

GSOC ROBOTIC ARM “EVENT IN A BOX”



GSOC STEM “Event in a Box” - GSOC Robotic Arm Display

Background

This document accompanies the GSOC Robotic Arm “EVENT IN A BOX” and illustrates how to set up, run and break down the GSOC Robotic Arm event display.

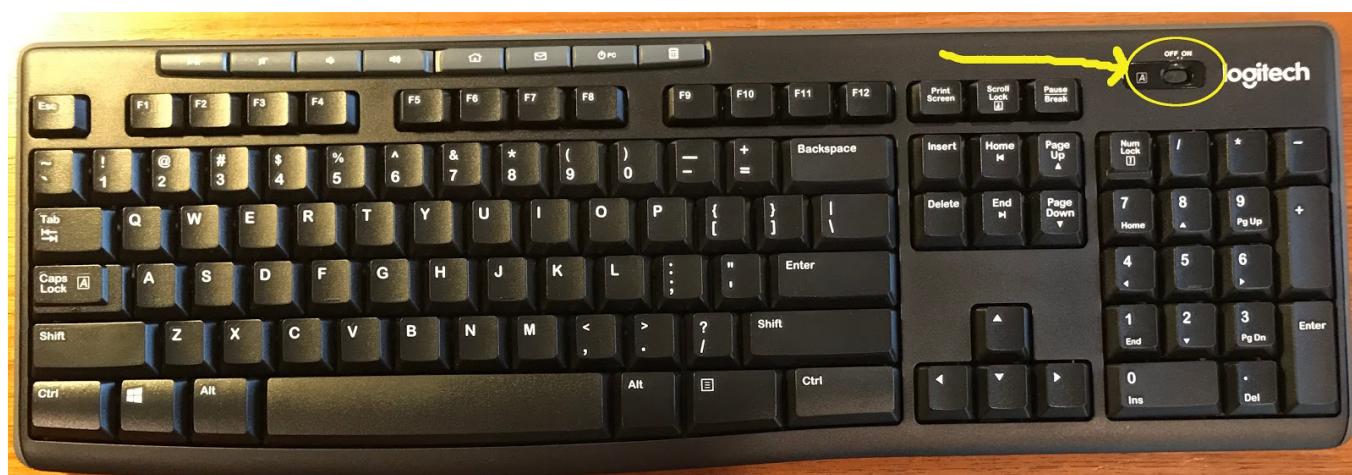
The GSOC Robotic Arm display can be used at an event or expo table. The display allows table visitors to type in their name and then watch the robotic arm write their name on special GSOC promotional paper. Paper should be included within the event box. A printable (double sided) template of the paper is available here: <https://github.com/bhontz/GSOCRoboticArm>. Note: regular paper can be used in a pinch! Note: the other resources for this project, i.e. “the code” can be found within this same repository link.

Parts overview

The following parts are included within the GSOC STEM Event box:



Raspberry Pi with touch screen display. Click on/off power switch is shown on the lower left of this image.



Logitech keyboard. On/Off switch is shown in the upper right corner.



