

CMU Graphics Tips

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CMU Graphics speed

CMU Graphics



What causes lags

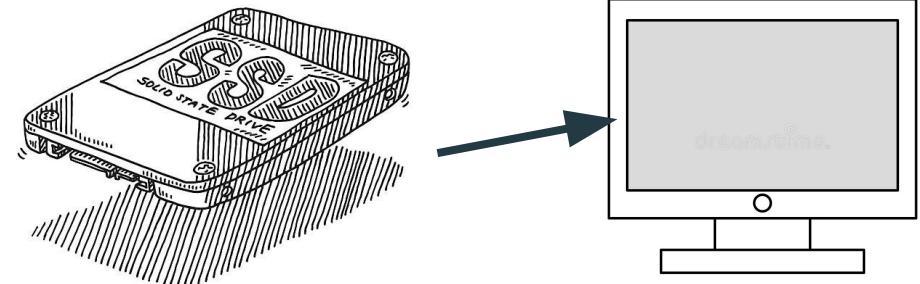
- IMAGES
- A LOT of stuff happening in `redrawAll()`
- Extremely inefficient algorithms
- Messing with `app.stepsPerSecond`

Biggest cause of lag : Drawing Images!

`drawImage(url, left, top, width=int, height=int)`

Problem 1:

- Loads the image every single time from the url, every time it is called
- Very slow!

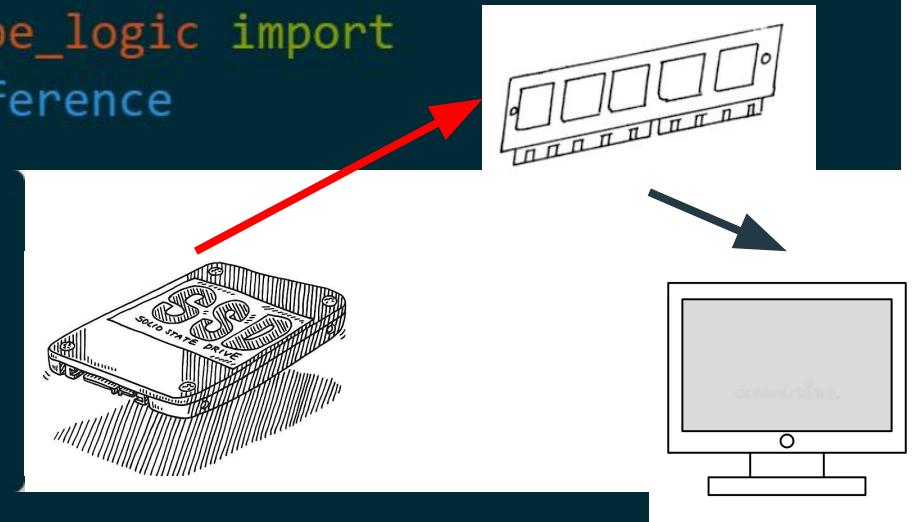


Solution: Image Caching

```
from cmu_graphics.shape_logic import  
loadImageFromStringReference
```

```
image =  
loadImageFromStringReference(  
'images/eduardo.png')
```

```
drawImage(image, x=0, y=0, width = self.width, height  
= self.height)
```



Another issue: large image size

```
drawImage(image, left, top, width=int,  
height=int)
```

Problem 2:

- If you have a very large image and you change the width and height parameters, it will still load the large image into memory
- Change actual image dimensions instead



Demo

onStep() - messing with app.stepsPerSecond

- Changing this will cause unpredictable behaviour, sometimes causing issues
- Also difficult to use if you want to control the speed of different events
- Keep app.stepsPerSecond constant and change something else...



#30 times per second by default?

```
def onStep(app):
    app.timer += 1
    # If you want to run it 5 times per second
    desired = 5
    interval = app.stepsPerSecond // desired
    if app.timer % interval == 0:
        runCode()
```

Sound

Part of CMU Graphics

(NOT THAT SIMPLE)

```
# creates a sound object
track = Sound("url")

# plays a sound object
track.play(loop=False, restart = False)

# pauses sound
track.pause()
```

Loading sound locally

```
import pathlib
cntPath = pathlib.Path(__file__).parent.resolve()
cntPath = str(cntPath)
cntPath = cntPath.replace("\\", "/")
menu = Sound(f'file:///{{cntPath}}/menu.mp3')
upgrade = Sound(f'file:///{{cntPath}}/upgrade.mp3')
gameOver = Sound(f'file:///{{cntPath}}/gameOver.mp3')
story = Sound(f'file:///{{cntPath}}/story.mp3')
won = Sound(f'file:///{{cntPath}}/won.mp3')
# Jacob, E (2023)
```

Sound Bug!

