Space Invader Game

OOPCGL – Mini Project

(Semester - III)

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SECOND YEAR ENGINEERING

Society for Computer Technology and Research's

PUNE INSTITUTE OF COMPUTER TECHNOLOGY

DHANKAWADI, PUNE – 43

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========== Second Year Engineering PICT, PUNE-43

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Aim: To design and implement game using open-source tools.

Objectives: Make use of maximum features of Object-Oriented Programming.

Technologies Used: Python game development library 'PyGame.'

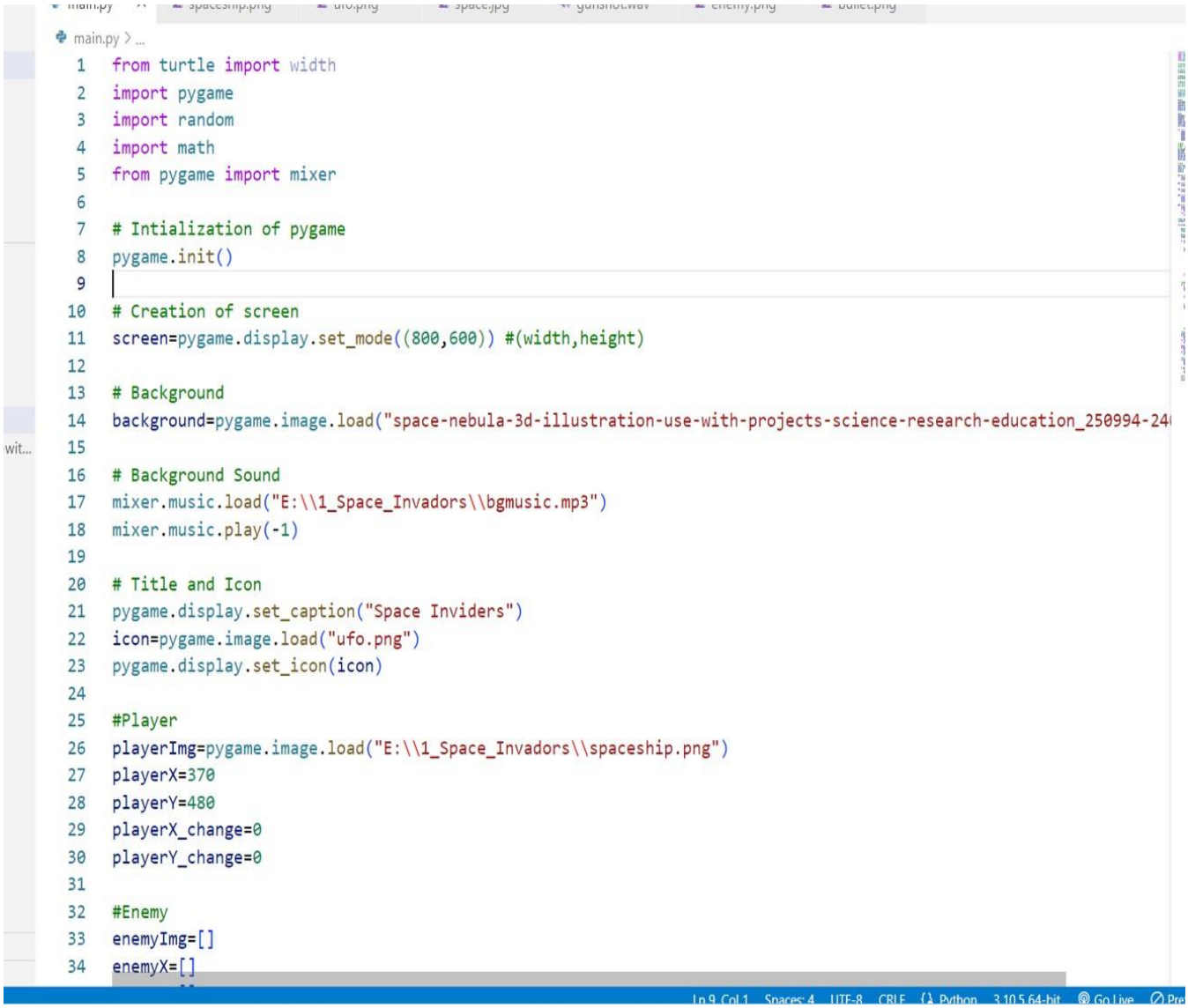
Brief Description:

In this mini project we have developed a 'Space Invaders Game' by using PyGame game development library i.e. PyGame.

