A Quick Tour of ROS

What is ROS?

Robot Operating System

For the programming assignments in this class, we will use a software platform called "Robot Operating System," or ROS.

The official description is:

> *The Robot Operating System (ROS) is a set of software libraries and tools for building robot applications.*

Why ROS exists: Distributed computation

Software for robots is often **distributed**.

- Sending commands from a human's desktop computer to a robot.
- Multiple robots cooperating with each other.
- Multiple computers performing separate but related tasks in a single robot.
- Software decomposed into many smaller, stand-alone parts.

ROS makes this easier by providing **message passing** mechanisms for moving data between processes.

Why ROS exists: Code reuse

Software development is painful if standard algorithms must be re-implemented for each new robot or operating environment.

ROS makes this easier by providing **usable implementations** of many robotics algorithms, including both reliable, commonly-used techniques, and leading-edge research results.

Equally important, because these algorithms interact with each other using the message passing system described above, it is easy to **combine many algorithms** in a single application.

Why ROS exists: Simulation

Robot programming is often much faster when the part of the initial testing can be done using a **simulator**, rather than a real robot.

ROS makes this easier by providing a consistent way for simulators and robots to expose the **same APIs**.

> The code never "knows" whether it is talking to a real robot or to a simulator.