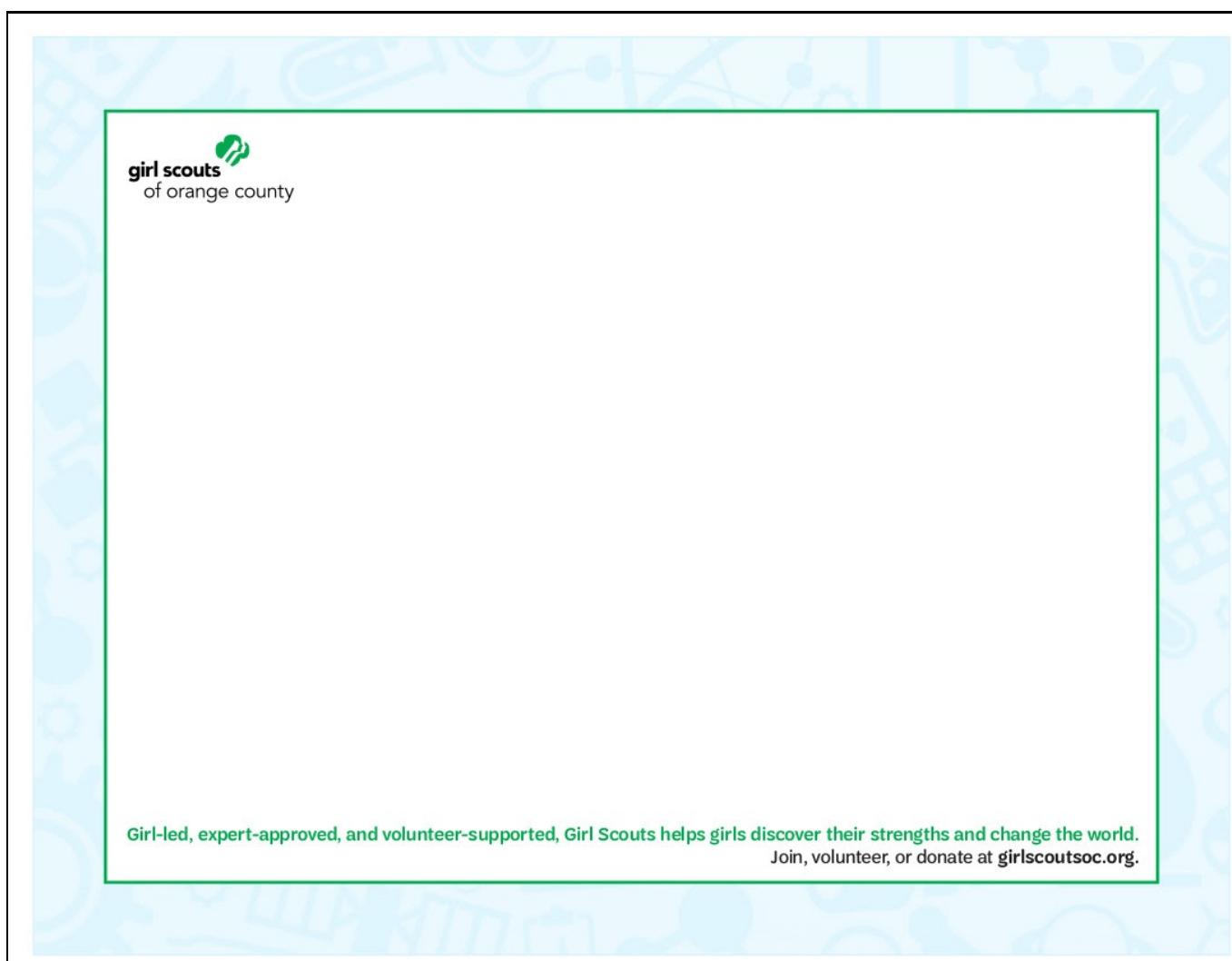
Robotic Arm (sitting on Fisker mat). AC Power cable to the left, and flat USB micro cable to the right.



PVC weights used to hold the paper down on the Fisker mat.



BIC Round Stic pens. THESE WORK VERY WELL.



Promotional paper (double sided). Place this side UP (robotic arm writes on this side).

The only requirements for this robotic display beyond this part lists are a table, AC power, and enough paper for the number of visitors you anticipate. You do not need WiFi.

Robotic Arm display setup

First plug the Raspberry Pi and robotic arm's AC adapter into the power strip included within the event box. Plug the powerstrip into an AC outlet or extension cord.

Position the Fiskars mat on the table as shown. Place the robotic arm at the base of the Fiskars mat as shown. The middle of the robotic arm base should align with the 8.5" mark on the Fiskar mat.



Align the middle of the robotic arm base with the 8.5" mark on the Fisker mat.

Position the keyboard and Raspberry Pi on the table in a spot that will be accessible to table visitors. Turn on the keyboard using the switch in the upper right corner of the keyboard.

Plug the robotic arm AC adapter into the robotic arm, and connect the included USB micro cable to the robotic arm as shown below.



Robotic arm: AC Power plug is on the left, USB micro plug on the right.

