Building Lily∞Bot

1. Start by laying out the bottom of the chassis and the battery module that corresponds to your controller. The AA battery holder is for the Arduino Uno, the 9V battery holder is for the Microbit, and the Pico battery holder is for the Raspberry Pi Pico.

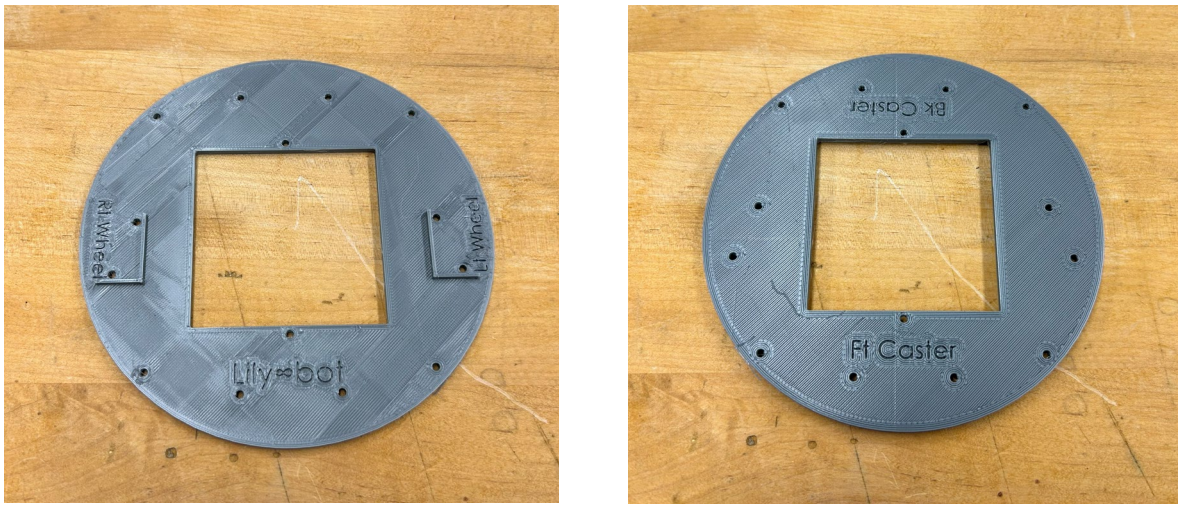

Figure 1: Top (left) and bottom (right) faces of the bottom chassis

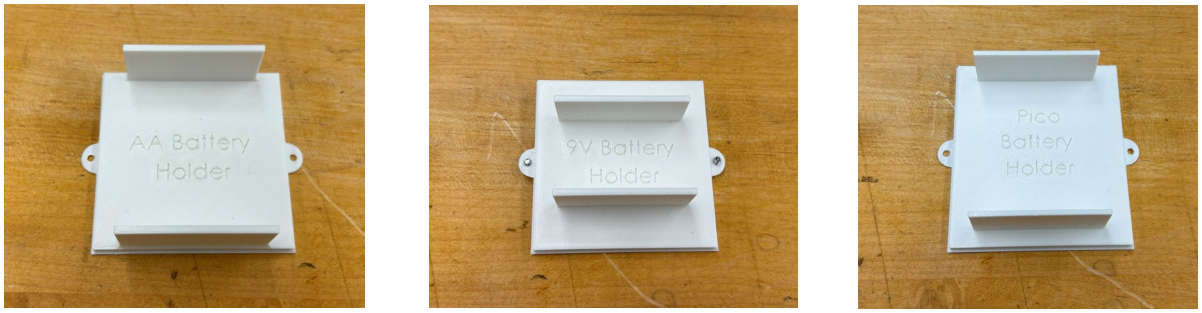

Figure 2: AA Battery holder for the Arduino Uno, 9V battery holder for the Microbit, and the battery holder for the Raspberry Pi Pico

2. Now that you have your bottom chassis and the right battery holder, let's start assembling. This guide uses the 9V battery pack module for its robot. Place your bottom chassis with the Rt Motor and Lt Motor text facing up and the Ft Caster and Bk Caster text facing down. Take

your battery holder and slot it into the chassis from the bottom such that the mounting holes line up with the holes in the chassis. Figure 3 shows the robot base with a 9V battery pack module screwed into it.

