Checkers in Python

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Description

This program creates checker pieces and a checkerboard in a pygame window with basic mouse capture by setting drawing checker pieces and controlling checker pieces as functions and classes.

Overview

Inputs for this program are only keyboard keys when prompted and mouse movement and clicks. Output is a pygame window and the checkers game.

User-Defined Functions

checkerboard()

This function draws the checkerboard pattern in an 8 by 8-pixel image, then upscales to the size of the screen

whitecp(), blackcp(), kingwhitecp(), kingblackcp()

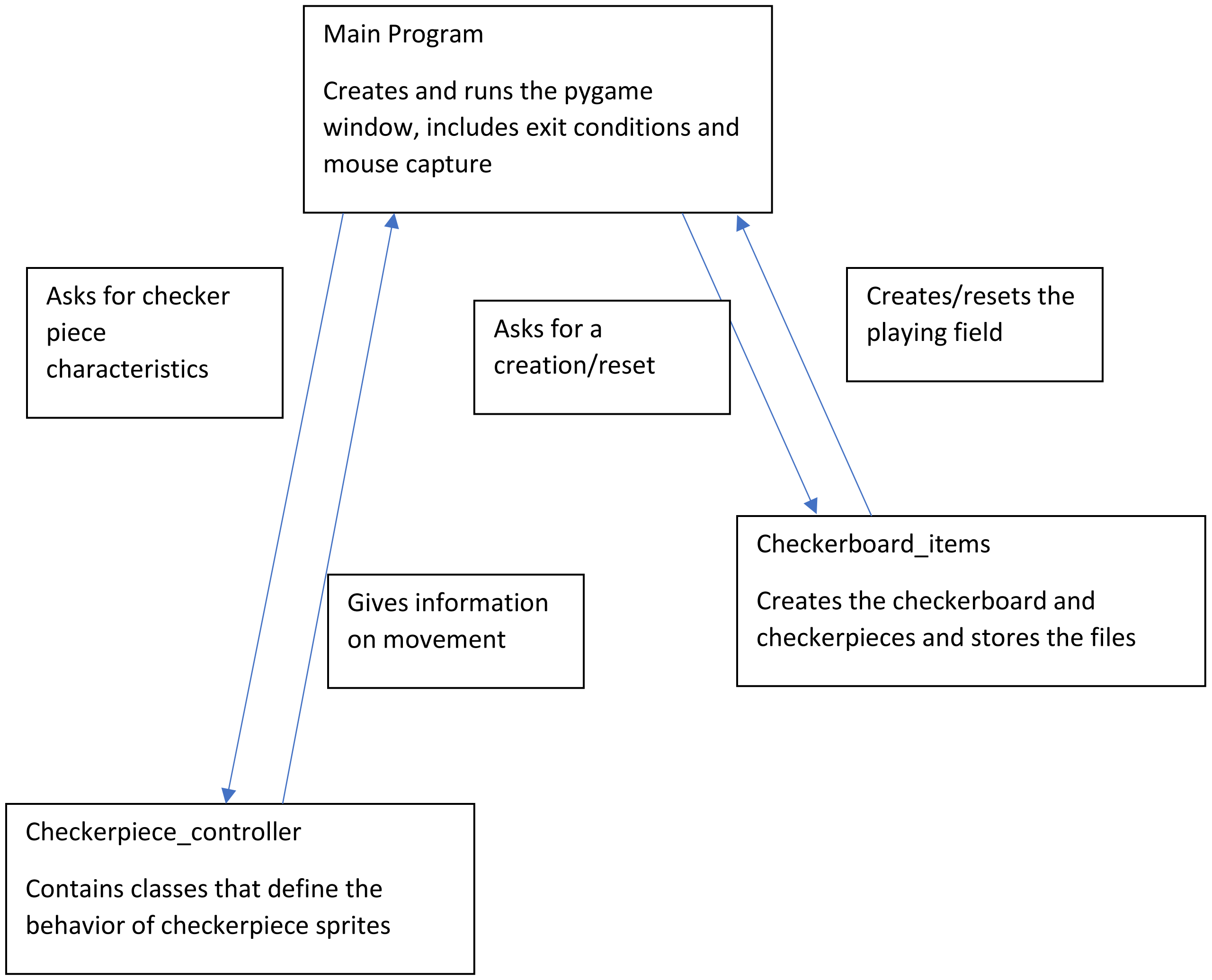
These functions draw the white checker piece, black checker piece, king white checker piece and king black checker piece, respectively.