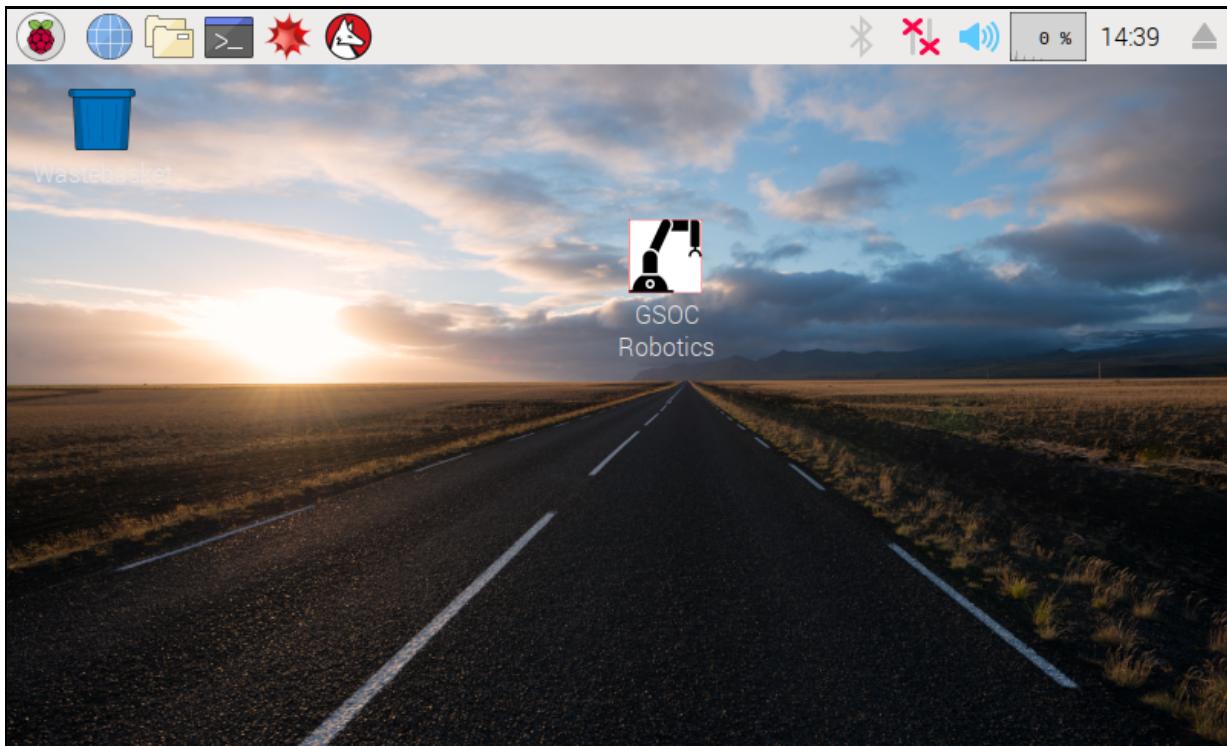
Plug the other end of the flat USB micro cable into the Raspberry Pi's USB ports as shown.



Robotic arm's USB cable plugs into the Raspberry Pi as shown. Logitech plug is required for the keyboard.

Be sure the robotic arm is laying flat on the Fiskers mat, then press the orange (bronze) button on the base of the robotic arm (near the USB micro port) to turn on the robotic arm. You should hear a beep and the arm may move slightly.

Next, turn on the Raspberry Pi using the on/off clicker described in the parts overview. *Note: If a prior user did not power down the Raspberry Pi using the on/off clicker, the Raspberry Pi will have started up as soon as it is plugged in (which is fine).* Once the Raspberry Pi boots up, the screen will appear as shown below.



