Lab 7: Self-balancing Robot (1)

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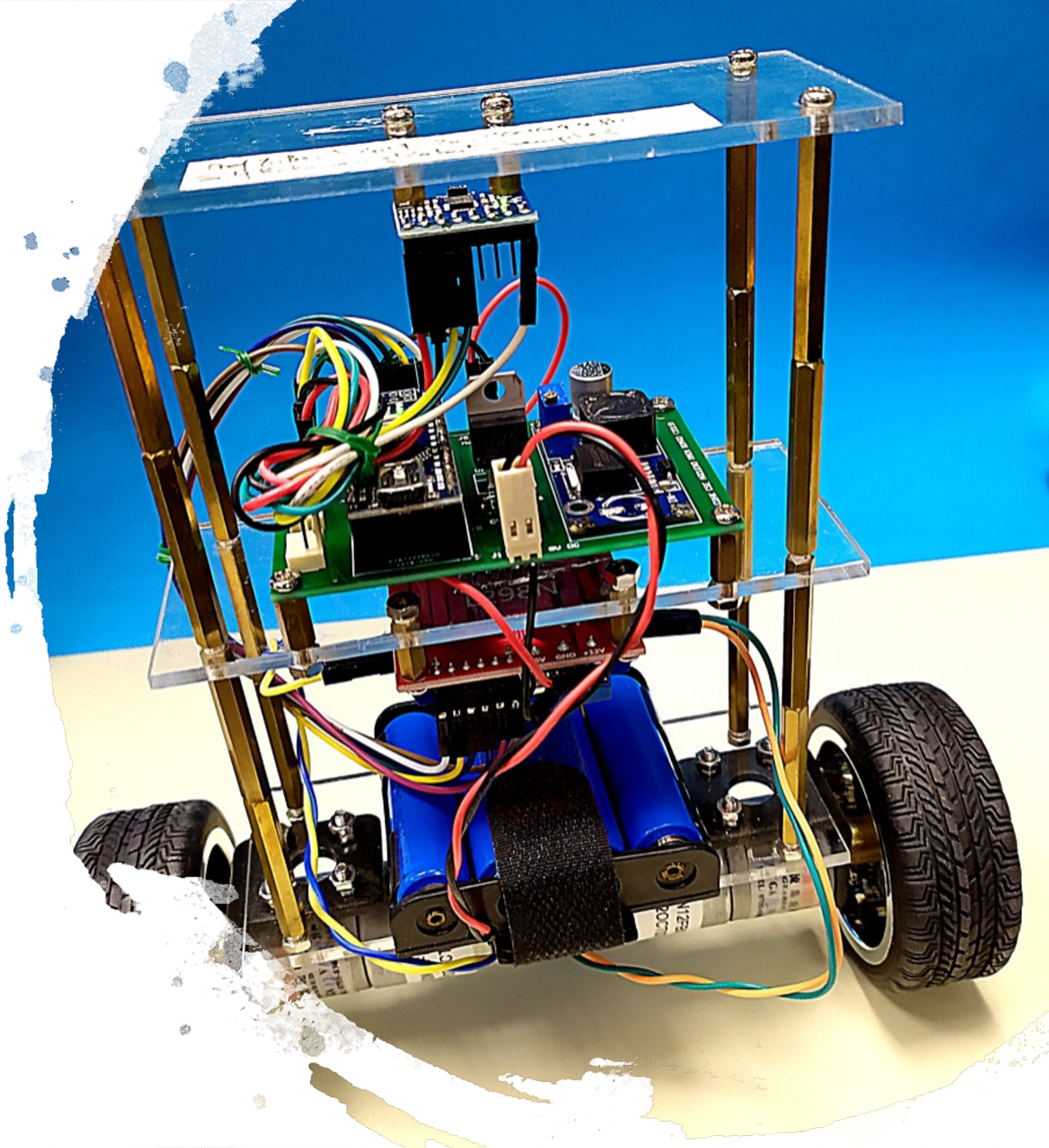
Introduction

- Develop a self-balancing robot
- Your task in this lab (mainly hardware)
  - Assembly the robot
  - Test the robot working correctly



Lab Materials

- Three acrylic boards
- Two motors with mountings and adapters
- Two wheels
- An IMU GY-521 module
- A L298N motor driver module
- A battery pack

