

# Introducing CodeX

Mission 2



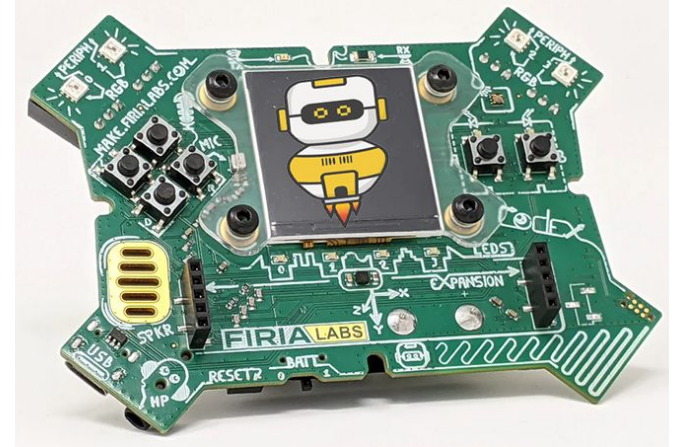
# Greetings!

You are at the beginning of an exciting journey, where you will explore coding with your CodeX, using Python.

Why should you learn coding?

- It is more than robots
- It is more than computers
- It is more than laptops or tablets
- It is more than cell phones
- It is more than games

Computer chips are making lots of things we use smarter. But ... everything a computer does is coded by people like YOU



# Pre-Mission Preparation

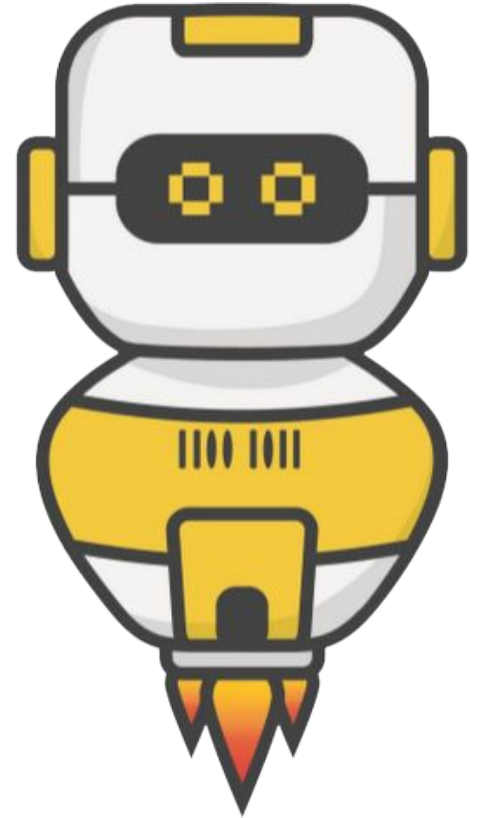
In your Mission 2 log, answer the pre-mission preparation questions:

- What are some things you can attach to a computer or laptop?
- Why do you think you should learn to program a computer?



## Mission 2: Introducing CodeX

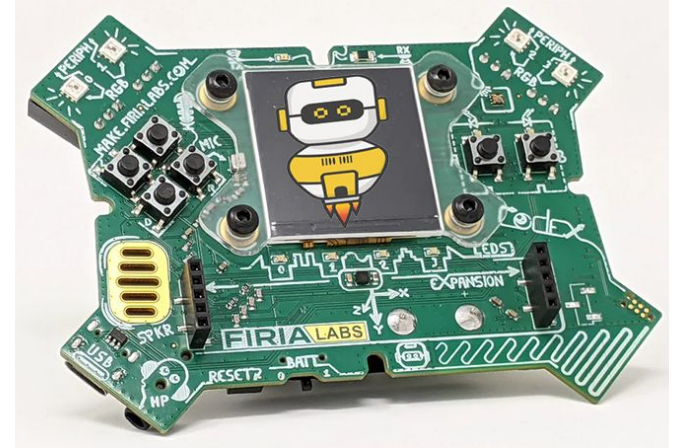
Introduction to CodeX where you get your device connected and run some code!



