PROGRAMACIÓN DE VIDEO JUEGOS

TETRIS

POR:

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¿QUÉ ES TETRIS?

Un video juego implementado en la época de la unión sovietica, fue creado por Alekséi Pázhitnov y fue publicado un 6 de junio de 1984

1 ¿EN QUÉ CONSISTE?

Consiste en que varias piezas geométricas caen para ir rellenando la ventana, el objetivo es formar líneas para evitar que la ventana se llene

2 JUGABILIDAD

Consiste en jugar con las flechas de tu teclado para mover las fichas y cambiarles la direccion

3 LA EVOLUCIÓN

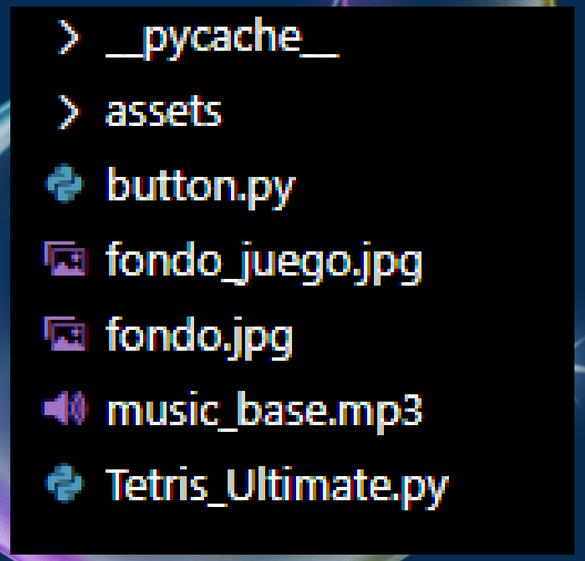
Existen muchas versiones del juego de las cuales las mas resaltadas es tetris 99

4 ¿POR QUÉ LO ESCOJIMOS?

La mayoria de nosotros conocemos y recordamos este juego con nostalgia, por el hecho que fue uno de los primeros y uno de los mas jugados.

¿QUE ES PYGAME?

Pygame es una biblioteca de python que principalmente esta orientada a la programación de video juegos en 2D




```python
import pygame
import random
import sys
from button import Button
colors = [
    (1, 1, 128),            #Azul
    (150, 50, 255),          #Morado
    (255, 128, 1),          #Naranja
    (255, 255, 1),          #Amarillo
    (25, 255, 255),          #Celeste
    (1, 255, 1),            #Verde
    (255, 1, 1),            #Rojo
]
```

```python
class Figure:
    figures = [
    [[1,5,9,13],[4,5,6,7]],                     #I
    [[1,4,5,6],[1,2,5,6],[4,5,6,10],[1,5,8,9]],     #J
    [[1,4,5,6],[1,5,6,9],[4,5,6,9],[1,4,5,9]],      #T
    [[2,4,5,6],[1,5,9,10],[4,5,6,8],[0,1,5,9]],     #L
    [[1,2,5,6]],                                #O
    [[1,2,4,5],[0,4,5,9]],                      #S
    [[0,1,5,6],[1,4,5,8]],                      #Z
    ]
    def __init__(self, x, y):...
    def image(self):                #Forma de la figura...
    def rotate(self):               #Rotacion de la figura...
class Tetris:
    def __init__(self, height, width):...
    def new_figure(self):...
    def intersects(self):...
    def break_lines(self):...
    def go_space(self):...
    def go_down(self):...
    def freeze(self):...
    def go_side(self, mov_x):...
    def rotate(self):...
class Juego:
    def __init__(self):...
    def quit(self):...
    def play(self,mievento):...
    def menu(self):...
def main():...
main()
```

```python
class Button():
    def __init__(self, image, pos, text_input, font, base_color, hovering_color):...

    def update(self, screen):...

    def checkForInput(self, position):...

    def changeColor(self, position):...
```

CLASES IMPLEMENTADAS

clase Button

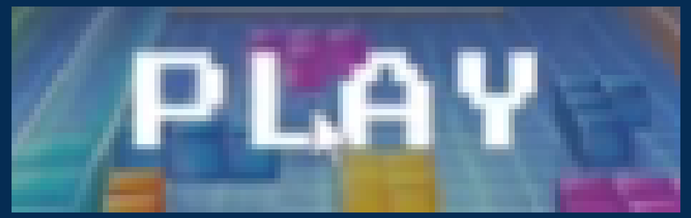
```python
class Button():
    def __init__(self, image, pos, text_input, font, base_color, hovering_color):
        self.image = image
        self.x_pos = pos[0]
        self.y_pos = pos[1]
        self.font = font
        self.base_color, self.hovering_color = base_color, hovering_color
        self.text_input = text_input
        self.text = self.font.render(self.text_input, True, self.base_color)
        if self.image is None:
            self.image = self.text
        self.rect = self.image.get_rect(center=(self.x_pos, self.y_pos))
        self.text_rect = self.text.get_rect(center=(self.x_pos, self.y_pos))

    def update(self, screen):
        if self.image is not None:
            screen.blit(self.image, self.rect)
        screen.blit(self.text, self.text_rect)
```