Policy of Lab Materials

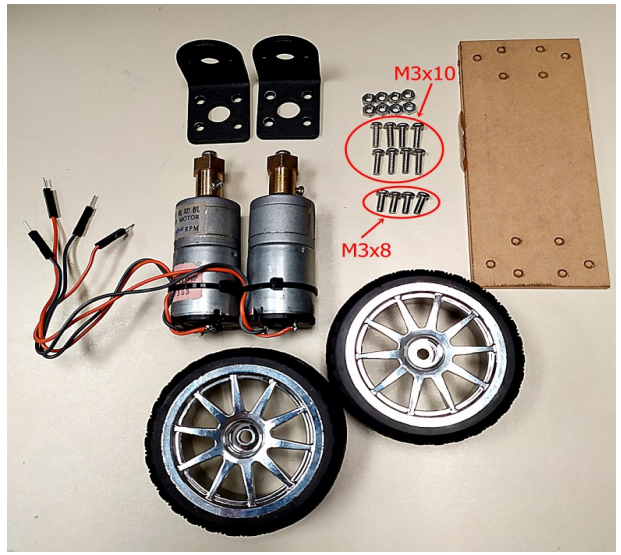
- No service of package delivery
- Hong Kong local students
  - Go to lab to do the experiment
  - Get the lab materials provided by us
- Mainland students & Oversea students
  - Purchase the materials by yourself
  - Purchase links are available on website

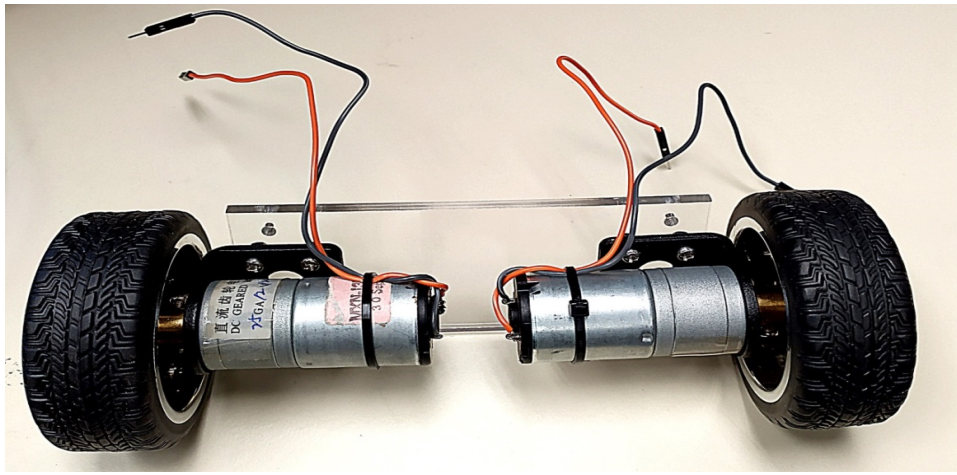
Objectives

- To learn how to build an application product using embedded system
- To familiar with the practical work in engineering

Procedure 1

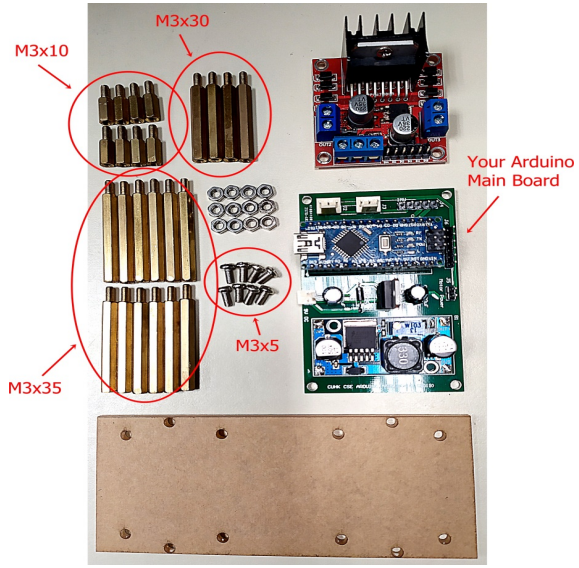
- **Assembly the robot wheels**
  - Collect following components
  - On the acrylic board assembly the motors