Once the sound loops
more than once, you can
no longer pause it

**Solution: Play the sound
right before pausing it**

```
won.play()  
won.pause()  
upgrade.play()  
upgrade.pause()  
story.play()  
story.pause()  
gameOver.play()  
gameOver.pause()
```

Other tips

Use the CMU Graphics built-in functions!



▼ Built-In Functions

distance

angleTo

getPointInDir

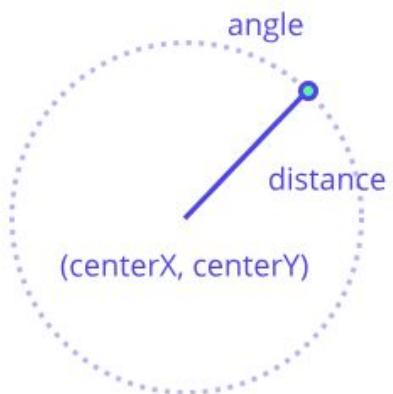
rounded

makeList

sleep

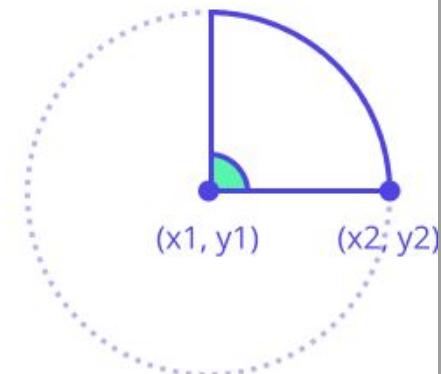
getPointInDir(centerX, centerY, angle, distance)

Returns a point that is the given number of pixels from the center point, in the given direction.



angleTo(x1, y1, x2, y2)

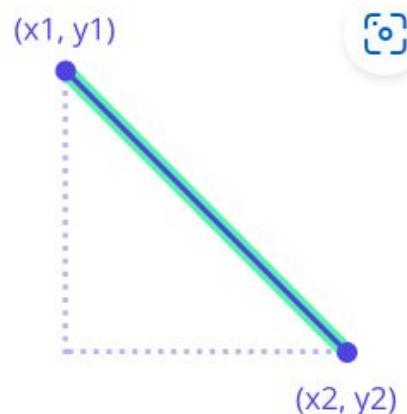
Returns an integer representing the angle from the point $(x1, y1)$ to $(x2, y2)$ with straight up being 0 degrees.



distance(x1, y1, x2, y2)

Returns a number representing how far apart the point (x_1, y_1) and (x_2, y_2) are.

This is equivalent to the square root of $((x_1-x_2)^2 + (y_1-y_2)^2)$.



Arcade



Beautiful, state of the art

arcade machine

Perfect for your post-MVP

addition

Easy to transport (kind of)



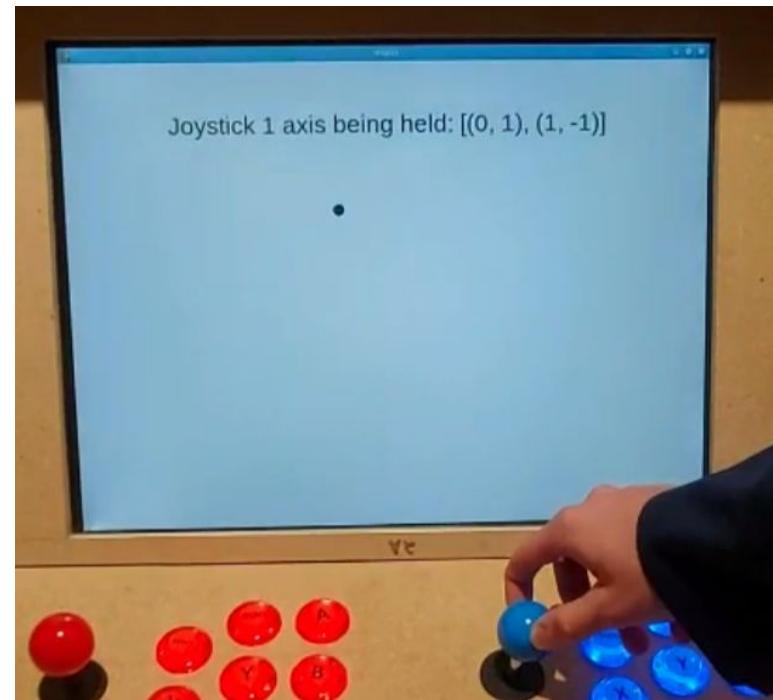
```
def onJoyPress(app, button, joystick):
```

```
def onDigitalJoyAxis  
(app, results, joystick):
```

