Step 1 - Assembling the duckiebot

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This document provides detailed instructions for assembling the duckiebot.

Part A - Assembling the car - bottom part

What you need: Chassis
1. Put Speed board holders (on the same side of the wires of the motor)

![Drawing of Speed board holder and Motor]

**NOTICE:** DO NOT MOUNT “Speed board holder”, those are not needed and the following pictures are wrong

2. Insert motor holders on the chassis-bottom and put the motors as below (with the longest screws M3*30 and M3 nuts)

**NOTICE:** Put a motor so that its wires go inward (toward the center of the chassis-bottom) and ‘black’ wire is closer to the chassis-bottom. This makes wiring easier later on.
3. Assemble wheels

4. Assemble Omni wheel
5. Put the car upright (omni wheel pointing towards the table) and arrange wires so that they go through the center rectangle. Put 4 spacers with 4 of M3*6 screws on each corner as below.

We now have a complete bottom part! Don't put the chassis-up yet. We will put a Raspberry Pi on it first.
Part B - Putting a PI, camera, and hats - top part

What you need:
Chassis, Canakit, Camera, Camera mount, Nylon spacers, 3x.5mm Screws, Nylon nuts
Motor hat, PWM hat, male-male wire (power from HAT to HAT), standoffs

1. Put a Raspberry PI (in CanaKit) on the top of the chassis-up using 8 standoffs (in your Duckiebox). Fasten 4 nylon nuts (in your Duckiebox) on the opposite side.
2. Put heatsinks on the chips and plug in the wifi adapter (**all inside CanaKit**)

3. Put a camera mount (**in your Duckiebox**) using M3*10 flathead screws and M3 nuts (which were for a battery holder **in the chassis kit**). **Note:** Put the camera first before screwing down, because of the cable (Alex)
Put a camera (in your Duckiebox) inside the mount and connect it to the PI.

To stick the cable in pull up on the black connector (it will slide up) and then you can stick the cable in. Then slide the connector back down to lock it in.
4. Now, let’s put the chassis-bottom and chassis-up together. Find 4 Nylon spacers and 4 3x.5mm screws in your Duckiebox. They are in the same bag. Place 4 Nylon spacers on the top of 4 gold spacers of the chassis-bottom, and fasten them with 4 3x.5 mm screws. This is to make more room for a battery.
5. Put a DC+Stepper Motor HTt with 4 standoffs (all in your Duckiebox).

6. Connect the motors’ wires. Find a male-male wire (power from HAT to HAT) in your Duckiebox. Connect it to +5V input as below.

Notice: you need a smaller screwdriver for this step and the next step. Ask a staff for the (smaller) screwdriver. :)

Notice: We are using M1 and M2. The left (in robot frame) motor is connected to M1 and the right motor is connected to M2. If you have followed Part A correctly, `leftMotor:Red - leftMotor:Black - rightMotor:Black - rightMotor:Red` will be correct wiring.

7. Put a Servo/PWM Pi HAT board (in your Duckiebox) with 4 standoffs. Connect the male-male wire to +5V output.

8. Put a battery (in your Duckiebox). If you want, secure the battery using zip ties.
9. Connect power cables (USB A to 5mm cable in your Duckiebox and USB cable in the battery box).

Later, we will attach a LED board and LEDs. But this setup is enough to go to the next setup! :)