Name: **Session:**

Programming I
Lab Exercise 11.2.2023
Creating a Paint Program

In this exercise, we will be creating a basic painting program. To be consistent with other programming languages, we will start by creating a main function. In this activity in addition to drawing, we will be looking for two specific Pygame events: MOUSEMOTION and KEYDOWN. The MOUSEMOTION event will allow us to draw lines (very short ones) and the KEYDOWN event will allow us to change drawing parameters.

When your program is complete and working, submit a screen shot of your name painted on the canvas and attach it to this sheet.

Start by importing the modules we will require:

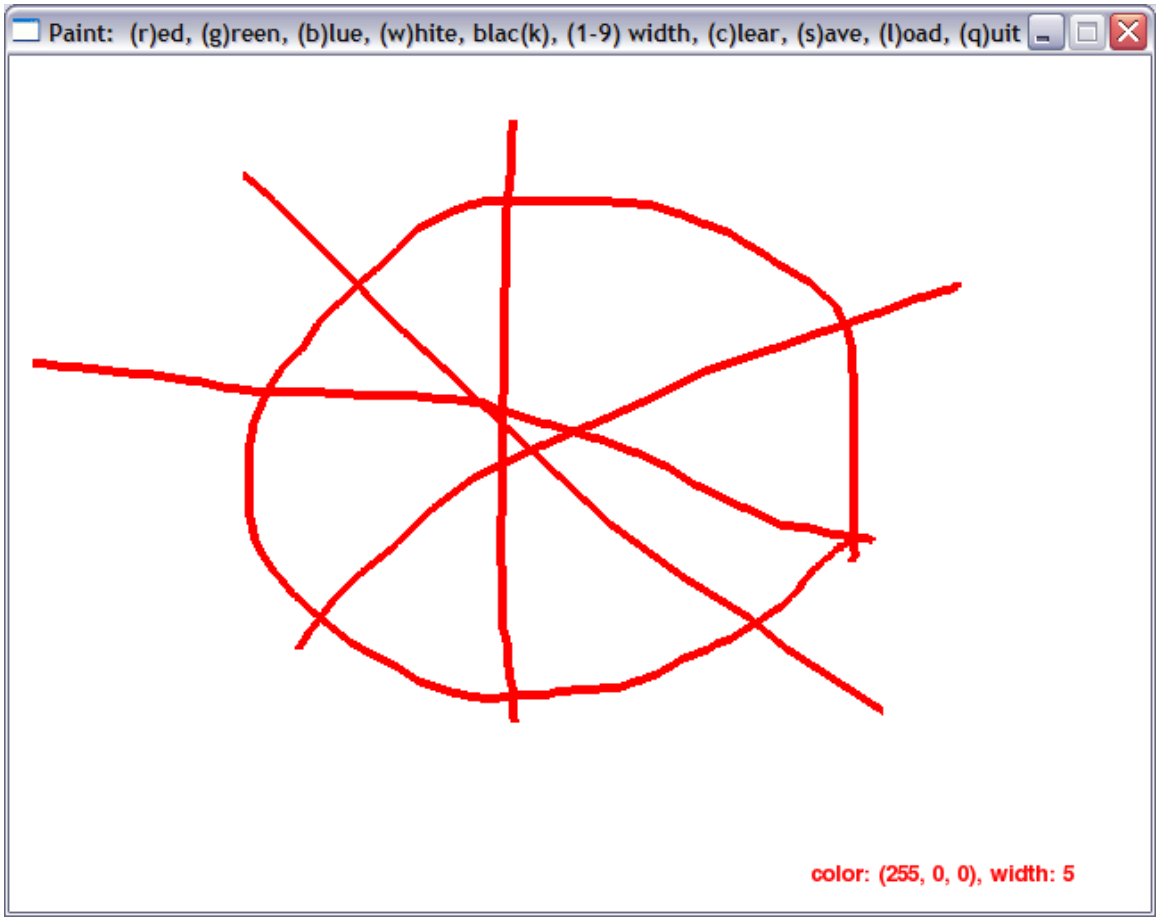
```
import pygame, sys
```

Now create a main function:

```
    #Initialize Pygame
    pygame.init()

    #Setup the screen
    screen = pygame.display.set_mode((1024, 768))
    pygame.display.set_caption("Paint:  (r)ed, (g)reen, (b)lue, (w)hite, " +
                               "blac(k), (1-9) width, (c)lear, (s)ave, "
                               + "(l)oad, (q)uit")

    #Create a background to draw on
    background = pygame.Surface(screen.get_size())

    #Make background white
    background.fill((255, 255, 255))

    #Create a clock
    clock = pygame.time.Clock()

    #Initialize variables
    keepGoing = True
    lineStart = (0, 0)
    drawColor = (0, 0, 0)
    lineWidth = 3
```

```
#Start game loop
    while keepGoing:
        #Set clock rate
        clock.tick(30)

        #Check events
        for event in pygame.event.get():
            #QUIT event
            if event.type == pygame.QUIT:
                keepGoing = False

            #MOUSEMOTION event
            elif event.type == pygame.MOUSEMOTION:
                #Store mouse position in lineEnd
                lineEnd = pygame.mouse.get_pos()

                #Draw a line if left mouse button is pressed
                if pygame.mouse.get_pressed() == (1, 0, 0):
                    pygame.draw.line(background, drawColor, lineStart,
                                     lineEnd, lineWidth)
                #Store lineEnd in lineStart
                lineStart = lineEnd

            #KEYDOWN event
            elif event.type == pygame.KEYDOWN:
                #place myData into a tuple to be passed to checkKeys
                myData = (event, background, drawColor, lineWidth, keepGoing)

                #Call checkKeys and store returned tuple in myData
                myData = checkKeys(myData)

                #unpack myData tuple
                (event, background, drawColor, lineWidth, keepGoing) = myData

        #BLIT background
        screen.blit(background, (0, 0))

        #Call showStats and store returned result in myLable
