

## Exercise: Final Project | CMU CS Academy

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1 #Henry Zutter, 2021-2022, Space Invaders
2 app.background = 'black'
   title = Group(Label('SPACE INVADERS', 200, 55, size=45, fill=rgb(0, 255, 0), font='mono
   space', bold=True), Label('arrow keys to move, space to shoot, enemies will slowly move
   towards you.', 200, 100, fill=rgb(0, 255, 0), size=11, bold=True), Rect(100, 200, 45, 1
3   5, fill=rgb(0, 255, 0), align='center'), Label('YOU', 100, 180, fill=rgb(0, 255, 0)), O
   val(300, 200, 45, 15, fill=rgb(0, 255, 0)), Label('/:<', 300, 180, fill=rgb(0, 255, 0),
   size=15))
4 player = Rect(200, 370, 45, 15, fill=rgb(0, 255, 0), align='center', visible = False)
5 enemies = Group()
6 lwv = Label('.', 200, 200, size=50, fill=rgb(0, 255, 0))
7 app.level = 1
8 enemies.dx = 10
9 score = Label(0, 20, 20, fill=rgb(0, 255, 0), bold=True, size=30)
10 score.visible = False
11 for row in range(5):
12     for col in range(6):
13         enemies.add(Oval(72.5+(col*50), 25+(row*20), 45, 15, fill=rgb(0, 255, 0)))
14 enemies.centerX = 200
15 enemies.visible = False
16 app.steps = 0
17 lasers = Group()
18 booms = Group()
19
20 def makeABoom(x, y):
21     booms.add(Circle(x, y, 2, fill=None, border=rgb(0, 255, 0), borderWidth = 5))
22
23 def onStep():
24     score.left = 5
25     app.steps += 1
26     for boom in booms.children:
27         boom.radius += 5
28         boom.opacity -= 5
29         if boom.opacity == 20:
30             boom.visible = False
31             booms.remove(boom)
32     if app.steps == 100 and title.visible == True:
33         title.visible = False
34         player.visible = True
35         enemies.visible = True
36         score.visible = True
37     if app.steps == 1100 and title.visible == True:
38         title.visible = False
39         lwv.visible = False
40     if title.visible == False and (app.steps+1)%(10//app.level) == 0:
41         if (enemies.right >= 397.5 and enemies.dx == 10) or (enemies.left <= 2.5 and en
   enemies.dx == -10):
42             enemies.dx*=-1
43             enemies.centerY += 20
44         else:
45             enemies.centerX += enemies.dx
46     for laser in lasers.children:
47         laser.centerY += laser.dy+app.level-1
48         if laser.bottom < 0 or laser.top > 400:
49             lasers.remove(laser)

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50     if laser.hitsShape(player)==True:
51         if laser.dy == 10:
52             player.visible = False
53             Label('GAME OVER', 200, 50, size=50, fill='red')
54             app.stop()
55     for enemy in enemies.children:
56         if laser.hitsShape(enemy) == True and laser.dy == -10:
57             makeABoom(enemy.centerX, enemy.centerY)
58             enemies.remove(enemy)
59             lasers.remove(laser)
60             score.value += 1
61
62         if enemy.hitsShape(player)==True:
63             player.visible = False
64             Label('GAME OVER', 200, 50, size=50, fill='red')
65             app.stop()
66     if len(enemies.children) == 0:
67         app.level += 1
68         score.value += 10
69         title.visible = True
70         title.opacity = 0
71         lwv.value = 'LEVEL '+str(app.level)
72         lasers.clear
73         booms.clear
74         for row in range(5):
75             for col in range(6):
76                 enemies.add(Oval(72.5+(col*50), 25+(row*20), 45, 15, fill=rgb(0, 255, 0
77 )))
78         enemies.centerX = 200
79         app.steps = 1000
80     def onKeyHold(keys):
81         if title.visible == False:
82             if 'left' in keys:
83                 player.centerX -= 5
84             if 'right' in keys:
85                 player.centerX += 5
86
87     def onKeyPress(key):
88         if title.visible == False:
89             if key == 'space' and len(lasers.children) < 1:
90                 laser = Line(200, 200, 200, 215, fill=rgb(0, 255, 0))
91                 laser.dy = -10
92                 laser.centerX = player.centerX
93                 laser.centerY = 365
94                 lasers.add(laser)
95                 laser2 = Line(200, 200, 200, 215, fill=rgb(0, 255, 0))
96                 laser2.dy = 10
97                 enemy = enemies.children[randrange(len(enemies.children))]
98                 laser2.centerX = enemy.centerX
99                 laser2.top = enemy.bottom
100                lasers.add(laser2)
101                laser3 = Line(200, 200, 200, 215, fill=rgb(0, 255, 0))
102                laser3.dy = 10
103                enemy2 = enemies.children[randrange(len(enemies.children))]
104                laser3.centerX = enemy2.centerX
105                laser3.top = enemy2.bottom

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106         lasers.add(laser3)
107
108 #COPYRIGHT...
109 Label('@ 2021/22 Henry Zutter', 65, 390, size=8, fill='white')
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