Functions Used:

1. **pygame.display:** pygame module to control the display window and screen.
2. **pygame.mixer:** For loading and playing songs.
3. **pygame.event:** For interacting with events and queues.
4. **pygame.font:** Loading and rendering true type fonts.
5. **pygame.image:** Loading saving and transferring of surfaces.

Code and Output Snippets:



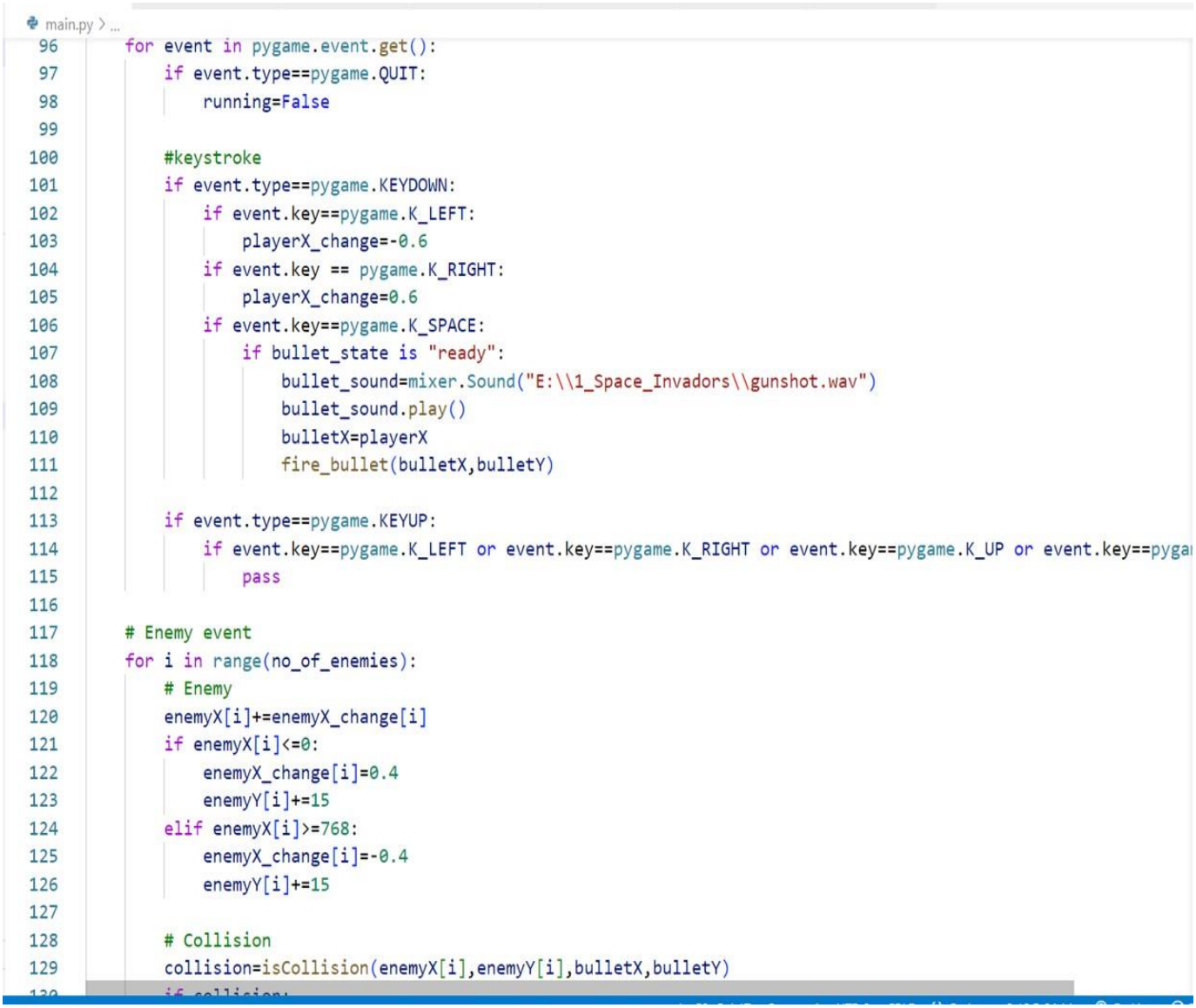
```python
from turtle import width
import pygame
import random
import math
from pygame import mixer

# Intialization of pygame
pygame.init()

# Creation of screen
screen=pygame.display.set_mode((800,600)) #(width,height)

# Background
background=pygame.image.load("space-nebula-3d-illustration-use-with-projects-science-research-education_250994-24

# Background Sound
mixer.music.load("E:\\1_Space_Invadors\\bgmusic.mp3")
mixer.music.play(-1)

# Title and Icon
pygame.display.set_caption("Space Inviders")
icon=pygame.image.load("ufo.png")
pygame.display.set_icon(icon)

#Player
playerImg=pygame.image.load("E:\\1_Space_Invadors\\spaceship.png")
playerX=370
playerY=480
playerX_change=0
playerY_change=0

#Enemy
enemyImg=[]
enemyX=[]
```

