

# APCSP Program Code

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1
2 # Images and media used in game:
3 # [1] Galaxy Background Image - https://www.pinterest.com.mx/pin/343610646540535196/?nic_v1=1aTdf4H5i2BvM8zrzbvEZJsp9y53q2DVjsUUmih28MD28312FHH2BLGz47w5tw8GF5H6wJ
4 # [2] Fireball Sprites - https://www.seekpng.com/png/u2q8a9u2i1r5u2r5_meteor-design/ (Edited the colors of the sprite)
5 # [3] Bullet Sound Effect - https://www.zapsplat.com/music/retro-sci-fi-laser-beam-version-2/
6 # [4] Spaceship Sprite - https://www.seekpng.com/png/u2q8q8q8y3y3e6_preview_sprite-spaceship-png/ (Edited the colors of the sprite)
7
8 # Libraries:
9 import random
10 import time
11 import pygame
12 pygame.init()
13
14 # Game Window:
15 gameWindowWidth = 500
16 gameWindowHeight = 500
17 gameWindow = pygame.display.set_mode((gameWindowWidth, gameWindowHeight))
18 background = pygame.image.load("galaxy.jpg")
19 pygame.display.set_caption("Game Window")
20
21 # Classes:
22 class textClass():
23     def __init__(self, txt, color, size):
24         self.text = txt
25         self.textColor = color
26         self.textSize = size
27         self.textFont = "freesansbold.ttf"
28     def textDisplay(self):
29         font = pygame.font.Font(self.textFont, self.textSize)
30         displayText = font.render(self.text, True, self.textColor)
31         return displayText
32
33 class spaceship():
34     def __init__(self, x, y):
35         self.spaceShipx = x
36         self.spaceShipy = y
37         self.spaceShipWidth = 64
38         self.spaceShipHeight = 64
39         self.spaceShipSpeed = 10
40         self.spaceShipSprite = pygame.image.load("spaceship.png")
41     def spaceshipLeft(self):
42         self.spaceShipx -= self.spaceShipSpeed
43     def spaceshipRight(self):
44         self.spaceShipx += self.spaceShipSpeed
45     def spaceshipUp(self):
46         self.spaceShipy -= self.spaceShipSpeed
47     def spaceshipDown(self):
48         self.spaceShipy += self.spaceShipSpeed
49     def drawSpaceShip(self):
50         gameWindow.blit(self.spaceShipSprite, (self.spaceShipx, self.spaceShipy))
51
52 class bulletClass():
53     def __init__(self, x, y):
54         self.bulletx = x
55         self.bulley = y
56         self.bulletWidth = 3
57         self.bulletHeight = 7
58         self.bulletSpeed = 8
59         self.bulletColor = (255, 0, 0)
60     def bulletCollision(self, list):
61         list.pop(list.index(self))
62     def moveBullet(self):
63         self.bulley -= self.bulletSpeed
64     def drawBullet(self):
65         pygame.draw.rect(gameWindow, self.bulletColor, (self.bulletx, self.bulley, self.bulletWidth, self.bulletHeight))
66
67 class fireballClass():
68     def __init__(self, x, y):
69         self.fireballx = x
70         self.firebally = y
71         self.fireballWidth = 29
72         self.fireballHeight = 65
73         self.fireballSpeed = 8
74         self.fireballRandNum = random.randint(0, 1)
75         self.fireballPlus = False
76         self.fireballMinus = False
77         self.fireballSprite = pygame.image.load("fireball.png")
78     def fireballCollision(self, list):
79         list.pop(list.index(self))
80     def moveFireball(self):
81         self.firebally += self.fireballSpeed
82     def drawFireball(self):
83         gameWindow.blit(self.fireballSprite, (self.fireballx, self.firebally))
84
85 # Score Tracking:
86 def scoreListMethod(list, num):
87     list.append(str(num) + " ")
88
89 def scoreFileWriteMethod(list):
90     scoreFileWrite = open("playerScore.txt", "a")
91     scoreFileWrite.writelines(list)
92
93 def listSplitMethod(list):
94     return list[0].split()
95
96 def listConvertNum(list):
97     for x in range(0, len(list)):
98         list[x] = int(list[x])
99
100 def scoringMethod():
101     scoreFileRead = open("playerScore.txt", "r")
102     scoreFileText = scoreFileRead.read()
103     scoreFileList = []
104     scoreFileList.append(scoreFileText)
105     scoreFileList2 = listSplitMethod(scoreFileList)
106     listConvertNum(scoreFileList2)
107     highScore = max(scoreFileList2)
108     if len(scoreFileList2) == 0:
109         highScore = 0
110     return highScore
111
112 # Music and Sound Effects:
113 def playBulletSoundEffect():
114     pygame.mixer.music.load("bulletsondeffect.wav")
115     pygame.mixer.music.play()
116
117 # Game Over:
118 red = (255, 0, 0)
119 gameOver = textClass("Game Over!", red, 50)
120 gameOverTextDisplay = gameOver.textDisplay()
121 gameOverRect = gameOverTextDisplay.get_rect()