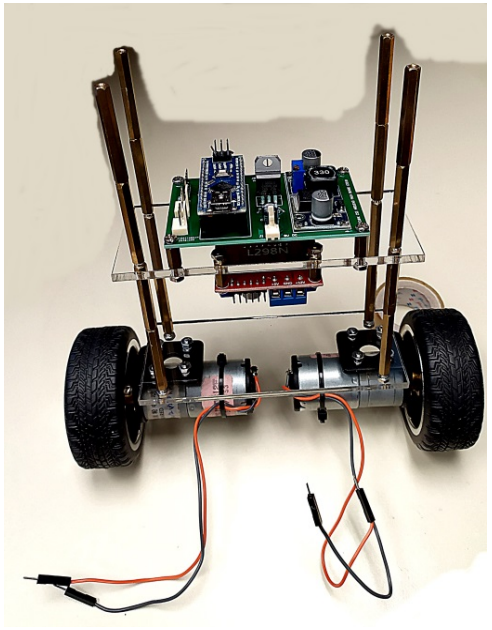




Procedure 2

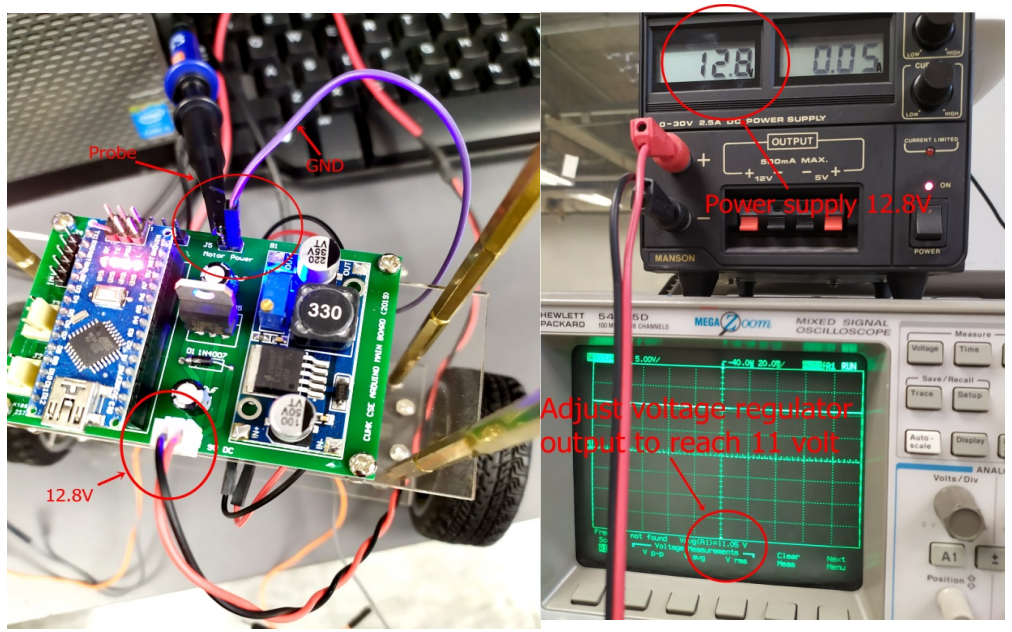
- **Assembly the L298N motor driver module and Arduino main board**
  - Collect following components shown in left figure
  - Assembly the L298N motor driver module and Arduino main board





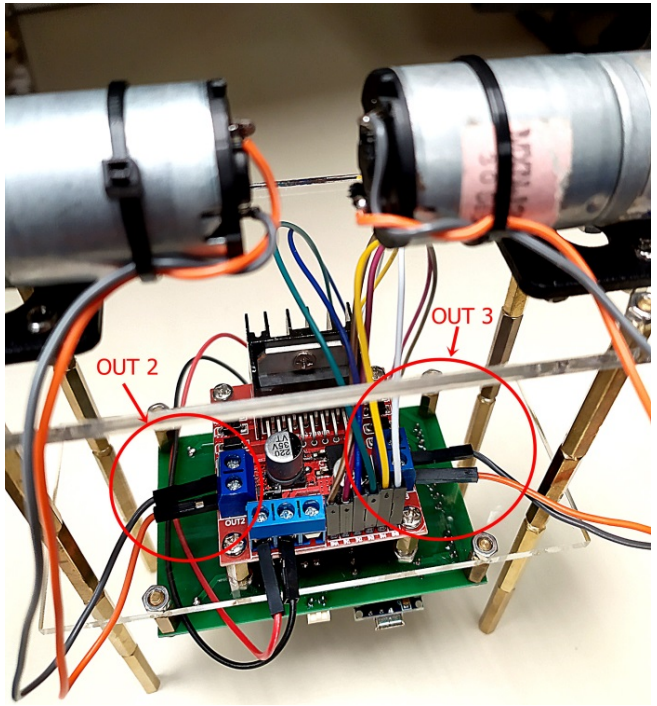
Procedure 3

- **Adjust the output voltage of regulator module**
  - Adjust the variable resistor on the regulator module such that output of voltage regulator to reach 11 volt