main.py > ...

```
33  enemyImg=[]
34  enemyX=[]
35  enemyY=[]
36  enemyX_change=[]
37  enemyY_change=[]
38  no_of_enemies=5
39
40  for i in range(no_of_enemies):
41      enemyImg.append(pygame.image.load("E:\\1_Space_Invadors\\enemy.png"))
42      enemyX.append(random.randint(0,735))
43      enemyY.append(random.randint(0,150))
44      enemyX_change.append(0.8)
45      enemyY_change.append(0.8)
46
47  # Bullet
48  # Ready : you can't see the bullet on the screen
49  # Fire : the bullet is currently moving
50  bulletImg=pygame.image.load("E:\\1_Space_Invadors\\bullet.png")
51  bulletX=0
52  bulletY=480
53  bulletX_change=0
54  bulletY_change=1
55  bullet_state="ready"
56
57  # Score
58  score_value=0
59  font = pygame.font.Font("freesansbold.ttf",32)
60  textX=10
61  textY=10
62
63  def show_score(x,y):
64      score=font.render("Score : "+str(score_value),True,(255,255,255))
65      screen.blit(score,(x,y))
66
```

main.py > ...

```
63  def show_score(x,y):
64      score=font.render("Score : "+str(score_value),True,(255,255,255))
65      screen.blit(score,(x,y))
66
67  def player(x,y):
68      screen.blit(playerImg,(x,y))
69
70  def enemy(x,y,i):
71      screen.blit(enemyImg[i],(x,y))
72
73  def fire_bullet(x,y):
74      global bullet_state
75      bullet_state="fire"
76      screen.blit(bulletImg,(x+16,y+10))
77
78  def isCollision(enemyX,enemyY,bulletX,bulletY):
79      distance=math.sqrt((math.pow(enemyX-bulletX,2))+(math.pow(enemyY-bulletY,2)))
80      if distance < 27:
81          return True
82      else:
83          return False
84
85  # Game loop
86  running=True
87
88  while(running):
89
90      #RGB-Red,Green,Blue
91      screen.fill((0,0,0))
92
93      #Background
94      screen.blit(background,(0,0))
95
96      for event in pygame.event.get():
```



```
main.py > ...
96      for event in pygame.event.get():
97          if event.type==pygame.QUIT:
98              running=False
99
100         #keystroke
101         if event.type==pygame.KEYDOWN:
102             if event.key==pygame.K_LEFT:
103                 playerX_change=-0.6
104             if event.key == pygame.K_RIGHT:
105                 playerX_change=0.6
106             if event.key==pygame.K_SPACE:
107                 if bullet_state is "ready":
108                     bullet_sound=mixer.Sound("E:\\1_Space_Invadors\\gunshot.wav")