# What is a CodeX?

A physical device for computing

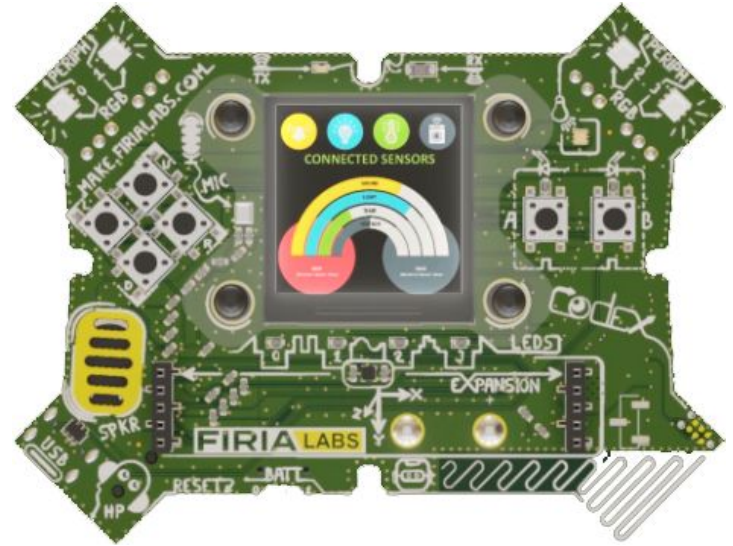
- A circuit board, with a lot of stuff added to it
  - Bright, colorful LED lights
  - Color graphics display
  - Built-in speaker
  - Several buttons for input
  - Sensors
  - And more!



# Objective #1: Behold the CodeX

The Firia Labs codeX is a powerful embedded computer

- LCD display
- LED lights
- Speaker
- Sensors
- Buttons



# Mission Activity #1

The instructions have three words that can be added to the toolbox



## DO THIS:

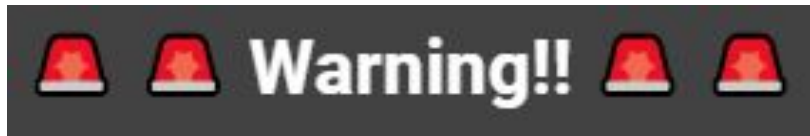
- Click on one of the words
- Fill out the Mission Log for your word
- **Recommended:** click on all three words to add them all to your toolbox



# Objective #2: Static electricity

Static electricity ⚡ can build up inside you when you walk across a carpet, or many other activities

- Static electricity ⚡ can discharge when you touch the CodeX
- This is not good for the CodeX!



# Objective #2: Static electricity

Follow these guidelines to keep your CodeX static-free

- Hold the CodeX by its edges
- Be gentle with the components
- Keep the CodeX in its case when not in use
- Touch grounded metal (doorknob, desk, etc.) before touching the CodeX



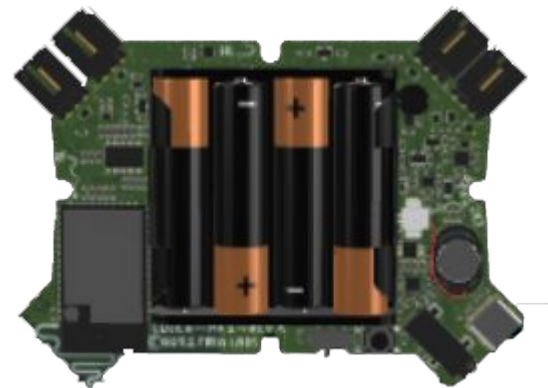
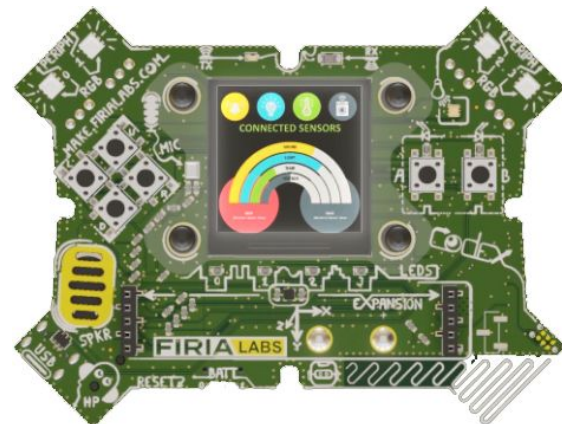


# Mission Activity #2

Use the simulator to look for three lightning bolts ⚡ on the CodeX.

