

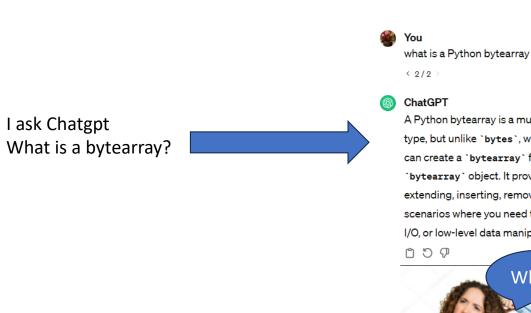
Assuming you have an image called tree.png and you want to display it on the ssd1306.

- 1. Edit this image in a graphic editor such as paint.
- 2. Resize the image to 128 x 64 pixels.

  This will fill the entitle screen which have a resolution of 128 x 64 pixels.
- 3. Save this edited file as, say, tree.png

tree.png

# Before we can display it, we need to convert the image into a bytearray



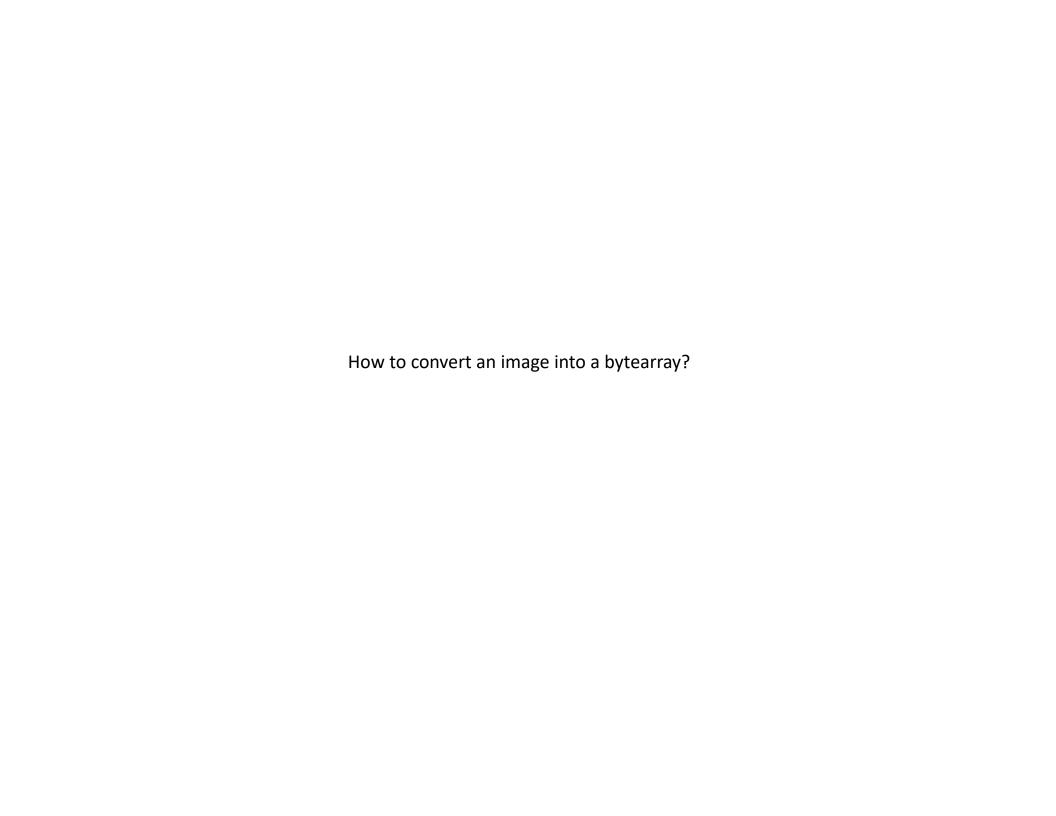
A Python bytearray is a mutable sequence of bytes. It's similar to Python's built-in `bytes` data type, but unlike `bytes`, which is immutable, `bytearray` allows you to modify its elements. You can create a `bytearray` from a string, iterable of integers, or even directly from another `bytearray` object. It provides methods to manipulate the bytes it contains, such as appending, extending, inserting, removing, and modifying individual elements. This makes it useful for scenarios where you need to work with mutable sequences of bytes, such as in networking, file I/O, or low-level data manipulation tasks.