122 gameOverRect.center = ((gameWindowWidth/2), (gameWindowHeight/2))
123 def gameOverMethod():
124     gameWindow.blit(gameOverTextDisplay, gameOverRect)
125     pygame.display.update()
126     time.sleep(2)
127     introLoop()
128
129 # New Record:
130 newRecord = textClass("New Record!", red, 50)
131 newRecordTextDisplay = newRecord.textDisplay()
132 newRecordRect = newRecordTextDisplay.get_rect()
133 newRecordRect.center = ((gameWindowWidth/2), (gameWindowHeight/2))
134 def newRecordMethod():
135     gameWindow.blit(newRecordTextDisplay, newRecordRect)
136     pygame.display.update()
137     time.sleep(2)
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139: introLoop()
140:
141: # Collisions:
142: def bulletCollision(x1, y1, width1, height1, x2, y2, width2, height2):
143:     if x2 <= x1 <= x2 + width2 and y2 <= y1 <= y2 + height2:
144:         return True
145:     elif x2 <= x1 + width1 <= x2 + width2 and y2 <= y1 <= y2 + height2:
146:         return True
147:     else:
148:         return False
149:
150: def spaceshipCollision(x1, y1, width1, height1, x2, y2, width2, height2):
151:     if x2 <= x1 <= x2 + width2 and y2 <= y1 <= y2 + height2:
152:         return True
153:     elif x2 <= x1 + width1 <= x2 + width2 and y2 <= y1 <= y2 + height2:
154:         return True
155:     elif x2 <= x1 + width1 <= x2 + width2 and y2 <= y1 + height1 <= y2 + height2:
156:         return True
157:     elif x2 <= x1 + width1 <= x2 + width2 and y2 <= y1 + height1 <= y2 + height2:
158:         return True
159:     elif x1 <= x2 <= x1 + width1 and x1 <= x2 + width2 <= x1 + width1:
160:         if y1 <= y2 + height2 <= y1 + height1 and y1 <= y2 + height2 <= y1 + height1:
161:             return True
162:     else:
163:         return False
164:
165: # Key Presses:
166: def keyPresses(obj):
167:     keyPressed = pygame.key.get_pressed()
168:     if keyPressed[pygame.K_LEFT] == True and obj.spaceShipx >= 0:
169:         obj.spaceShipLeft()
170:     elif keyPressed[pygame.K_RIGHT] == True and obj.spaceShipx <= gameWindowWidth - obj.spaceShipWidth:
171:         obj.spaceShipRight()
172:     elif keyPressed[pygame.K_UP] == True and obj.spaceShipy >= 0:
173:         obj.spaceShipUp()
174:     elif keyPressed[pygame.K_DOWN] == True and obj.spaceShipy <= gameWindowHeight - obj.spaceShipHeight:
175:         obj.spaceShipDown()
176:
177: def moveBullets(list, obj):
178:     keyPressed = pygame.key.get_pressed()
179:     if keyPressed[pygame.K_SPACE] == True:
180:         playBulletSoundEffect()
181:         if len(list) < 25:
182:             list.append(bulletClass(round(obj.spaceShipx + obj.spaceShipWidth // 2), obj.spaceShipy))
183:
184: # IntroLoop Method:
185: def introPlayedMethod():
186:     played = open("playerScore.txt", "r")
187:     playedData = played.read()
188:     playedList = []
189:     playedList.append(playedData)
190:     playedList2 = listSplitMethod(playedList)
191:     return len(playedList2)
192:
193: # Game:
194: def gameLoop():
195:     # Objects:
196:     spaceship = spaceShip(215, 400)
197:     bulletList = []
198:     fireballList = []
199:     score = 0
200:     scoreList = []
201:     gameRunning = True
202:     while gameRunning == True:
203:         for event in pygame.event.get():
204:             if event.type == pygame.QUIT:
205:                 gameRunning = False
206:                 playerHighScore = scoringMethod()
207:             # Bullets:
208:             for bullet in bulletList:
209:                 if bullet.bullety < gameWindowHeight and bullet.bullety > 0:
210:                     bullet.moveBullet()
211:                 else:
212:                     bulletList.pop(bulletList.index(bullet))
213:
214:             # Fireballs:
215:             for fireball in fireballList:
216:                 if fireball.firebally < gameWindowHeight and fireball.firebally > 0:
217:                     fireball.moveFireball()
218:                 else:
219:                     fireballList.pop(fireballList.index(fireball))
220:             if fireball.fireballRandNum == 1:
221:                 fireball.fireballSprite = pygame.image.load('fireball2.png')
222:                 fireball.fireballPlus = False
223:             else:
224:                 fireball.fireballSprite = pygame.image.load('fireball.png')
225:                 fireball.fireballPlus = True
226:             if len(fireballList) < 4:
227:                 fireballList.append(fireballClass(random.randrange((spaceship.spaceShipWidth // 2), (gameWindowWidth - (spaceship.spaceShipWidth))), 1))
