

Setting Up Your Robot

This chapter begins with some background on my thoughts as to what a robot is, and what robots are made of – a fairly standard list of parts and components. This chapter is designed to allow you to duplicate the exercises and use the source code that is found throughout the book. I thought you would appreciate information on how I set up my environments for development, what tools I use to create my code, and how I install the **Robotic Operating System (ROS)**. We will also cover the assembly of TinMan, our robot hardware that I used for the development and testing of the code in this book. There are many types and configurations of robots that can work with our concepts and source code, with some minor modifications.

Technical requirements

The hardware and software requirements for this chapter are as follows:

- Python 2.7 or 3.5, with NumPy, SciPy, Matplotlib, and scikit-learn installed. • ROS Kinetic Kame.
- A computer running Linux for development or a virtual machine running Linux under Windows. Ubuntu 16.04 is used for the examples and illustrations.
- A Raspberry Pi 3 or similar single board computer (BeagleBone Black, Odroid, or similar). We are not using the GPIO or special interfaces on the Pi 3, so there is not a lot of RasPi-specific code.
- An Arduino Mega 2560 microcontroller.
- A Pololu Micro Maestro Servo Controller x6.
- An Arduino development environment. This can be installed either on the control station (a laptop running Windows or a Linux laptop), or on the Raspberry Pi.
- The TinMan robot hardware was purchased from AliExpress and was called *Track Cars Creeper Truck Crawler Kits with 6DOF Robot Arm and 6PCS MG1501 Servos Robo-Soul TK-6A*. It came with no instructions and a lot of extra hardware.