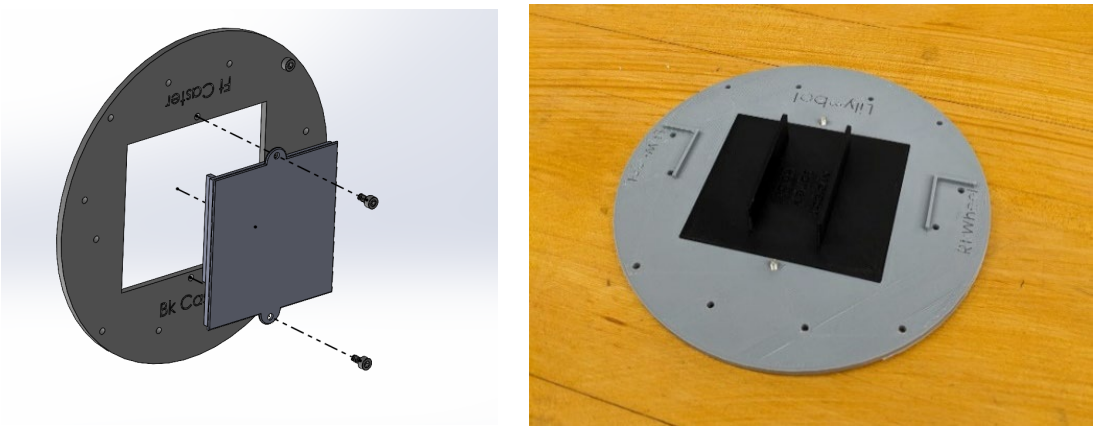

Figure 3: Bottom base with battery pack module.

3. Get the left and right 3d printed motor mounts and the 2 motors. If not attached, you will need to use two 10 mm (about 0.39 in) M3 machine screws to attach each motor to the motor mount. Make sure that the red and black wires point toward the long-slotted end of the motor mount. Figure 4 shows the right and left motors inserted into the motor mounts with the 10 mm screws. The figure also shows 2 wheels and four 8 mm (about 0.31 in) M3 mounting screws for attaching the motor mount to the base of the robot.

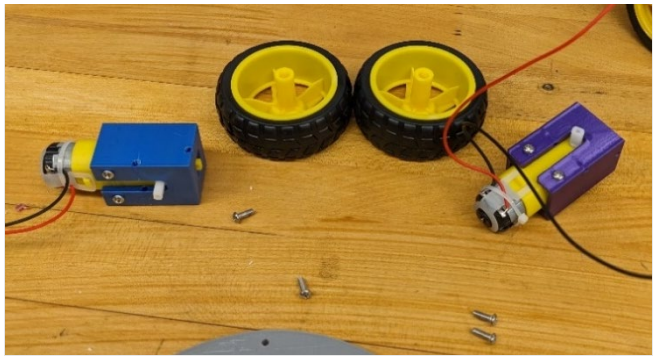

Figure 4: Wheels, Motors, and Screws.

4. Figure 5 shows the various batteries inserted into their corresponding battery holders. Each battery pack may be inserted at any time during the robot assembly process. Note that the robot will ship without batteries.

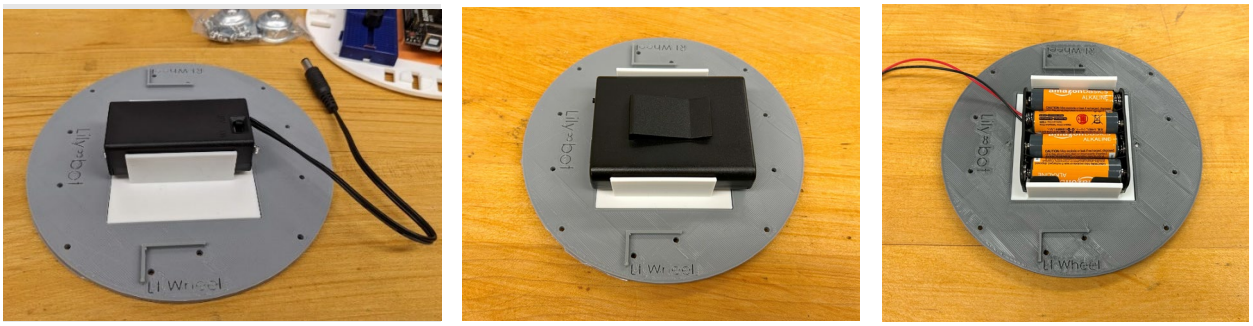

Figure 5: 9V, Pico, and AA battery packs inserted in battery pack module on robot base

5. The side of each motor should have either an R or an L engraved on it. Starting with the left motor, place it on the left side of the base (also engraved) such that the wires face the inside of the robot and the mounting holes on the motor line up with the base. Take one of your mounting screws, and, using a Phillips head screwdriver, thread it into the bottom of the base until the head is flush with the base. Repeat with the other screw until the motor is securely in place. Repeat with the other motor. Figure 6 shows mounting the motors to the robot base.