109                     bullet_sound.play()
110                     bulletX=playerX
111                     fire_bullet(bulletX,bulletY)
112
113         if event.type==pygame.KEYUP:
114             if event.key==pygame.K_LEFT or event.key==pygame.K_RIGHT or event.key==pygame.K_UP or event.key==pyga
115                 pass
116
117     # Enemy event
118     for i in range(no_of_enemies):
119         # Enemy
120         enemyX[i]+=enemyX_change[i]
121         if enemyX[i]<=0:
122             enemyX_change[i]=0.4
123             enemyY[i]+=15
124         elif enemyX[i]>=768:
125             enemyX_change[i]=-0.4
126             enemyY[i]+=15
127
128         # Collision
129         collision=isCollision(enemyX[i],enemyY[i],bulletX,bulletY)
130         if collision:
```

main.py > ...

```
128         # Collision
129         collision=isCollision(enemyX[i],enemyY[i],bulletX,bulletY)
130         if collision:
131             explosion_sound=mixer.Sound("E:\\1_Space_Invadors\\explosion.wav")
132             explosion_sound.play()
133             bulletY=480
134             bullet_state="ready"
135             score_value+=1
136             print(score_value)
137             enemyX[i]=random.randint(0,735)
138             enemyY[i]=random.randint(50,150)
139 
140         enemy(enemyX[i],enemyY[i],i)
141 
142     # Player
143     playerX+=playerX_change
144     if playerX<=0:
145         playerX=0
146     elif playerX>=736:
147         playerX=736
148 
149     playerY+=playerY_change
150     if playerY<=0:
151         playerY=0
152     elif playerY>=536:
153         playerY=536
154 
155     # Bullet Movement
156     if bulletY<=0:
157         bulletY=480
158         bullet_state="ready"
159 
160     if bullet_state is "fire":
161         fire_bullet(bulletX,bulletY)
```

main.py > ...

```
149     playerY+=playerY_change
150     if playerY<=0:
151         playerY=0
152     elif playerY>=536:
153         playerY=536
154 
155     # Bullet Movement
156     if bulletY<=0:
157         bulletY=480
158         bullet_state="ready"
159 
160     if bullet_state is "fire":
161         fire_bullet(bulletX,bulletY)
162         bulletY-=bulletY_change
163 
164     player(playerX,playerY)
165     show_score(textX,textY)
166     pygame.display.update()
```

