Building A Sumo Robot: A project Guide and description

The aim of this resource is to assist you to build a mini-Sumo robot. While it will not include all the information necessary it is a guide and is intended to help a student understand the process and steps involved .

Many further resources exist on the internet and you should seek these out. A good place to start is http://robotroom.com/SumoRules.html

Project Scope:
The robot shall conform to these standards and shall
- be less than 10 cm wide x 10 cm long in its starting position
- be less than 500g in weight
- use the supplied Tamiya gearbox motor.
- be designed so as not to cause permanent damage to humans or bots
- allow you access to change batteries or undertake repairs
- support sufficient batteries (1 x 9V and 4 'AA') and allow for the addition of circuit boards etc. plan beyond step 1.
- support IR detectors on the front and also edge detectors.
- support the addition of an IR receiver chip.
- utilize wheels that are either student made or purchased.
- be designed so as to conform to international mini-sumo rules.

Stages of construction:
> **Stage 1:** be able to drive forward, reverse and turn left and right using a tether.
> **Stage 2:** make basic predetermined movements under PIC control.
> **Stage 3:** be able to drive with IR control. (optional stage)
> **Stage 4:** demonstrate the above with functioning Edge detectors.
> **Stage 5:** find and locate and win an encounter with a 10 cm cube.
> **Stage 6:** be able to take part in a fully functioning sumo competition and WIN!

The Tamiya twin motor and gear box set. Requires assembly!

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Stage 1: Tether Controlled Sumo Bot

Documentation:
Documents that will be submitted at various stages of the project will include
- rough sketches of the robot design (2 minimum)
- a 1:1 scale drawing of the chosen design (either isometric or orthographic.)
- cardstock model of the chosen design.
- Schematic diagram showing tether control of the bot.

Once these steps are complete you may see Mr. B for materials to build the robot. Build and complete the basic chassis, attach the gearbox with wires soldered and zip tied in place. You will also need to get a battery pack and attach it to the bot.
Get it marked!

Electronic resources:

1) DC motors.

Your robot will be powered by two d.c. motors that drive gear boxes. The motors are powered by the 4 'AA' batteries which will provide about 6 Volts. D.C. motors are easy to use because they are easy to reverse. This is necessary to allow the robot to turn. Robots of this type use "skid Steer" steering. Reversing the current direction to a motor causes the motor to change direction. This is easy to do with a switch. The diagram below shows how to use a switch called a double pole, double throw switch. This is basically two switches in one package. Using two different color pens draw in the two possible current flow directions.
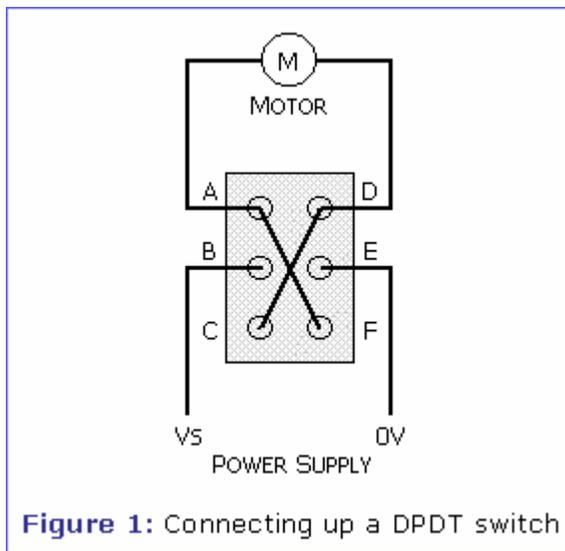
Get this checked: _____.

Self Check:
Do you understand "skid steer"
Dou you know how the robot motors can be reversed?
Do you know what the switch will do in the circuit?

Figure 1: Connecting up a DPDT switch

1.1) Collect two DPDT switches. Identify the legs under it. You may want to use a meter to which legs connect when the switch is activated.
1.2) Make up a control panel with the two switches attached to it. Mark directions on it like a remote control.
1.3) Make up two 'tethers' at least 6 feet long. Attach the switches to the bot.
1.4) Test for short circuits before putting batteries in place.
1.5) Drive the Robot. Get in the ring and fight to win!

Stage 1 is now complete. Get it marked.

CAUTION
ELECTRICAL SAFETY