User-Defined Classes

whitecp(), blackcp(), kingblackcp(), kingwhitecp()

These classes define the characteristics for each type of piece. These classes are referenced in the main program, where each pygame sprite is assigned an attribute from this list of classes.

Interaction Diagram


Main Program
Creates and runs the pygame window, includes exit conditions and mouse capture
Asks for checker piece characteristics
Asks for a creation/reset
Creates/resets the playing field
Checkerboard_items
Creates the checkerboard and checkerpieces and stores the files
Gives information on movement
Checkerpiece_controller
Contains classes that define the behavior of checkerpiece sprites

User Manual

====INSTRUCTIONS ON HOW TO PLAY====
The checkerboard is on a 8 by 8 checkerboard, and a display on the **right will show where** your selection is from (0,0) to (8,8)
To move a checker piece off the board, press the button "T"
To reset the game, press the button "R"
To change between a king and a regular piece, press the button "E"
To close the game, press the exit button for the window

The logic section would have added much more to the code, so currently, the movement is on an honor system
This shouldn't be a problem either way because the current game was two-player anyways

Occasionally, the game will glitch and crash on startup. If this happens, close the program and wait for the console to restart
Once the instance is reset to In [1], run again

Currently movement is not added into the game, but it includes all of the required components. The project kinda got too out of hand on complexity.

Appendix

Checkerboard items

```
#Import statements
#Uses Image for creating the .jpg file
#Uses ImageDraw for creating the shapes that represent each checkerpiece
from PIL import Image, ImageDraw

#Generates the checkerboard pattern, for initialization and reset
#First creates a 8 by 8 pixel image, then upscales to correct size
def checkerboard():
    size = 8
    pix = Image.new("RGB", (size, size), "red")
    pixelmap = pix.load()

    for x in range(8):
        for y in range(8):
            if ((x%2==0 and y%2==1) or (x%2==1 and y%2==0)):
                for i in range(x,x+1):
                    for j in range(y,y+1):
                        pixelmap[i,j] = (50, 50, 50)

    pix = pix.resize((size*100,size*100),Image.NEAREST)
    pix.save("checkerboard.jpg")

#Code for drawing checkerpieces
#Size of canvas: 100 pixels: fits on current checkerboard scaling
#Draws the white checkerpiece
def whitecp():
    size = 100
    pix = Image.new("RGB", (size, size), (50,50,50))

    draw = ImageDraw.Draw(pix)
    draw.ellipse((5,5,95,95), fill=(256,256,256))
    draw.ellipse((7,7,93,93), fill=(0,0,0))
    draw.ellipse((9,9,91,91), fill=(256,256,256))

    del draw
    pix.save("whitecp.jpg")

#Draws the black checkerpiece
def blackcp():
    size = 100
    pix = Image.new("RGB", (size, size), (50,50,50))

    draw = ImageDraw.Draw(pix)
    draw.ellipse((5,5,95,95), fill=(0,0,0))
    draw.ellipse((7,7,93,93), fill=(256,256,256))
    draw.ellipse((9,9,91,91), fill=(0,0,0))

    del draw
    pix.save("blackcp.jpg")

#Draws the white king checkerpiece
def kingwhitecp():
    size = 100
    pix = Image.new("RGB", (size, size), (50,50,50))

    draw = ImageDraw.Draw(pix)
    draw.ellipse((5,5,95,95), fill=(256,256,256))
    draw.ellipse((7,7,93,93), fill=(0,0,0))
    draw.ellipse((9,9,91,91), fill=(256,256,256))
    draw.ellipse((20,20,80,80), fill=(0,0,0))

    del draw
    pix.save("kingwhitecp.jpg")

#Draws the black king checkerpiece
def kingblackcp():
    size = 100
    pix = Image.new("RGB", (size, size), (50,50,50))

    draw = ImageDraw.Draw(pix)
    draw.ellipse((5,5,95,95), fill=(0,0,0))
    draw.ellipse((7,7,93,93), fill=(256,256,256))
    draw.ellipse((9,9,91,91), fill=(0,0,0))
    draw.ellipse((20,20,80,80), fill=(256,256,256))

    del draw
    pix.save("kingblackcp.jpg")
```