If you are as confused as I am it's ok. For the time being take it as just a representation of our image tree.png for our program

So that we can plunk it into a program like this.

```
[ imageinssd1306.py ]
 1 from machine import Pin, I2C
 2 import framebuf
 3 #SSD1306 Library
 4 from ssd1306 import SSD1306 I2C
                                                     This is the bytearray
 5 #Set up ssd1306
                                                     representing the image
 6 WIDTH =128
                                                     tree.png
 7 HEIGHT= 64
 8 i2c bus=I2C(0,scl=Pin(17),sda=Pin(16),freq=200000)
   oled = SSD1306 I2C(WIDTH, HEIGHT, i2c bus)
10
   11
12
```



We need to use this program to convert. <a href="mailto:img2bytearray.py">img2bytearray.py</a> (inside lesson folder)

Credit:This program is created by novaspirit. See this link for more info.

https://www.youtube.com/watch?v=YR9v04qzJ5E&t=593s

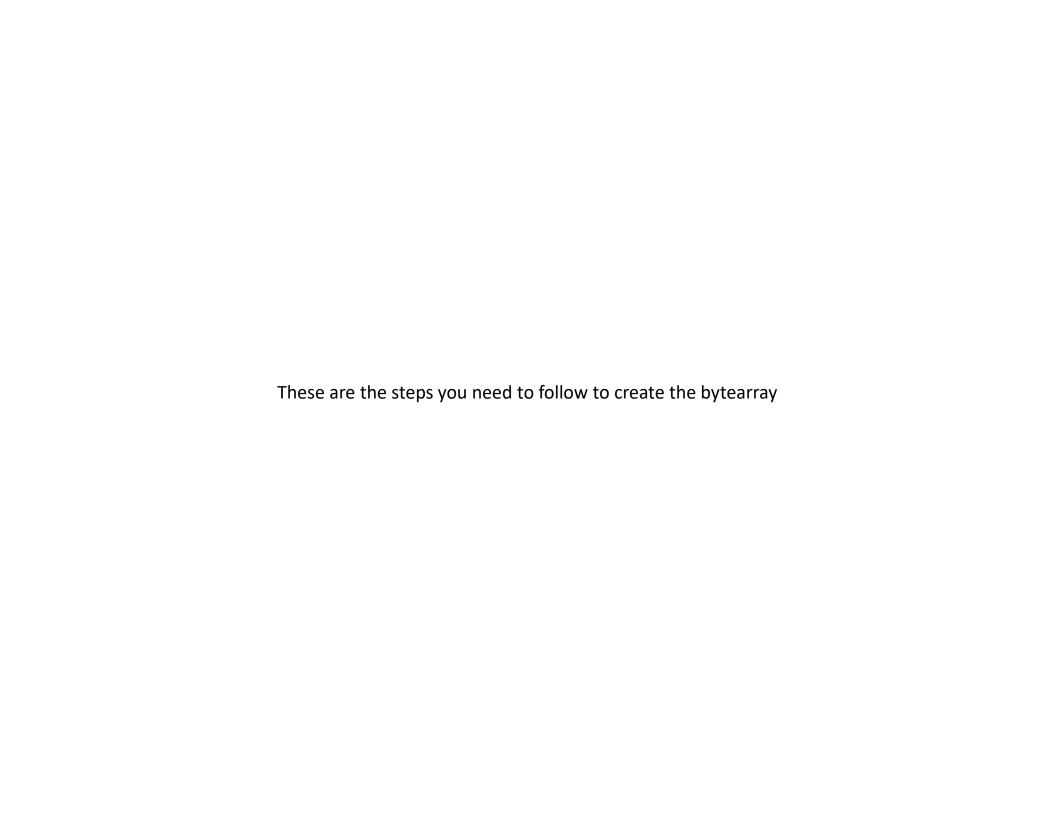
img2bytearray.py is also available via this github link

https://github.com/novaspirit/img2bytearray

To save you the trouble of downloading it I have a copy of this file in the lesson folder.

img2bytearray.py is a python3 program so we need to run it on the PC where python3 is installed and not on Thonny.