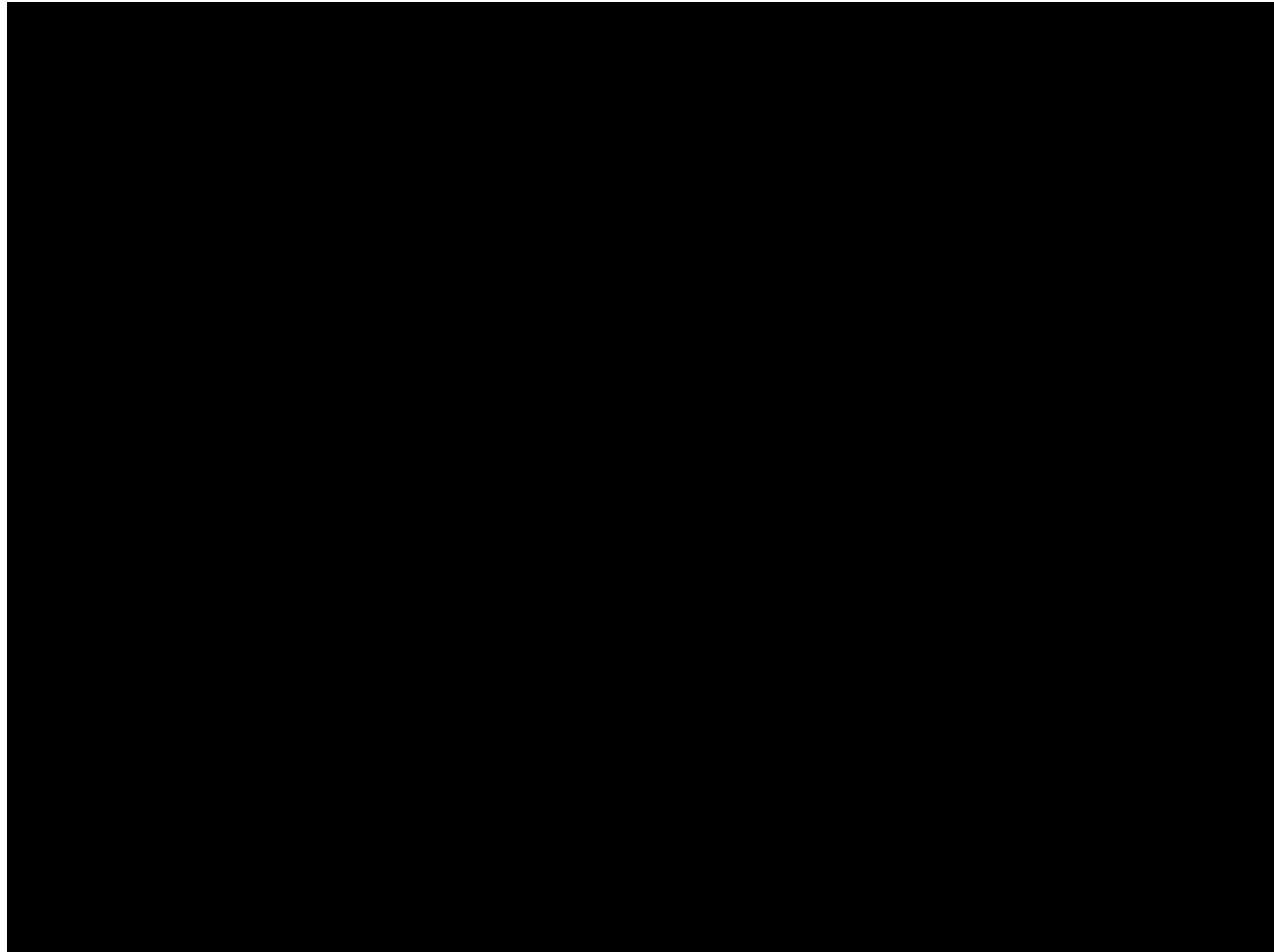


What inputs do the functions take?