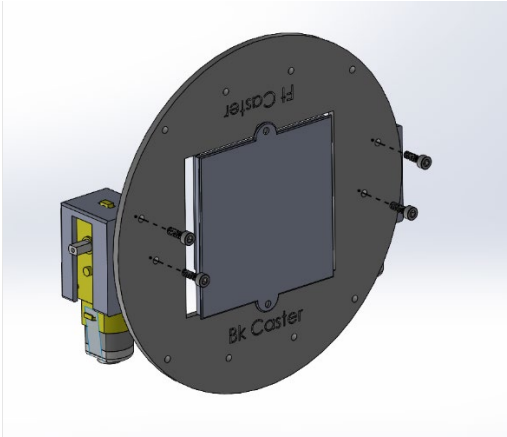

Figure 6: Attaching the motors to the robot base.

6. Collect 2 caster wheels, 4 M3 screws, 4 M3 nuts, and 4 M3 lock washers as shown in Figure

Figure 7: 2 caster wheels, 4 M3 8 mm (about 0.31 in) screws, 4 M3 lock washers, 4 M3 washers

7. Mount the front caster wheel (labeled on bottom of base) by taking the wheel and placing its flat side against the bottom of the base. Take each screw and push it through the wheel and base. Take your lock washer (one for each screw) and place it on the screw. Finally, thread the nut onto the screw, using a Phillips head screwdriver and appropriate wrench to firmly secure the wheel in place. Repeat with back caster wheel. Figure 8 shows the steps to attach the two cater wheels to the bottom robot chassis.

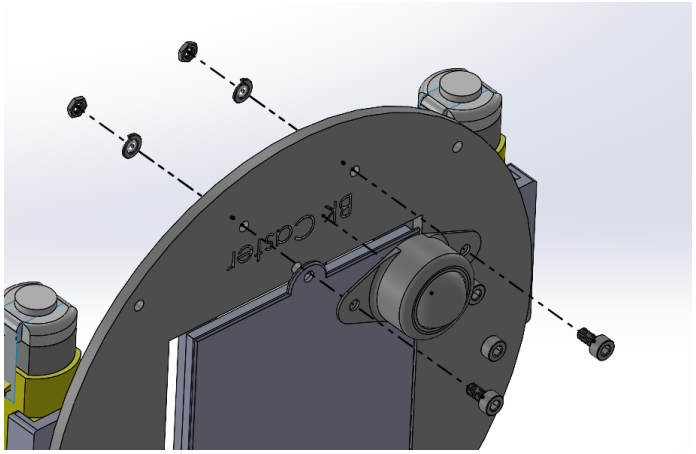

Figure 8: Attach the caster wheel to the bottom robot chassis using 2 screws, 2 nuts, and 2 lock washers

8. Collect 4 standoffs and 4 8mm (about 0.31 in) M3 machine screws as shown in Figure 9.

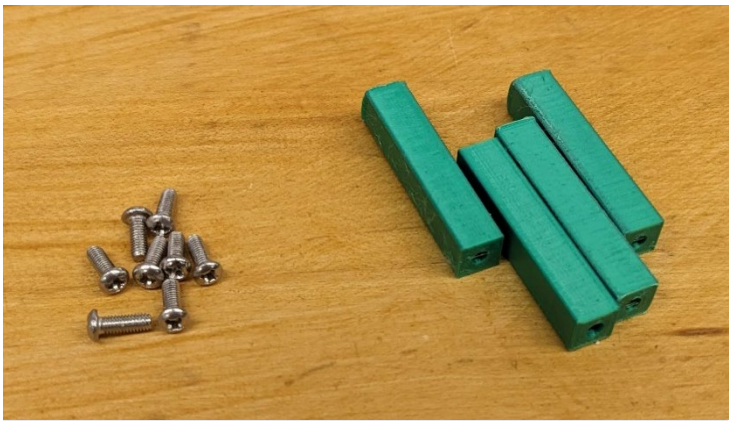

Figure 9: 4 standoffs and 8 8 mm M3 screws

9. Take one standoff and position it above one of the 4 holes on the outside of the bottom piece. Take one screw and thread it through the hole, into the standoff from the bottom of the base. Screw it in carefully, making sure the screw is perpendicular to the base. If you feel too much resistance, take it out and try again making sure the screw is straight. Figure 10 shows an example of connecting one standoff to the robot bottom chassis.