I will show you how this is done.



- 1. In your c drive root directory, create a folder. Name it images
- 2. Copy and paste img2bytearray.py to this folder
- 3. Copy and paste the image (tree.png) to this folder
- 4. Open the terminal / command prompt.
- 5. CD to this folder
- 6. C:\images>
- 7. We need to install an image processing library called pillow. To install do this.
- 8. C:\images> pip install pillow [enter]



#### ChatGPT

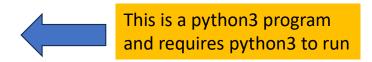
The Pillow library in Python is primarily used for image processing tasks. It's a powerful library that allows you to open, manipulate, and save many different image file formats. With Pillow, you can perform a wide range of operations on images, such as resizing, cropping, rotating, filtering, adjusting colors, adding text, and much more. It's widely used in various domains, including web development, computer vision, data analysis, and scientific computing, whenever there's a need to work with images programmatically.

0 0 0

Now that pillow library and <a href="img2bytearray.py">img2bytearray.py</a> is setup in c:\images We are ready to start converting our image file to bytearray. Type this:

C:\images> python3 ./img2bytearray.py ./tree.png 128 64

./ = the folder the programs are in img2bytearray.py is the conversion program tree.png is the image file name
 128 64 is the resolution we are using for this image



Hit Enter to run and you will see this on your terminal. Copy the lines starting from b" to the last line "

10\xa1e\xff\xe0\x00\x00\xf8UU\xa7R\x9f\xc3\xf5Im]U\x1f\x80\x00\x07\xff\*\xa4\xa9UE\xfb\xaa\xaa\xa2\xaa\xaf\xe0\x00\x001p\xa9]\*\x xaa\x9f\x00\x00\x00\x7fUM\xa5\xf8\xaa\xbfI\x1f\xa9eT\xff@\x00\x00/R\xaaT\xbfE\xff\xa4\xfdUUJ\xfd\x00\x00\x00?\xea\xaa\xaa\x8f\xfb\ xff\xffj\xaa\xa8\xbf\xa0\x00\x00\x00\x0f\xd1US\xff\xff\xff\x92\xaa\xa7\xff\x00\x00\x00\x00\x07\xfe\x84\xaf\xff\xff\xff xea\x92 \xff\xff\xff\x00\x18\xeb\x18\x00\x00?\xfa\xaa~\xb6\xed\xa5z\xaa\xbf\xf0-o\x00\x00\x01\xffV\xd5\xfb[[z\xff[k\xfc\x18\xd2\xa 03\xab\xc0\x00\x07\xdb\xa5\xff\xff\xea\x95k\xff\xffm\x9f\xc0\x14\x00\x00\x0b\xed\_\xff\xff\xff\xff\xff\xff\xff\xd6\xdf\xe0\x00\x00\  $90\x00 \xff\xfa\xdb{e\xff\xad\xbbk \xff\xfc\x00\x00\x0f\xff\xff\xfb\xad\xbb\xff\xd6\xd6\xd0\xff\x7f\x80\x00\x07\xfc \xd7\xb6\xaa$ bfZ\xdbmW\xeb\xb7\xf8\x00\x1e\xae\xbf\xdd\xba\xd7\xd6\xff\xd7m\xb7\xbb\xf5m\xfc\x00\x7f\xb5\xdbf\xd6\xbak\xff\xea\xb5Z\xd6\xfb\xb5 bf\xfe\xa6\xd5\xff\xff\xff\xaa\xb6\xbf\xffu\xf8\x00\x1f\xed\xff\xda\xbf\xfdU \xff\xdb\xff\xfe\xab\xf4\x00/\xb2\xff\xff\xff\xff 00\x00\x00\x00\x00\x00\x03\xff\xfbo\xda\xdbW\xff\x00\x00\x00\x00\x00\x00\x00\x00?\xfe\xaaom\x7f\xf4\x00\x00\x00\x00\x00\x00 00\x00\x00\x00\x00\x00\x00\x00