        myLabel = showStats(drawColor, lineWidth)

        #BLIT myLabel
        screen.blit(myLabel, (850, 730))

        #flip the display
        pygame.display.flip()
```

```
#End program
pygame.display.quit()
sys.exit()
```



The above screen is what we will be creating. In addition to the drawing surface, there is an information label to tell us the status of our drawing color as well as the width of our paintbrush. The caption of the window gives us information on how to use the program.

Next we must add a function to process the keys. We will call this function checkKeys.

```
def checkKeys(myData):
    #Define filename to store bitmapped image
    filename = 'myPainting.bmp'
```

The checkKeys function is passed a variety of data which must be extracted into a tuple as such:

```
    #extract the data
    (event, background, drawColor, lineWidth, keepGoing) = myData
```

This takes the data from myData and places it into the appropriate fields of the tuple.

Next we need to add the code to handle the KEYDOWN event for the following keys:
‘q’, ‘c’, ‘s’, ‘l’, ‘r’, ‘g’, ‘w’, ‘b’, ‘k’, ‘1’, ‘2’, ‘3’, ‘4’, ‘5’, ‘6’, ‘7’, ‘8’, ‘9’

```
if event.key == pygame.K_q:
        #quit
        keepGoing = False
    elif event.key == pygame.K_c:
        #clear screen
        background.fill((255, 255, 255))
    elif event.key == pygame.K_s:
        #save picture
        pygame.image.save(background, filename)
    elif event.key == pygame.K_l:
        #load picture
        background = pygame.image.load(filename)

#colors
elif event.key == pygame.K_r:
        #red
        drawColor = (255, 0, 0)
elif event.key == pygame.K_g:
        #green
            drawColor = (0, 255, 0)
elif event.key == pygame.K_w:
        #white
            drawColor = (255, 255, 255)
elif event.key == pygame.K_b:
        #blue
            drawColor = (0, 0, 255)
elif event.key == pygame.K_k:
        #black
            drawColor = (0, 0, 0)

#line widths
elif event.key == pygame.K_1:
            lineWidth = 1

#you need to add the line width code for keys 2 – 9
```

Now you need to return the data from the checkKeys function using the following code:

```
#return all values
myData = (event, background, drawColor, lineWidth, keepGoing)
return myData
```

Finally, we need to write a showStats function that will return a summary of color and line width information that can be displayed to the user.

```
def  showStats(drawColor, lineWidth):
        #shows the current statistics (lineWidth and drawColor)
        myFont = pygame.font.SysFont("None", 20)
        stats = "color: %s, width: %d" % (drawColor, lineWidth)
        statSurf = myFont.render(stats, 1, (drawColor))
        return statSurf
```

Lastly, be sure to call main()