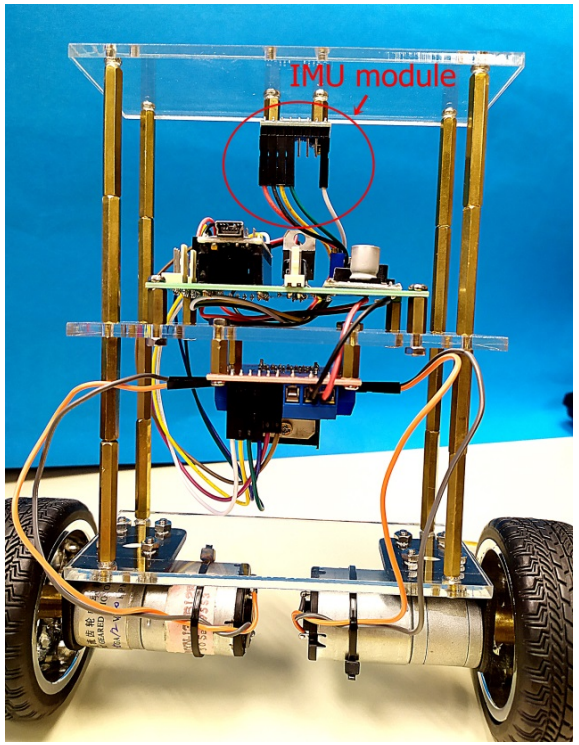
Procedure 4

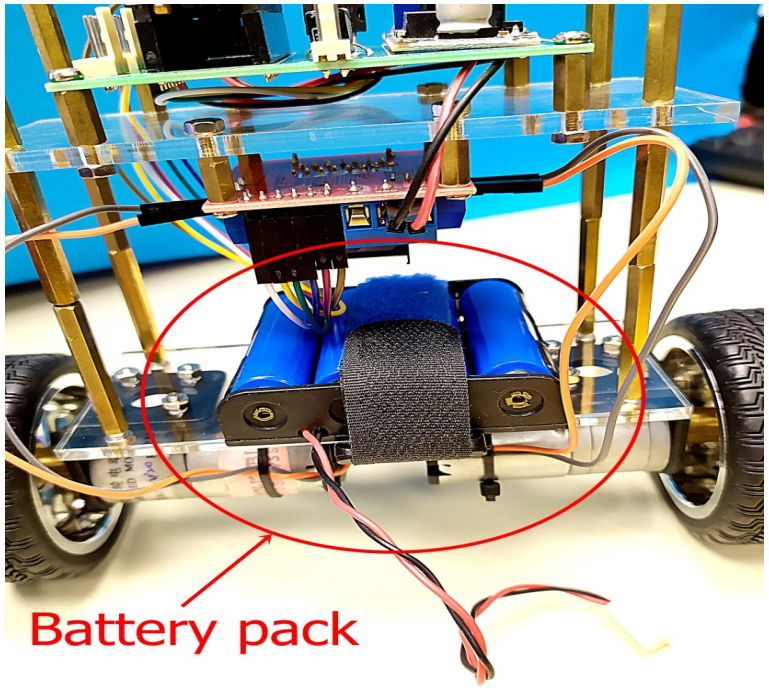
- **Connect the L298N motor driver to Arduino main board and connect motors to motor driver**



Procedure 5 & 6

- **Assembly and connect the IMU module**
- **Attach the battery pack**





Testing the robot

- Use provided Lab7.ino program to test the robot
- The robot should move in the same direction of its skew direction
- If the direction of the wheel is not correct you can just swap the connections of motor wires
- If you have difficulty in trouble shooting your robot please don’t hesitate to ask our technician for help

Requirement

- ***Submission***
  - Record a demo video of testing the robot
  - You are required to submit the demo video to blackboard before deadline.