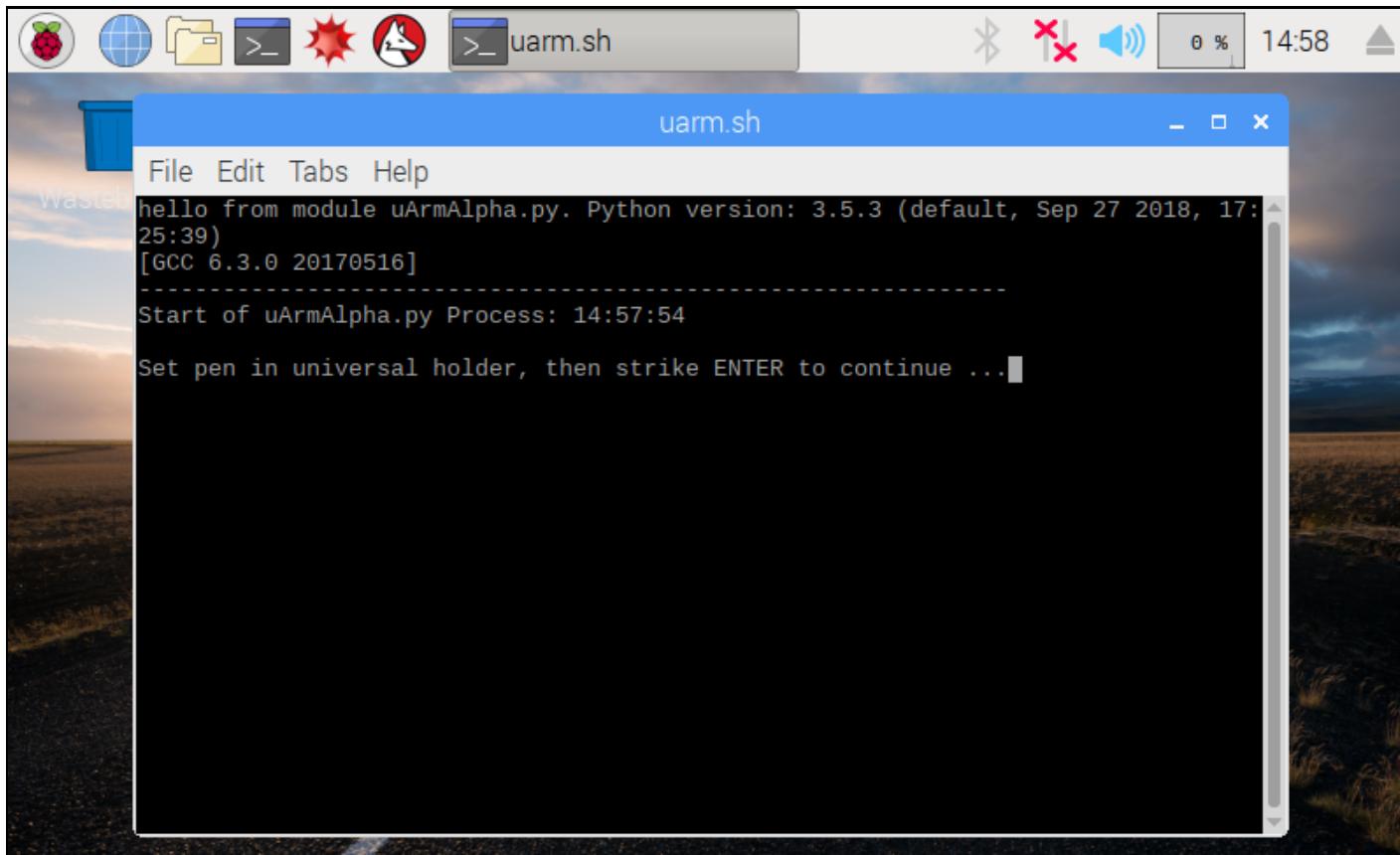
Raspberry Pi's screen after power up.

Place a piece of the promotional paper on the Fiskers mat so that the bottom of the longer edge of the paper positioned nearest the robotic arm aligns with the 14" and 3" marks on the Fiskers mat as shown. Place the white PVC pipe “weights” on the very edges of both sides of the paper to hold the paper in place as shown.