## DO THIS:

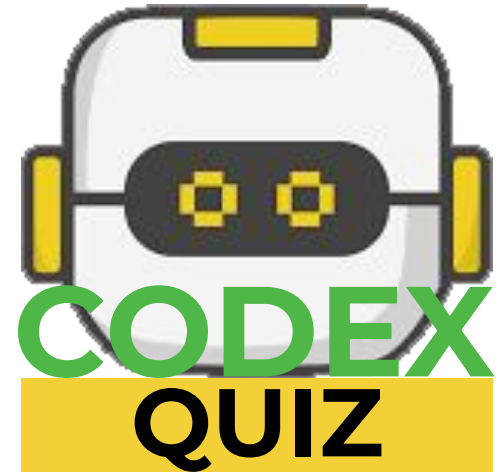
- Close the instruction panel
- Use camera controls to rotate the CodeX in the scene
- Find all three ⚡ and click on them
- One is on the back, so make sure you rotate all the way around



# Safety quiz

Do you remember how to keep your CodeX safe?

- Answer the quiz question



# Objective #3: Find the CPU

Where does the code run? On the **CPU**

- Central Processing Unit
- The “brain” of the CodeX
- Interacts with other computer parts (called peripherals)
  - Lights
  - Display
  - Speaker
  - Sensors



# Objective #3: Find the CPU

The CPU has many responsibilities:


- Collects data
- Issues commands
- Pushes display information
- Stores information
- And many more things



# Mission Activity #3

The CPU is an amazing device!

## DO THIS:

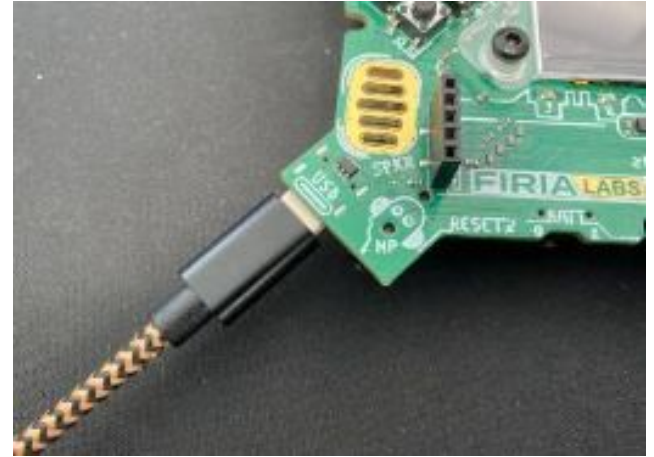
- Click on  to add it to your toolbox
- Write about the CPU in your Mission Log
- Close the instruction panel
- Use the camera controls to rotate the CodeX and find the CPU
- Click on the CPU



# Objective #4: Connect the USB

A USB cable is used to connect the CodeX to your computer or laptop

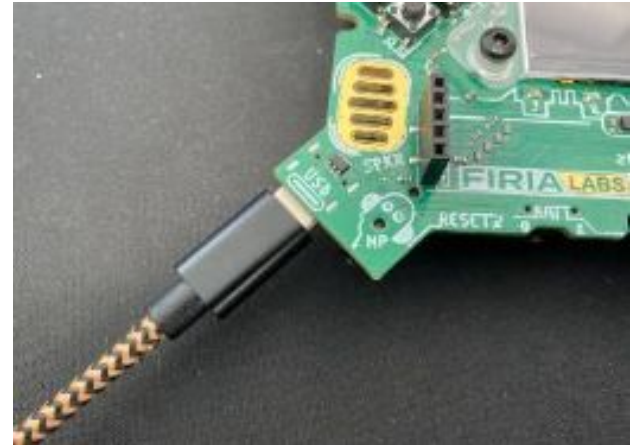
- The USB cable lets your computer communicate with the **CodeX**.
- It provides 5 volt DC power to the CodeX.