228:
229:             moveBullets(bulletList, spaceship)
230:             keyPresses(spaceship)
231:
232:             # Collisions and Crashing:
233:             for bullet in bulletList:
234:                 for fireball in fireballList:
235:                     collision = bulletCollision(bullet.bulletx, bullet.bullety, bullet.bulletWidth, bullet.bulletHeight, fireball.fireballx, fireball.firebally, fireball.fireballWidth, fireball.fireballHeight)
236:                     if collision == True:
237:                         fireball.fireballCollision(fireballList)
238:                         bullet.bulletCollision(bulletList)
239:                         if fireball.fireballPlus == True:
240:                             score += 1
241:                         else:
242:                             score -= 1
243:
244:             for fireball in fireballList:
245:                 crash = spaceshipCollision(spaceship.spaceShipx, spaceship.spaceShipy, spaceship.spaceShipWidth, spaceship.spaceShipHeight, fireball.fireballx, fireball.firebally, fireball.fireballWidth, fireball.fireballHeight)
246:                 if crash == True:
247:                     scoreListMethod(scoreList, score)
248:                     scoreFileWriteMethod(scoreList)
249:                     if score > playerHighScore:
250:                         newRecordMethod()
251:                     else:
252:                         gameOverMethod()
253:
254:             # FPS:
255:             gameClock = pygame.time.Clock()
256:             gameClock.tick(30)
257:
258:             # Score Text:
259:             scoreText = textClass("Score: " + str(score), red, 15)
260:             scoreDisplayText = scoreText.textDisplay()
261:             highScoreText = textClass("High Score: " + str(playerHighScore), red, 15)
262:             highScoreDisplayText = highScoreText.textDisplay()
263:
264:             gameWindow.blit(background, (0, 0))
265:             spaceship.drawSpaceShip()
266:             for bullet in bulletList:
267:                 bullet.drawBullet()
268:             for fireball in fireballList:
269:                 fireball.drawFireball()
270:             gameWindow.blit(scoreDisplayText, (430, 20))
271:             gameWindow.blit(highScoreDisplayText, (392, 35))
272:             pygame.display.update()
273:             pygame.quit()
274:
275: def introLoop():
276:     # Main Loop
277:     gameRunning = True
278:     while gameRunning == True:
279:         for event in pygame.event.get():

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282     if event.type == pygame.QUIT:
283         gameRunning = False
284
285     # Avoid crashing into fireballs.
286     red = (255, 0, 0)
287     rule1Text = textClass("Avoid crashing into fireballs.", red, 25)
288     rule1DisplayText = rule1Text.textDisplay()
289
290     # Arrow keys to move. Space to shoot.
291     rule2Text = textClass("Arrow keys to move. Space to shoot.", red, 25)
292     rule2DisplayText = rule2Text.textDisplay()
293
294     # Orange fireballs increase your score.
295     orange = (255, 162, 0)
296     rule3Text = textClass("Orange fireballs increase your score.", orange, 25)
297     rule3DisplayText = rule3Text.textDisplay()
298
299     # Blue fireballs decrease your score.
300     blue = (0, 81, 255)
301     rule4Text = textClass("Blue fireballs decrease your score.", blue, 25)
302     rule4DisplayText = rule4Text.textDisplay()
303
304     # This game has been played ___ times.
305     playedLen = introPlayedMethod()
306     playedText = textClass("This game has been played " + str(playedLen) + " time(s).", red, 25)
307     playedDisplayText = playedText.textDisplay()
308
309     # Press Q to continue.
310     pressQText = textClass("Press Q to continue to game.", red, 25)
311     pressQDisplayText = pressQText.textDisplay()
312
313     # Key Presses
314     keyPressed = pygame.key.get_pressed()
315     if keyPressed[pygame.K_q] == True:
316         gameLoop()
317
318     black = (0, 0, 0)
319     gameWindow.fill(black)
320     gameWindow.blit(rule1DisplayText, (75, 50))
321     gameWindow.blit(rule2DisplayText, (30, 85))
322     gameWindow.blit(rule3DisplayText, (22, 120))
323     gameWindow.blit(rule4DisplayText, (37, 155))
324     gameWindow.blit(playedDisplayText, (9, 190))
325     gameWindow.blit(pressQDisplayText, (73, 225))
326     pygame.display.update()
327     pygame.quit()
328     introLoop()

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