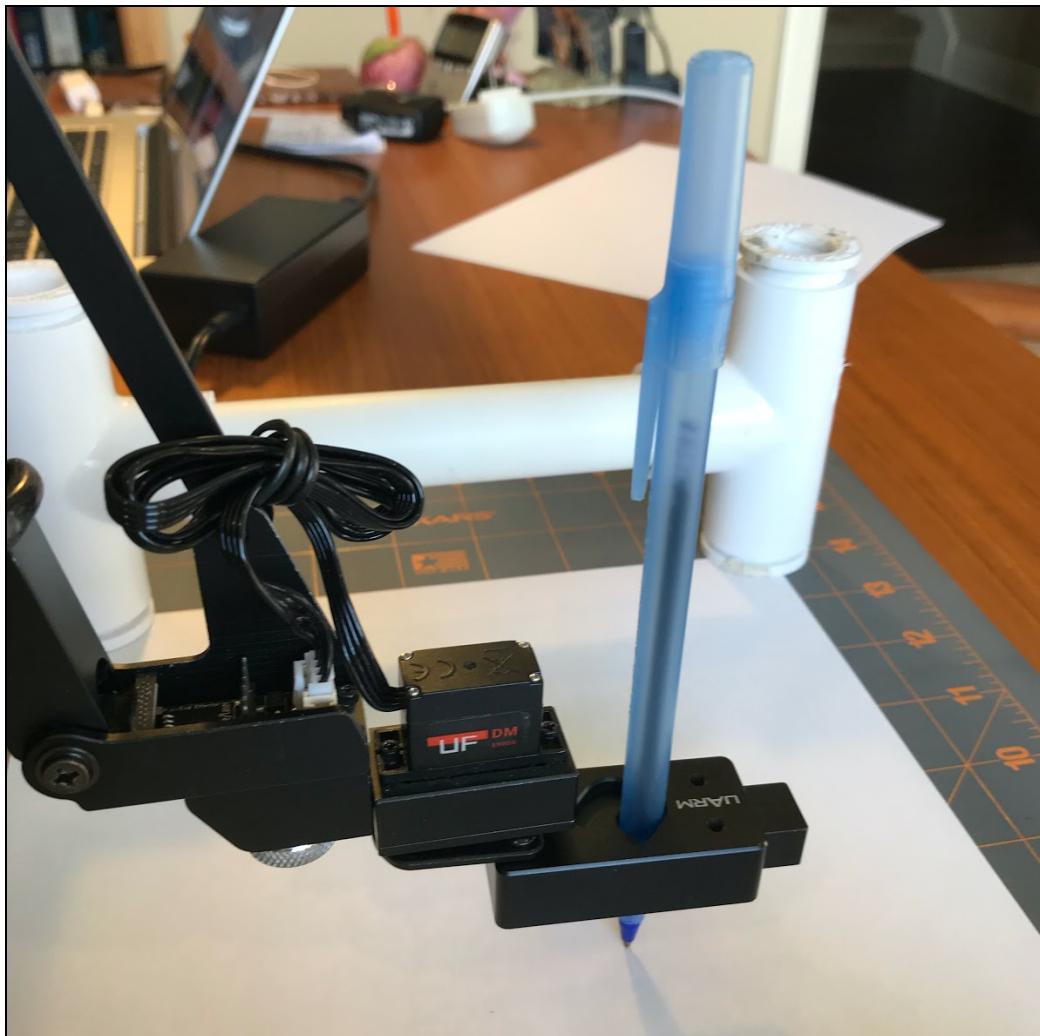
Proper placement of the paper, arm and PVC weights on the Fiskers mat (regular paper shown).

The Raspberry Pi's display is a touch screen. Double tap the GSOC Robotic Arm icon in the middle of the screen. The robotic arm will beep and move above the Fiskers mat. Additionally, a black “terminal window” will be displayed immediately thereafter as shown below.



Raspberry Pi's screen after double tapping the GSOC Robotics icon.

The black terminal window indicates “set pen in universal holder”. The universal holder is at the end of the robotic arm as shown below. Gently press the front of the universal holder and slide the pen into the holder so that the pen point is touching the paper as shown below. Note that you DO NOT have to forcefully press down on the pen, it just has to touch the paper.



Pen placed properly within the Robotic arm's universal holder, just touching the paper.

Once the pen is in place, press the Enter key on the keyboard as prompted by the terminal window. An additional message indicating “Starting UI in 5 seconds” will appear. After five seconds the Raspberry Pi screen will appear as follows:



After setting the pen and selecting ENTER on the keyboard, this screen appears. “GSOC Robotics” was entered as an example text entry; normally this field is blank.

You are now set up and ready to receive visitors to the table!

Instructing visitors at the table

Have visitors form a line. With paper in place as described in *Robotic Arm display setup*, allow the first user to type their name using the keyboard. Their name should appear on the screen as they type. **AFTER they enter their name using the keyboard, have the visitor touch the Submit button on the screen as shown below. NOTE: ENTER on the keyboard DOES NOT submit their name, users need to touch the Submit button on the screen.**

The robotic arm takes a second or two to start moving. Please encourage the visitors to be patient after touching the Submit button.