# Mission Activity #4

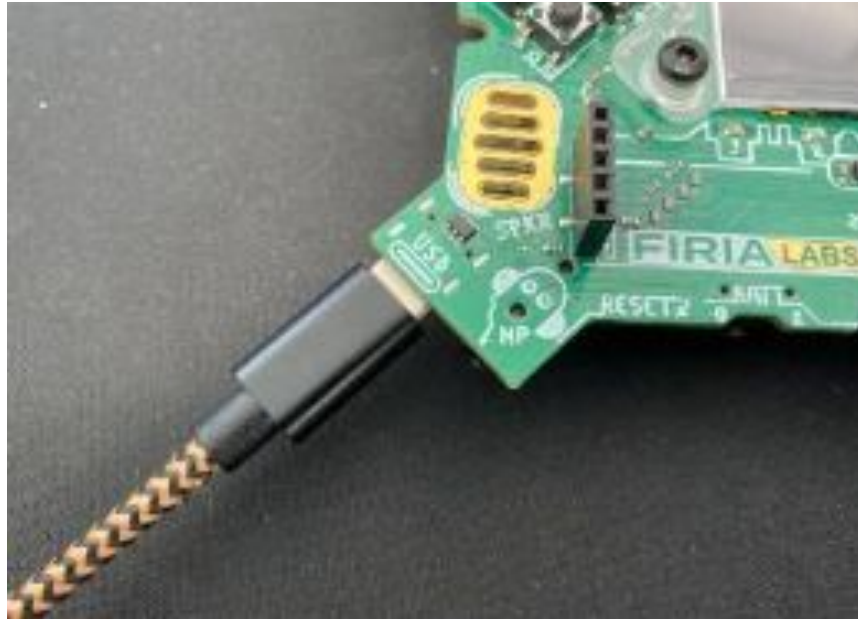
## DO THIS:

- Close the instruction panel
- Use the camera controls to rotate the CodeX and find the USB port
- Click on the port



# Objective #5: Link to CodeSpace

The CodeX must be linked to your browser before it can be used with CodeSpace.

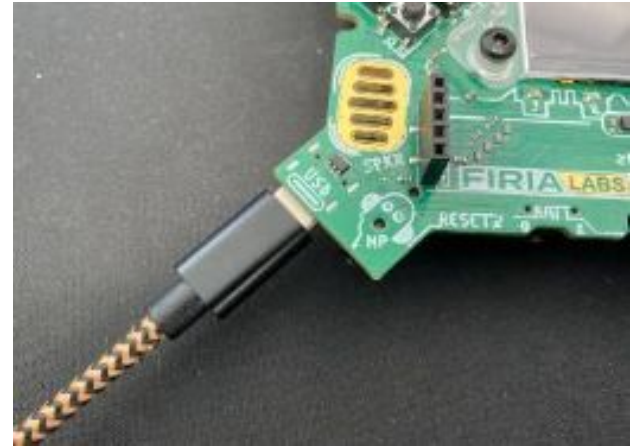




# Mission Activity #5

## DO THIS:

- Gently take out your CodeX
- Connect the CodeX to your computer with a USB cable
- Close the pop-up window

