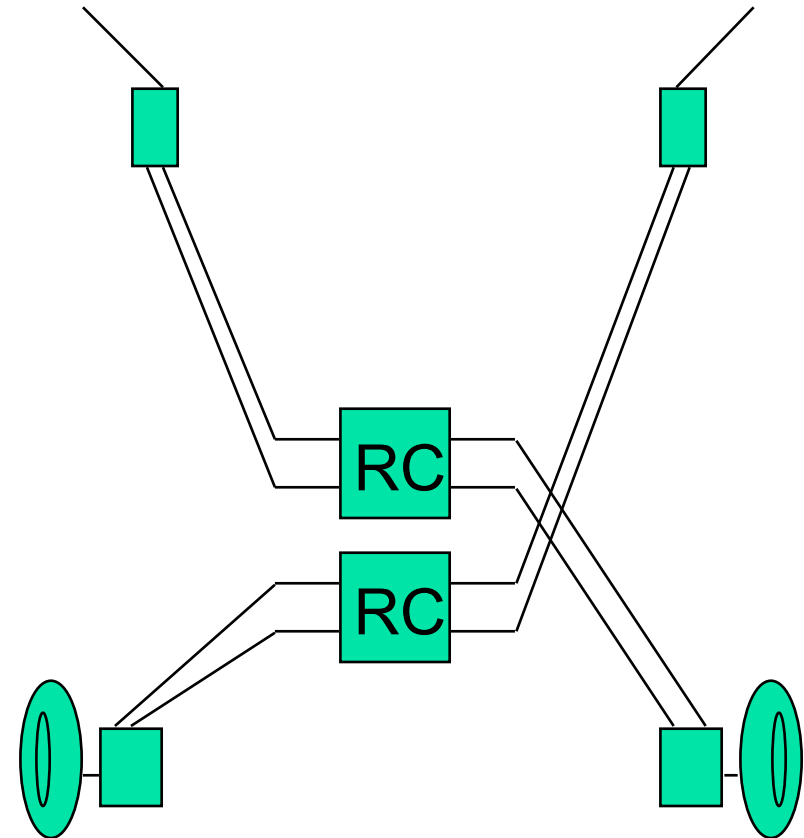
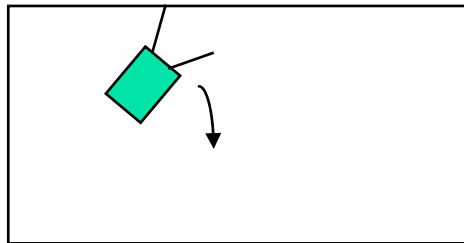
First...The Virtues of Crossed Connections

- Many sensors on one side of your body are attached to the other side of your brain
 - Your optic nerves for example



How it could work

- Cross-connect the sensor to one of the half-brains and then to the actuator
- As sensor contacts other side motor reverses momentarily





Hints on Building it

- If you haven't already completed a vehicle you must
- Build and test one half-brain at a time
- Buy extra electronic components as you tend to "blow" transistors
- You don't have to build this circuit but you do have to demonstrate the behaviour in your AMR