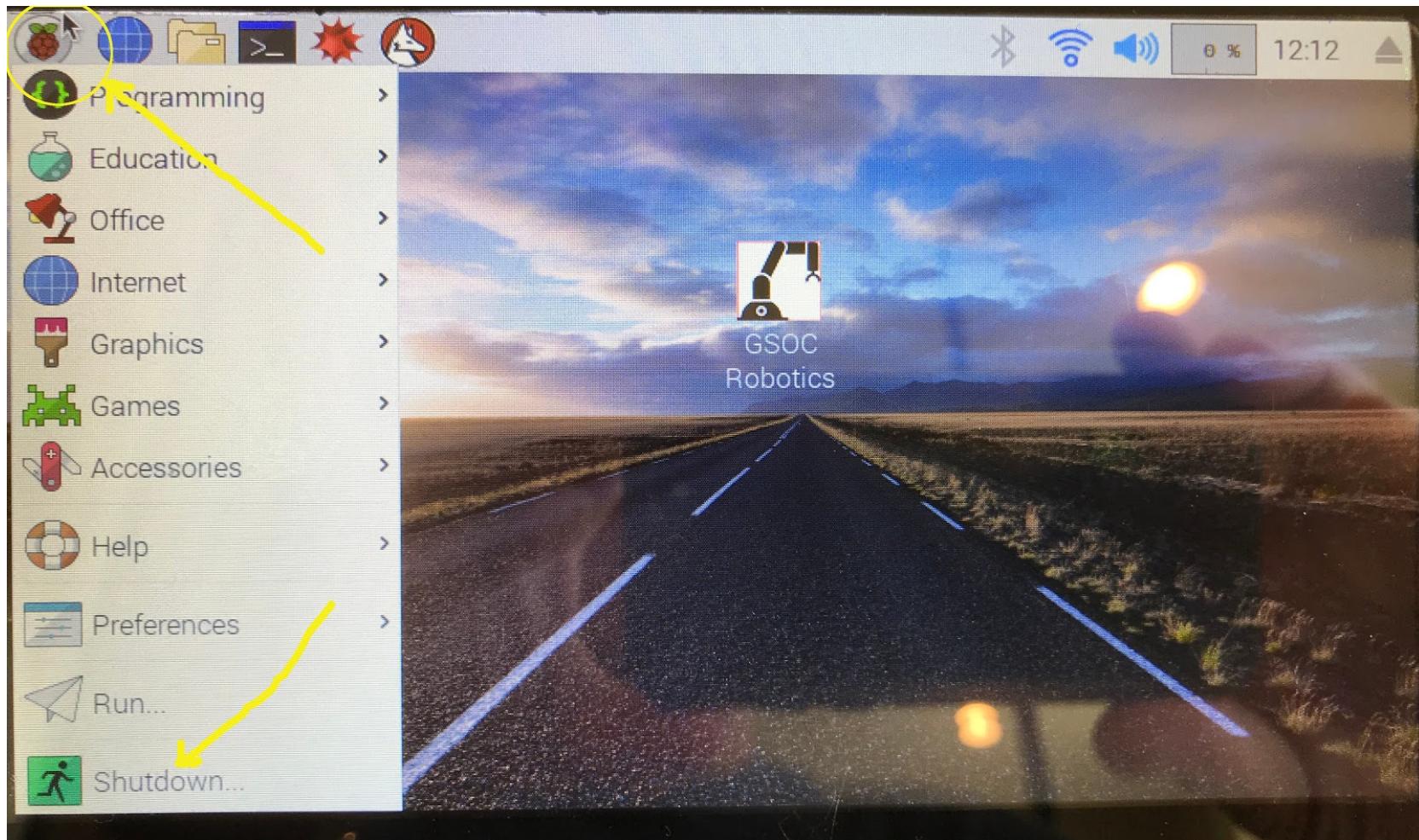
Allow the arm to complete writing the visitors name. The arm is finished once it is back at the center of the Fiskers mat with the pen raised above the surface of the paper. Remove the paper from the mat and hand it to the visitor. Replace the paper as described above, and allow the next visitor to type in their name.

Rinse and Repeat!!

Shutting Down

Once the event is complete, or if the case that the arm stops working, first press the Close button on the screen to exit the black terminal window and return to the desktop.

You can shut down the Raspberry Pi by clicking on the red raspberry icon in the upper left corner of the desktop screen and then selecting **Shutdown...** from the subsequently displayed menu.



Please additionally click the Raspberry Pi's power switch (even though the Raspberry Pi screen appears to be off, it is still powered until this clicker is off).

Being careful to support the robotic arm (just hold on to it at the universal holder), press the orange push button on the robotic arm to power it off. The arm will drop to the table after being powered off. Next, disconnect the AC power cable and flat USB cables from the robotic arm. Remove the other end of the USB cable from the Raspberry Pi. Turn the keyboard off using the on/off switch in the upper right corner of the keyboard.

Unplug the Raspberry Pi and robotic arm AC adapter from the power strip and secure all parts back into the event box, being careful to include the power strip, pens, paper and pvc weights. Carefully bubble wrap and then strap the robotic arm using the red velcro strap before placing the arm into the event box.

