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Exercise: Multiple computers and ROSSerial

Objective: To distribute ROS across multiple computers and an embedded platform

Part 1: communicate between two machines

ROS is designed with distributed computing in mind. A well-written node makes no assumptions about where in the network it runs, allowing computation to be relocated at run-time to match the available resources (there are exceptions; for example, a driver node that communicate with a piece of hardware must run on the machine to which the hardware is physically connected).

When deploying robots across multiple computer you should keep the following in mind:

- You only need one master – the Turtlebot. All nodes must be configured to use the same master, via `ROS_MASTER_URI`.

1. Connect at least two computers to the Turtlebot
2. Assuming the IP's are 10.42.0.10 and 10.42.0.20 for the two computers, respectively, try pinging each other.

   From computer 1

   ```
   $ ping 10.42.0.20
   ```

   From computer 2

   ```
   $ ping 10.42.0.10
   ```
3. Set-up a topic publisher on one computer and set-up a topic subscriber on the other computer and try exchanging data.

Part 2: ROSSerial for Arduino

Implement a rosserial publisher node and a rosserial subscriber node. Follow the tutorial part 1-3 at http://wiki.ros.org/rosserial_arduino/Tutorials

1. Connect to the Arduino to the Raspberry Pi on the Turtlebot and make the Arduino publish data. Consider connecting a sensor (e.g. a button) to the Arduino and use that to publish "real" data.
2. Subscribe to that data from Matlab

rosserial and rosserial-arduino are already installed on the Turtlebots