100%

Checkerboard main

```
'''
====INSTRUCTIONS ON HOW TO PLAY====
Cursor movement is really hard to code, so movement is done using the keyboard
The checkerboard is on a 8 by 8 checkerboard, and a display on the right will show where your selection is from
(0,0) to (8,8)
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To reset the game, press the button "R"
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console to restart
Once the instance is reset to In [1], run again

Currently movement is not added into the game, but it includes all of the required components
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'''

# Import Statments
import checkerboard_items as ch
import pygame
import pygame.locals
from checkerpiece_controller import blackcp, whitecp, kingwhitecp, kingblackcp

# Various variables used later
selection = [0,0]
selected = True

# Reloads images for checkerpieces and checkerboard
ch.whitecp()
ch.checkerboard()
ch.blackcp()
ch.kingwhitecp()
ch.kingblackcp()

# Initialization of pygame for visuals and control
pygame.init()

# Set up the drawing window
screen = pygame.display.set_mode([1200, 800])
pygame.display.set_caption('Checkers Game - Adrian Chen ENGR 13300')
pygame.display.toggle_fullscreen()

# Counters for checkerpieces left on either side
blackcpcount = 0
whitecpcount = 0
kingblackcpcount = 0
kingwhitecpcount = 0

# Text for the menu and game
checkerboard = pygame.image.load('checkerboard.jpg')
```

```
myfont = pygame.font.SysFont('Times New Roman', 30)

title = myfont.render('===Checkers Game===', True, (0,0,0))
restart = myfont.render('Restart - Press R', True, (0,0,0))

blackcheckercounter = myfont.render("{}={}".format("Black Checker Count", blackcpcount), True, (0,0,0))
whitecheckercounter = myfont.render("{}={}".format("White Checker Count", whitecpcount), True, (0,0,0))
blackkingcheckercounter = myfont.render("{}={}".format("Black King Checker Count", kingblackcpcount),
True, (0,0,0))
whitekingcheckercounter = myfont.render("{}={}".format("White King Checker Count", kingwhitecpcount),
True, (0,0,0))

# Loads the checkerpieces
blackcp = blackcp()
whitecp = whitecp()
kingwhitecp = kingwhitecp()
kingblackcp = kingblackcp()

# Fill the background with white and creates the static parts of the screen
screen.fill((255, 255, 255))
screen.blit(checkerboard, (0,0))
screen.blit(title, (820,10))
screen.blit(restart, (820,750))

# Generates the first set of checkerpieces
screen.blit(kingblackcp.image, (100,0))
screen.blit(blackcp.image, (300,0))
screen.blit(blackcp.image, (500,0))
screen.blit(blackcp.image, (700,0))
screen.blit(blackcp.image, (000,100))
screen.blit(blackcp.image, (200,100))
screen.blit(blackcp.image, (400,100))
screen.blit(blackcp.image, (600,100))
screen.blit(blackcp.image, (100,200))
screen.blit(blackcp.image, (300,200))
screen.blit(blackcp.image, (500,200))
screen.blit(blackcp.image, (700,200))

screen.blit(whitecp.image, (0,500))
screen.blit(whitecp.image, (200,500))
screen.blit(whitecp.image, (400,500))
screen.blit(whitecp.image, (600,500))
screen.blit(whitecp.image, (100,600))
screen.blit(whitecp.image, (300,600))
screen.blit(whitecp.image, (500,600))
screen.blit(whitecp.image, (700,600))
screen.blit(whitecp.image, (0,700))
screen.blit(whitecp.image, (200,700))
screen.blit(whitecp.image, (400,700))
screen.blit(whitecp.image, (600,700))

# Run until the user asks to quit
running = True
while running:

    # Exit the loop if the exit button is pressed on the window
```

```
for event in pygame.event.get():
    if event.type == pygame.QUIT:
        running = False

# If the R button is pressed, reset all the checkerpieces back to where they were
if event.type == pygame.KEYDOWN and event.key == pygame.K_r:
    screen.blit(blackcp.image, (100,0))
    screen.blit(blackcp.image, (300,0))
    screen.blit(blackcp.image, (500,0))
    screen.blit(blackcp.image, (700,0))
    screen.blit(blackcp.image, (000,100))
    screen.blit(blackcp.image, (200,100))
    screen.blit(blackcp.image, (400,100))
    screen.blit(blackcp.image, (600,100))
    screen.blit(blackcp.image, (100,200))
    screen.blit(blackcp.image, (300,200))
    screen.blit(blackcp.image, (500,200))
    screen.blit(blackcp.image, (700,200))

    screen.blit(whitecp.image, (0,500))
    screen.blit(whitecp.image, (200,500))
    screen.blit(whitecp.image, (400,500))
    screen.blit(whitecp.image, (600,500))
    screen.blit(whitecp.image, (100,600))
    screen.blit(whitecp.image, (300,600))
    screen.blit(whitecp.image, (500,600))
    screen.blit(whitecp.image, (700,600))
    screen.blit(whitecp.image, (0,700))
    screen.blit(whitecp.image, (200,700))
    screen.blit(whitecp.image, (400,700))
    screen.blit(whitecp.image, (600,700))

# Moves the selection
pygame.key.set_repeat(2)
if event.type == pygame.KEYDOWN and event.key == pygame.K_UP:
    if selection[0] != 0:
        selection[0] -= 1
        print(selection)
if event.type == pygame.KEYDOWN and event.key == pygame.K_RIGHT:
    if selection[1] != 8:
        selection[1] += 1
        print(selection)
if event.type == pygame.KEYDOWN and event.key == pygame.K_DOWN:
    if selection[0] != 8:
        selection[0] += 1
        print(selection)
if event.type == pygame.KEYDOWN and event.key == pygame.K_LEFT:
    if selection[1] != 0:
        selection[1] -= 1
        print(selection)
if event.type == pygame.KEYDOWN and event.key == pygame.K_SPACE:
    if selected == True:
        selected == False
        print(selected)
    else:
        selected == True
```

```
            print(selected)

    # Adds checker type counters
    blackcheckercounter = myfont.render("{}={}".format("Black Checker Count", blackcpcount), True, (0,0,0))
    whitecheckercounter = myfont.render("{}={}".format("White Checker Count", whitecpcount), True, (0,0,0))
    blackkingcheckercounter = myfont.render("{}={}".format("Black King Checker Count", kingblackcpcount),
True, (0,0,0))
    whitekingcheckercounter = myfont.render("{}={}".format("White King Checker Count", kingwhitecpcount),
True, (0,0,0))
    selectionblit = myfont.render("{}={}".format("Selection", selection), True, (0,0,0))
    pygame.draw.rect(screen, (255, 255,255), (820,40,500,300))
    screen.blit(blackcheckercounter, (820,40))
    screen.blit(whitecheckercounter, (820,70))
    screen.blit(blackkingcheckercounter, (820,100))
    screen.blit(whitekingcheckercounter, (820,130))
    screen.blit(selectionblit, (820,160))
    pygame.display.flip()

#Exits the program
pygame.quit()
```