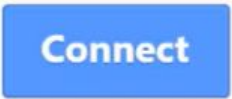


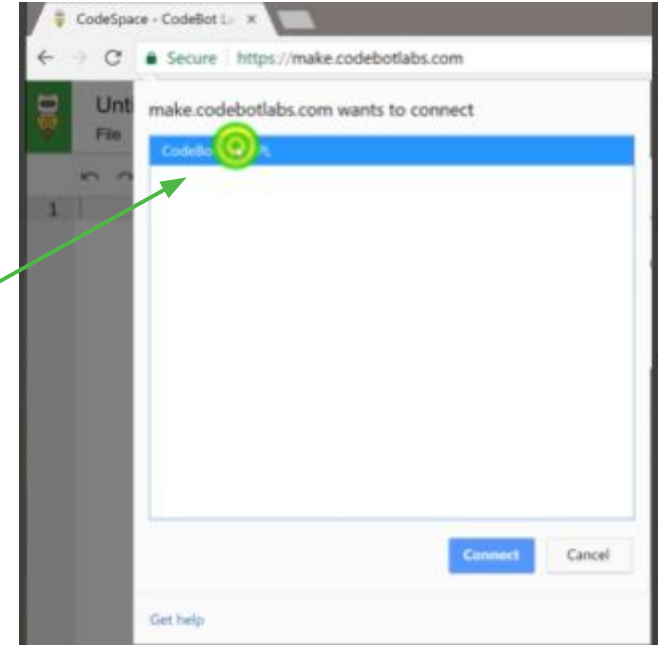
# Mission Activity #5

## DO THIS:

- Click on the red message at the bottom of the window



- Select CodeX from the pop-up window
- Click the 
- Notice that the message now says



# Objective #6: Save the code

Time to create a file!

- When you type code into the **text editor** panel, it is automatically saved in the CodeSpace cloud!
- Your code is stored in a file
- The file name should describe what the code will do

```
File Edit View Help
Default Program x
1 # Write your code here!
2
3 from botcore import *
4 from time import sleep_ms
5
6 motors.run(LEFT, 20)
7 motors.run(RIGHT, -20)
8 motors.enable(True)
9
10 while True:
11     leds.user(0x55)
12     sleep_ms(500)
13     leds.user(0xaa)
14     sleep_ms(500)
15
```

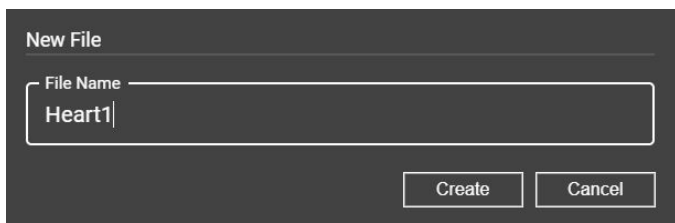
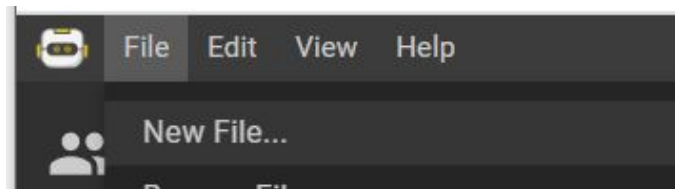


# Mission Activity #6

Create a new file for each mission.

## DO THIS:

- Click the **File** menu button
- Select “New File...”
- Name the file **Heart1**
  - *no spaces in a file name*
- Click **Create**



# Objective #7: The CodeTrek



The **CodeTrek** icon is at the bottom of the instruction panel.

The **CodeTrek** is a CodeSpace tool that gives you:

- A starting point for your program.
- Information about lines of code you need to write.
- Explanations of coding topics.
- Holes (TODOs) for you to fill in on your own!



# Objective #7: The CodeTrek



# TODO -- The words “to do” put together

- A `# TODO:` tells you what you need to do to complete the program
- It tells you there is still work **TO DO!**
- If you haven't typed in code where there is a `# TODO:` then you haven't completed the mission.



