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Assessment Light Show

- 1) What does RGB stand for in RGB LEDs?
 - a) Red, Green, Blue
 - b) Ready, Go, Begin
 - c) Round, Glow, Bright
 - d) Ring, Gold, Black

- 2) What is a Raspberry Pi Pico used for in the Light Show project?
 - a) To eat during the project
 - b) To assemble the LED matrix
 - c) To control the lights
 - d) To paint the LEDs

- 3) What does "bit depth" refer to in the context of RGB LEDs?
 - a) The number of colors that can be displayed
 - b) The size of the LED matrix
 - c) The brightness of the LEDs
 - d) The weight of the microcontroller

- 4) How many bits represent each color if each RGB light can be HIGH, MEDIUM, LOW, or OFF?
 - a) 1 bit
 - b) 2 bits
 - c) 3 bits
 - d) 4 bits

- 5) How many colors can each pixel in the RGB LED matrix display if each color (R, G, B) can be HIGH, MEDIUM, LOW, or OFF?
 - a) 4 colors
 - b) 8 colors
 - c) 16 colors
 - d) 64 colors

- 6) Describe how you could use what you've learned about RGB LEDs to create a simple animation on the LED matrix. What steps would you take and why?



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7) Imagine you are part of a team designing a new billboard for a city. How would you apply the knowledge from this project to ensure the billboard is colorful and energy-efficient?

8) Look at the Python code provided when you've completed this lesson. This code draws a design on the LED matrix. Can you analyze the pattern it creates and then modify the code to change the design? For example, try to make a simple heart shape or another pattern of your choice. Describe the changes you made to the code.



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Answer Key Light Show

- 1) A - Red, Green, Blue
- 2) C - To control the lights
- 3) A - The number of colors that can be displayed
- 4) B - 2 bits
- 5) D - 64 colors
- 6) *Example:* To create a simple animation, I would first design a series of images representing different animation frames. For instance, if I want to show a ball bouncing, I would draw the ball in various positions on the LED matrix for each frame. I would then write a program to display each frame in sequence, clearing the screen between each frame to create the illusion of movement. I would use a loop to repeat the frames and adjust the timing to control the speed of the animation.
- 7) *Example:* To design a colorful and energy-efficient billboard, I would use RGB LEDs with high bit depth to allow for a wide range of colors. I would ensure that the LEDs have multiple brightness levels to adjust the intensity of the light, making the display visible in different lighting conditions while conserving energy. I would also use efficient programming to control the display, minimizing the power consumption by turning off or dimming LEDs when not needed. Additionally, I would consider using motion sensors or timers to activate the billboard only when there are people nearby to see it, further saving energy.
- 8) *Example:* To change the design, I need to modify the `screen.draw` function where the grid pattern is defined. Here is an example of how I can change the design to create a simple heart shape:

```
## ---- Imports ---- ##
import piper_lightshow as lightshow
from piper_blockly import *

## ---- Definitions ---- ##
lightshow.init()
screen = lightshow.Pix()

try:
```



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```
    set_digital_view(True)
except:
    pass

## ---- Code ---- ##
screen.box(0, 0, 0, 8, 8)
screen.draw(lightshow.Pix.from_grid((
    ( 0, 7, 63, 7, 7, 63, 7, 0),
    ( 7, 63, 63, 63, 63, 63, 63, 7),
    (63, 63, 63, 63, 63, 63, 63, 63),
    (63, 63, 63, 63, 63, 63, 63, 63),
    ( 7, 63, 63, 63, 63, 63, 63, 7),
    ( 0, 7, 63, 63, 63, 63, 7, 0),
    ( 0, 0, 7, 63, 63, 7, 0, 0),
    ( 0, 0, 0, 7, 7, 0, 0, 0),
)), (1-1), (1-1))
lightshow.show(screen)
send_lightshow_buffer(screen.buffer)
```

Explanation: I changed the values in the `screen.draw` grid to create a heart shape. Each number in the grid represents a pixel on the LED matrix, where 0 is off, and higher numbers are brighter. The new pattern forms a heart by arranging the numbers in a symmetrical heart shape.