Checkerboard controller

```
# Import Statments
import pygame

# Classes defines position and sprite appearance for black, white, king black and king white checkerpieces
# Includes mouse capture and movement
class blackcp(pygame.sprite.Sprite):
    def __init__(self):
        super().__init__()
        pygame.sprite.Sprite.__init__(self)
        self.surf = pygame.Surface((100,100))
        self.image = pygame.image.load('blackcp.jpg').convert_alpha()
        self.rect = self.surf.get_rect()
        '''
        while True:
            for event in pygame.event.get():
                if event.type == pygame.MOUSEBUTTONDOWN and event.button == 1:
                    pos = pygame.mouse.get_pos()
                    if self.rect.collidepoint(event.pos):
                        return
                        '''

class whitecp(pygame.sprite.Sprite):
    def __init__(self):
        super().__init__()
        pygame.sprite.Sprite.__init__(self)
        self.surf = pygame.Surface((100,100))
        self.image = pygame.image.load('whitecp.jpg').convert_alpha()
        self.rect = self.surf.get_rect()
        '''
        while True:
            for event in pygame.event.get():
                if event.type == pygame.MOUSEBUTTONDOWN and event.button == 1:
                    pos = pygame.mouse.get_pos()
                    if self.rect.collidepoint(event.pos):
                        return
                        '''

class kingblackcp(pygame.sprite.Sprite):
    def __init__(self):
        super().__init__()
        pygame.sprite.Sprite.__init__(self)
        self.surf = pygame.Surface((100,100))
        self.image = pygame.image.load('kingblackcp.jpg').convert_alpha()
        self.rect = self.surf.get_rect()
        '''
        while True:
            for event in pygame.event.get():
                if event.type == pygame.MOUSEBUTTONDOWN and event.button == 1:
                    pos = pygame.mouse.get_pos()
                    if self.rect.collidepoint(event.pos):
                        return
                        '''

class kingwhitecp(pygame.sprite.Sprite):
```

```
def __init__(self):
    super().__init__()
    pygame.sprite.Sprite.__init__(self)
    self.surf = pygame.Surface((100,100))
    self.image = pygame.image.load('kingwhitecp.jpg').convert_alpha()
    self.rect = self.surf.get_rect()
    '''
    while True:
        for event in pygame.event.get():
            if event.type == pygame.MOUSEBUTTONDOWN and event.button == 1:
                pos = pygame.mouse.get_pos()
                if self.rect.collidepoint(event.pos):
                    return
                    '''
```