

Assignment 2

Due: Thursday, January 6, 2005, 11:45 pm

1 Workshops available

Don't forget to sign up on the sign up sheets in the 6th floor lab—workshops have limited space. The workshops run from 1 to 3 pm, and 7 to 9 pm. Each workshop lasts for an hour and begins on the hour.

- Workshop 3 – Electronics Assembly
 - When: January 5-6, 2005
 - Items to Bring: Handyboard and RF Receiver Board Kit
- Workshop 4 – Code & Sensors I: Basic Control and Robot Skills
 - When: January 5-6, 2005
 - Items to Bring: Handyboard and Sensors (pre-wired)

2 Building Your Electronics

1. Solder the RF receiver board.
 - Instructions for soldering the RF receiver board can be found online in the “Handouts” section.
 - Test the RF receiver Board. The code to test the handyboard with the RF board can be found online in the “Test Code” section of the server.
 - Checkoff: Show us the completed RF receiver board and demonstrate it working with the test code.
2. Solder the expansion board.
 - Instructions for soldering the expansion board have been included in your kit, but in case you've lost them, they can be found online in the “Handouts” section.
 - Every year there is one team that forgets to solder the IC sockets onto the board. Don't be that team. Do *not* solder the IC chips directly onto the PCB. Although nothing harmful happens if you do, if one of your chips blow out (such as the motor driver chips), desoldering the IC becomes an arduous task.
 - Checkoff: Show us the completed expansion board.

3 Your Task: Robot Rumba

1. Read every word of this assignment. There are a lot of details you should know, and every year we find contestants making the same mistakes.
2. For this assignment you will construct a complete robot.
 - The specifications are enumerated below:

- Build a two-wheeled drive vehicle (two wheels with motors, as many supporting wheels as needed)
 - Have a gear train with a gear ratio between 45:1 and 125:1
 - Motors directly drive gear trains (do not use the differential or your servos)
 - Vehicle moves backwards and forwards
 - Turns counter-clockwise (and, optionally, clockwise), in-place
 - Has a mechanical bump sensor somewhere
 - Reacts when the mechanical sensor is touched
- Checkoff: Show us the completed robot.
3. Hard-code a program into your robot that will show off all the requirements mentioned above.
- Be creative and show us a dance. Brownie points will be given to those that have accompanying music.
 - Don't spend too much time perfecting the motions of the robot; we basically want to see something that works.
 - You will be using this robot for Assignment 3.
 - Checkoff: Give us a demo of your robot in action.

4 Checkoff

You may be checked off by any organizer on duty. Demonstrate your robot's functionality. And don't break it all apart quite yet: you will need the robot for Assignment 3. When you get checked off, we will give you Assignment 3.

Try to stay on schedule with this assignment. We realize we are asking a lot of you within the first week—if you absolutely need more time, do not hesitate to ask your Organizer and TA. We will be flexible. But realize that every extra day you spend working on these assignments, the less possible time you could have working on your real robot. We figure, however, that after having made a complete robot by the end of this week, you will be ready to tackle the actual competition, and create something truly beautiful and elegant.