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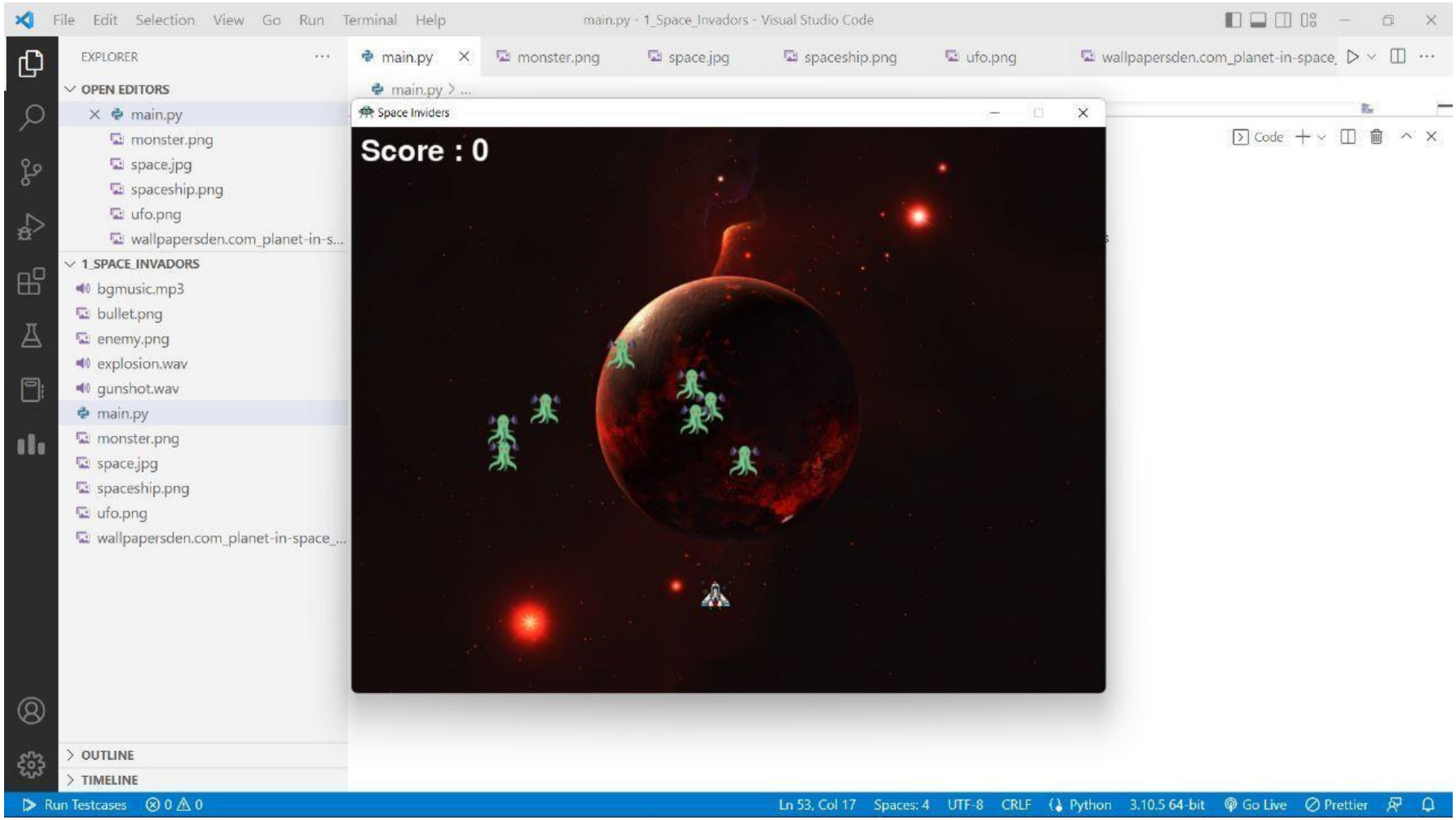
File Edit Selection View Go Run Terminal Help
main.py - 1_Space_Invadors - Visual Studio Code
EXPLORER
OPEN EDITORS
main.py
monster.png
space.jpg
spaceship.png
ufo.png
wallpapersden.com_planet-in-s...
1_SPACE_INVADORS
bgmusic.mp3
bullet.png
enemy.png
explosion.wav
gunshot.wav
main.py
monster.png
space.jpg
spaceship.png
ufo.png
wallpapersden.com_planet-in-space_...
OUTLINE
TIMELINE
main.py
monster.png
space.jpg
spaceship.png
ufo.png
wallpapersden.com_planet-in-space_
Space Inviders
Score : 0
Code
Run Testcases
Ln 53, Col 17
Spaces: 4
UTF-8
CRLF
Python
3.10.5 64-bit
Go Live
Prettier

Conclusion: We learnt basics of PyGame and successfully implemented OOPs concepts.

References:

- Geeks for Geeks.
- Reema Thareja, “Python Programming Using Problem Solving Approach” Oxford University Press