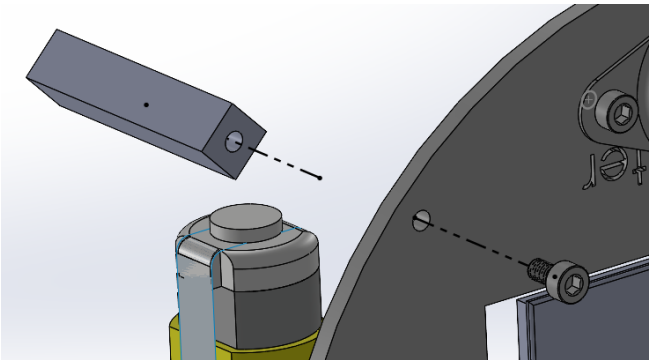

Figure 10: Connect one standoff to the robot bottom chassis with an 8 mm M3 screw

10. Repeat with the other standoffs, only screwing them in from the base. You should have 4 screws left over when you are done.

11. Retrieve the top chassis for the robot as shown in Figure 11 and attach the corresponding controller module to it using 2 screws.

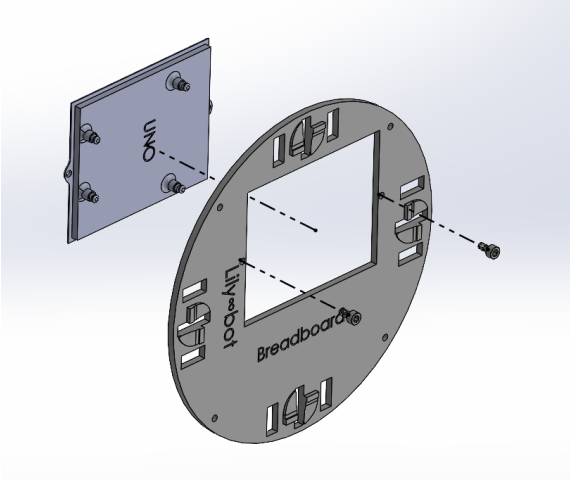

Figure 11: Screwing the controller mount into the top chassis

12. Some Pico and Uno controller mounts are snap-ons and some have holes to screw into. For the former, carefully snap the controller in place, lining the holes of the controller with the mounts and pressing slowly. For the latter, use two 6 mm screws to mount the controller. Figure 12 shows the Pico and Uno attached to the module with screws.

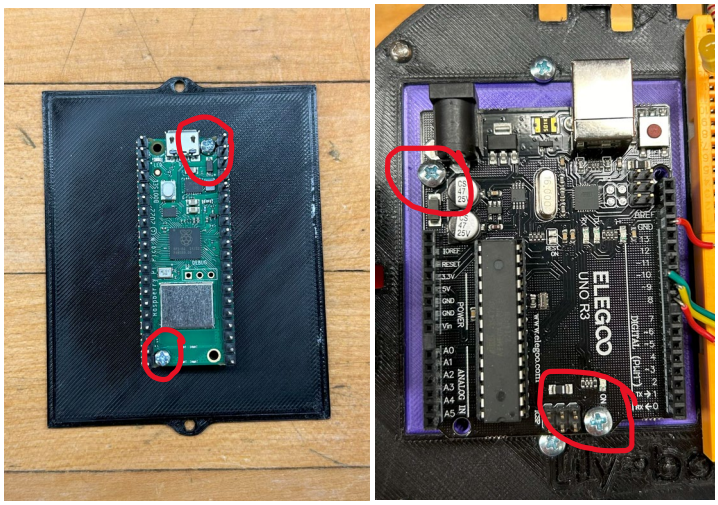

Figure 12: Pico and Uno microcontrollers screwed into their mounts

13. To install the Microbit, you need to carefully slide the board into the two grooves on the mount. Push it through such that the board is roughly centered on the mount. Then attach the vertical board by slotting it into the gold end of the horizontal board.