# Mission Activity #7



Check out CodeTrek

## DO THIS:

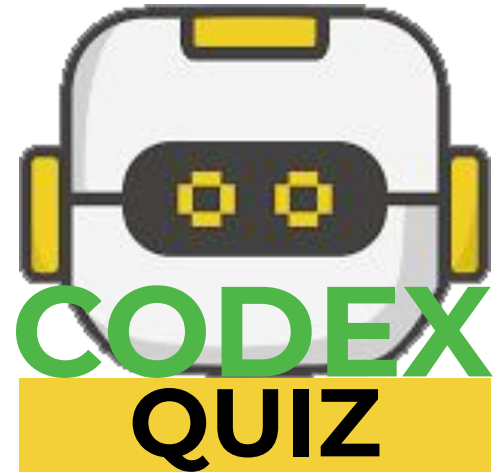
- Click on the CodeTrek icon at the bottom of the instruction panel
- Read both messages
- Close the CodeTrek



# Mission quiz

You have learned a lot more about CodeSpace and CodeX. Now .... time for another quiz!

- Answer two quiz questions





# Objective #8: Show some heart

Important programming notes:

- Your code is case sensitive
- That means
  - lower-case needs to be lower-case
  - upper-case needs to be upper-case
- Punctuation is important
  - Indenting matters
  - Use a period . when needed
  - Match parenthesis ( )
  - Use a colon : where needed

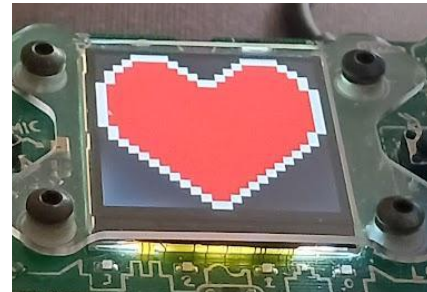
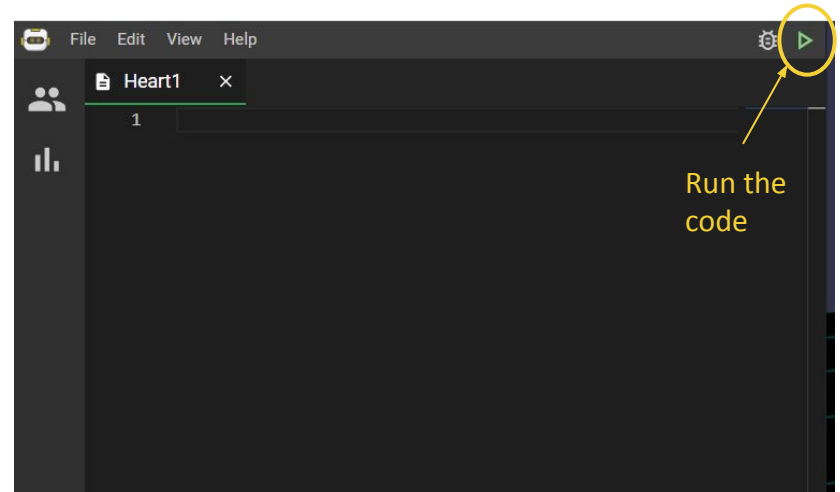


# Mission Activity #8

Time to type!


## DO THIS:

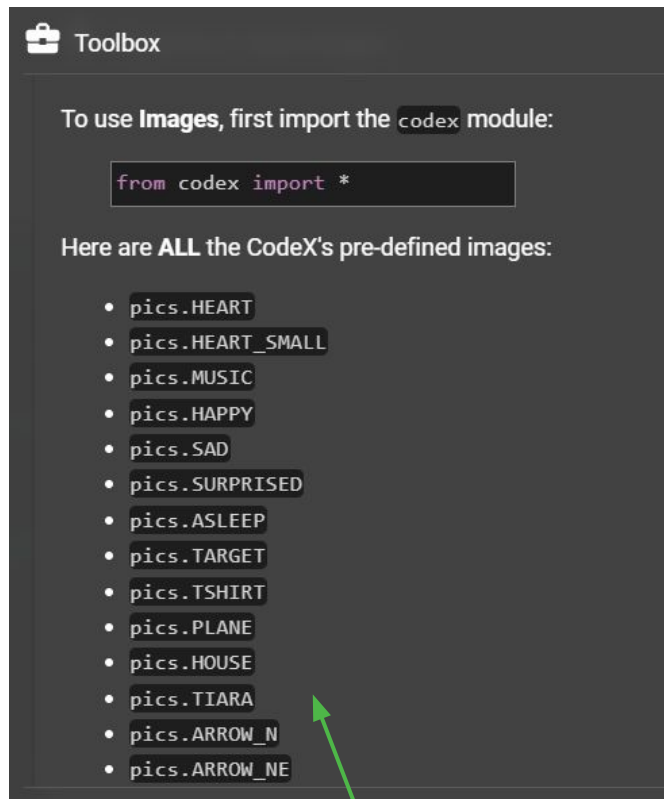
- Make sure your **Heart1** file has no code
- Click the icon to open CodeTrek
- Type the two lines of code EXACTLY as you see it
- Run the code