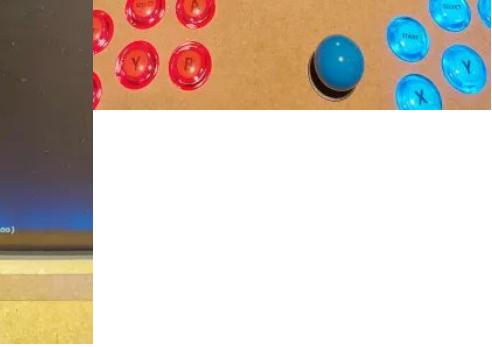
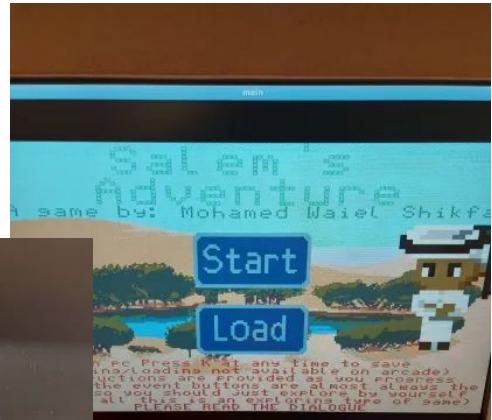
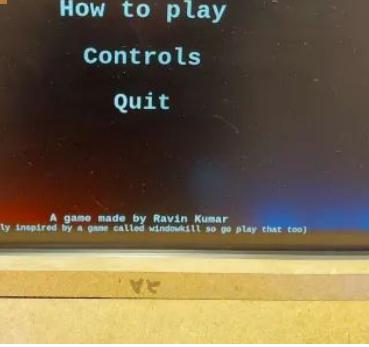
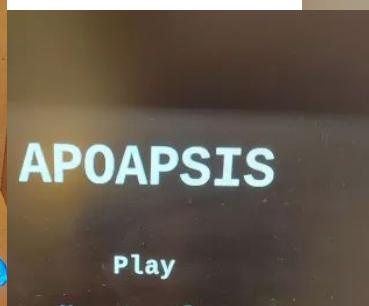
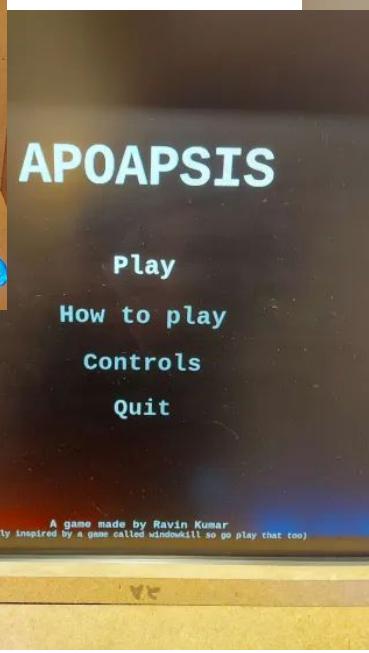
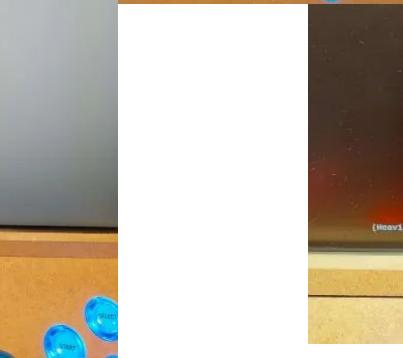
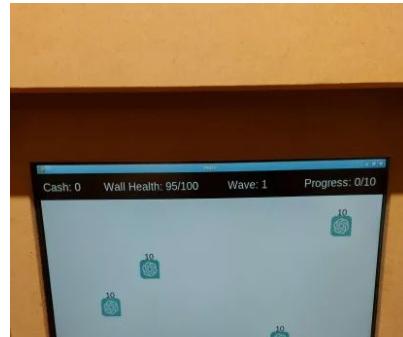
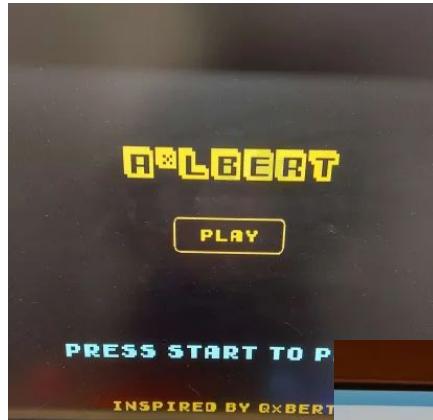
```
def onJoyPress(app, button, joystick):
    """Pressing Triangle and X triggers a size change in the circle"""
    app.text = f"Joystick {joystick} button pressed: {button}"
    if button == "3":
        app.player.getBigger()
    elif button == "0":
        app.player.getSmaller()
    # Make sure we can exit by pressing the "P1" button
    elif button == '5':
        sys.exit(0)
```



<https://github.com/CMU15-112/arcade-box-startercode>



There's many games there already



Q/A