Paste temporary to a text editor, like notepad. You need to copy and paste this to the pico program later

To be copied and pasted here from the text editor. It's better to do like this. tree=bytearray() then paste the super long string in between the ()

```
[ main.py ] *
   from machine import Pin, I2C
   import framebuf
   #SSD1306 Library
   from ssd1306 import SSD1306 I2C
   #Set up ssd1306
   WIDTH =128
   HEIGHT= 64
   i2c bus=I2C(0,scl=Pin(17),sda=Pin(16),freq=200000)
   oled = SSD1306 I2C(WIDTH, HEIGHT, i2c bus)
10
11
12
   #set up bytearrays for the images to be displayed
   13
14
15
   oled.fill(∅) #clear the display
                                                              Set up the framebuffer for display
16
                                                              tree is the name of the image bytearray
   fb=framebuf.FrameBuffer(tree, 128, 64, framebuf.MONO_HLSB)
17
                                                              oled.fill(0) is to clear screen.
   oled.blit(fb,0,0)
```

oled.blit is to display the image

oled.show is to show the imge

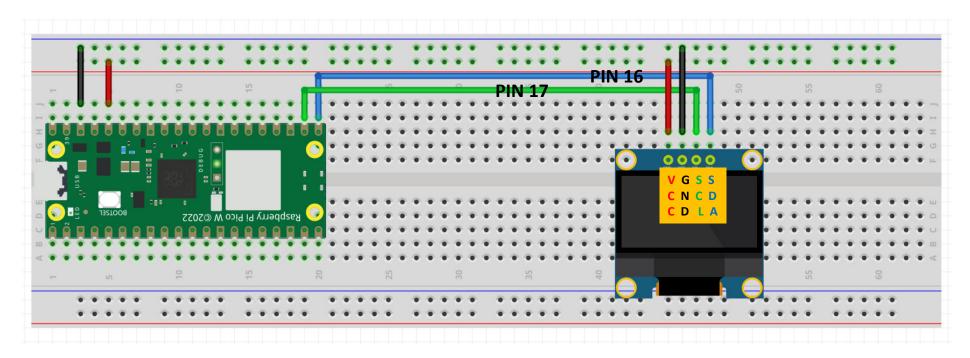
0,0 is the x,y coordinate for the top left

Hand corner of the display position

oled.show()

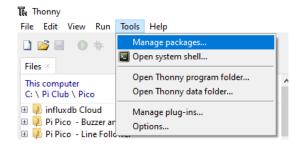
19 20

# Wiring of SSD1306

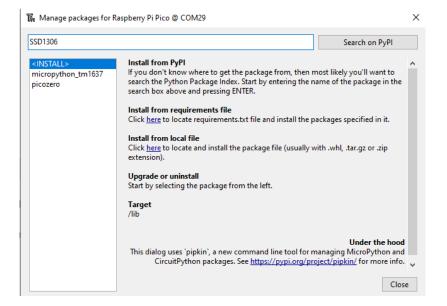


You will need to install the ssd1306 library. Installation step is available in next slide

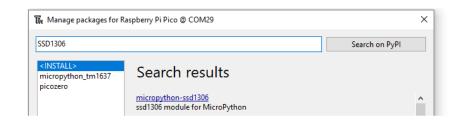
### Step 1 – Go to Tools and Manage packages



# Step 2 – Type SSD1306 in search box, click search



#### Step 3 – Select micropython-ssd1306



### Step 4 – Click Install.