# Objective #9: More images

The CodeX comes with more than one image ready for you to display

- Find the images that are built-in
- Click on 
- Then scroll down in the toolbox until you find the list of images



Toolbox

To use **Images**, first import the `codex` module:

```
from codex import *
```

Here are **ALL** the CodeX's pre-defined images:

- `pics.HEART`
- `pics.HEART_SMALL`
- `pics.MUSIC`
- `pics.HAPPY`
- `pics.SAD`
- `pics.SURPRISED`
- `pics.ASLEEP`
- `pics.TARGET`
- `pics.TSHIRT`
- `pics.PLANE`
- `pics.HOUSE`
- `pics.TIARA`
- `pics.ARROW_N`
- `pics.ARROW_NE`

*Scroll to see the list of images*



# Mission Activity #9

Find out what images you can use

## DO THIS:

- Go to your Mission Log and write down three images that interest you

- `pics.HEART`
- `pics.HEART_SMALL`
- `pics.MUSIC`
- `pics.HAPPY`
- `pics.SAD`
- `pics.SURPRISED`
- `pics.ASLEEP`
- `pics.TARGET`
- `pics.TSHIRT`
- `pics.PLANE`
- `pics.HOUSE`
- `pics.TIARA`
- `pics.ARROW_N`
- `pics.ARROW_NE`
- `pics.ARROW_E`
- `pics.ARROW_SE`
- `pics.ARROW_S`
- `pics.ARROW_SW`
- `pics.ARROW_W`
- `pics.ARROW_NW`

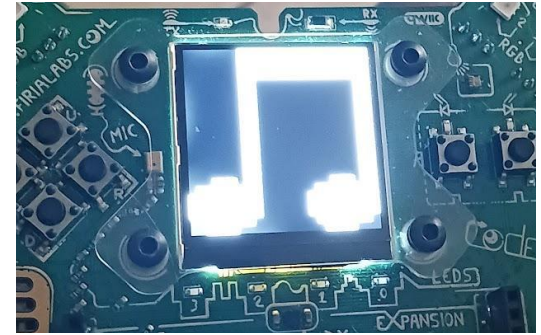


# Mission Activity #9

Display a different image

## DO THIS:

- Go to your **Heart1** file
- Change the image from **HEART** to **MUSIC**
  - Use CodeTrek if you need help
- Run the code
- Change the code to display another image
  - Repeat for as many images as you want



- pics.HEART
- pics.HOUSE
- pics.HEART\_SMALL
- pics.TIARA
- pics.MUSIC
- pics.ARROW\_N
- pics.HAPPY
- pics.ARROW\_NE
- pics.SAD
- pics.ARROW\_E
- pics.SURPRISED
- pics.ARROW\_SE
- pics.ASLEEP
- pics.ARROW\_S
- pics.TARGET
- pics.ARROW\_SW
- pics.TSHIRT
- pics.ARROW\_W
- pics.PLANE
- pics.ARROW\_NW



# Post-Mission Reflection

- Read the “completed mission” message and click to complete the mission
- Complete your Mission 2 Log

## Post-Mission Reflection

The CodeX can do a lot of things, and even connect to the world around it.

You can connect it to more sensors, more lights, motors, and more!

What projects can you imagine using the CodeX for?

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