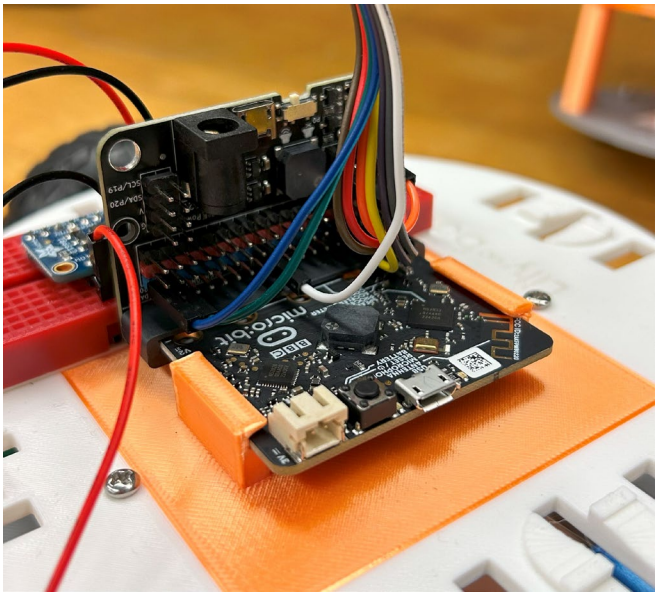

Figure 13: Installed Microbit controller

14. Next, attach two mini breadboards to the side of the module as shown in Figure 14. Make sure to not cover any of the sensor or standoff mounting holes.

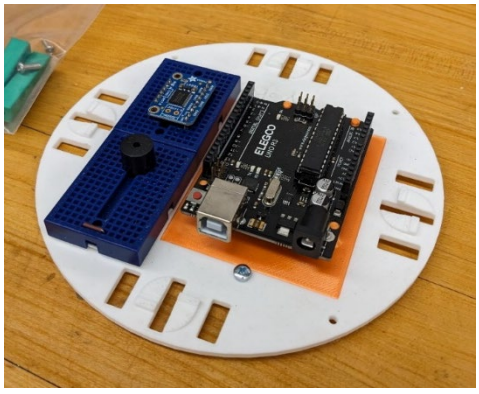

Figure 14: Upper robot chassis with microcontroller mount, microcontroller, two breadboards, and TB6612 motor controller installed in breadboard

15. Use the four screws to attach the robot upper chassis to the four standoffs. Make sure the text is aligned so that the words Lily∞Bot are above each other facing the same direction. Figure 10 shows the attachment of the four screws to the robot.

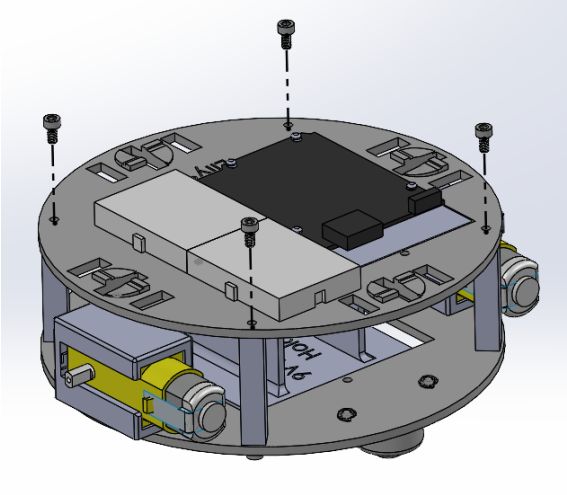

Figure 15: Attach the robot upper chassis to the bottom chassis with the 4 M3 8 mm machine screws and standoffs.

16. Finally, attach the two wheels to the DC motors as shown in Figure 16.

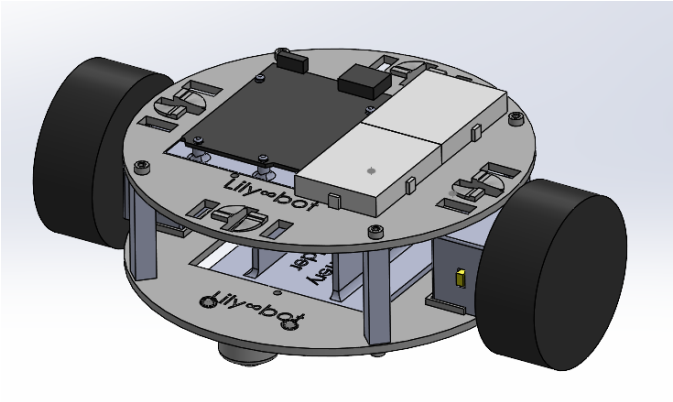

Figure 16: Two wheels attached to two DC motors on side of Lily∞Bot

Congratulations Lily∞Bot is Built!

References:

GitHub: https://github.com/berry123/Lily-Bot

HacksterIO: https://www.hackster.io/berry123

Instructables: https://www.instructables.com/member/carlottaberry/

Website: https://www.noiresteminist.com/shop

YouTube: https://www.youtube.com/playlist?list=PL175eO9NwPXICoPyAxInbduXcNKWURqm