CLASES IMPLEMENTADAS

clase Button

```
19
20      def checkForInput(self, position):
21          if position[0] in range(self.rect.left, self.rect.right) and
22              return True
23          return False
24
25      def changeColor(self, position):
26          if position[0] in range(self.rect.left, self.rect.right) and
27              self.text = self.font.render(self.text_input, True, self.
28          else:
29              self.text = self.font.render(self.text_input, True, self.
```




```
 and position[1] in range(self.rect.top, self.rect.bottom


 and position[1] in range(self.rect.top, self.rect.bottom
self.hovering_color)

self.base_color)
```

IMPORTS Y COLORES

```
import pygame
import random
import sys
from button import Button
colors = [
    (1, 1, 128),              #Azul
    (150, 50, 255),            #Morado
    (255, 128, 1),            #Naranja
    (255, 255, 1),            #Amarillo
    (25, 255, 255),            #Celeste
    (1, 255, 1),              #Verde
    (255, 1, 1),              #Rojo
]
```

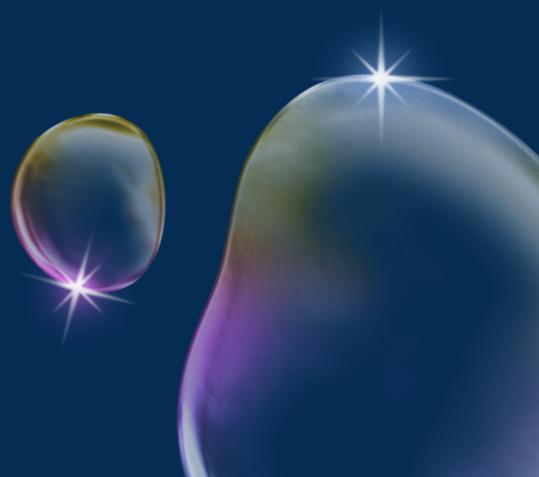
CLASES IMPLEMENTADAS

clase figura

```
class Figure:
    figures = [
    [[1,5,9,13],[4,5,6,7]],                                  #I
    [[1,4,5,6],[1,2,5,6],[4,5,6,10],[1,5,8,9]],              #J
    [[1,4,5,6],[1,5,6,9],[4,5,6,9],[1,4,5,9]],               #T
    [[2,4,5,6],[1,5,9,10],[4,5,6,8],[0,1,5,9]],              #L
    [[1,2,5,6]],                                             #O
    [[1,2,4,5],[0,4,5,9]],                                   #S
    [[0,1,5,6],[1,4,5,8]],                                   #Z
    ]
    def __init__(self, x, y):
        self.x =x                       #Posicion 3 de (0-9)
        self.y = y                       #Posicion 0 de (0-19)
        self.type=random.randint(0, len(self.figures) - 1) #Tipo figura
        self.rotation = 0                #Rotacion inicial
    def image(self):                     #Forma de la figura
        return self.figures[self.type][self.rotation]
    def rotate(self):                    #Rotacion de la figura
        self.rotation = (self.rotation + 1) % len(self.figures[self.type])
```

0	1	2	3
4	5	6	7
8	9	10	11
12	13	14	15

0	1	2	3
4	5	6	7
8	9	10	11
12	13	14	15



clase Tetris

```
class Tetris:
    def __init__(self, height, width):
        self.level = 2
        self.score = 0
        self.state = "start"
        self.field = []
        self.x = 100
        self.y = 50
        self.zoom = 20
        self.figure = None
        self.height = height
        self.width = width
        for i in range(height):
            new_line = []
            for j in range(width):
                new_line.append(-1)
            self.field.append(new_line)
```

-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
-1	-1	-1	-1	-1	-1	-1	-1	-1	-1

```
    def new_figure(self):
        self.figure = Figure(3, 0)
    def intersects(self):
        intersection = False
        for i in range(4):
            for j in range(4):
                if i * 4 + j in self.figure.image():
                    if i + self.figure.y > self.height - 1 or
                        intersection = True
        return intersection
```

[2,4,5,6]

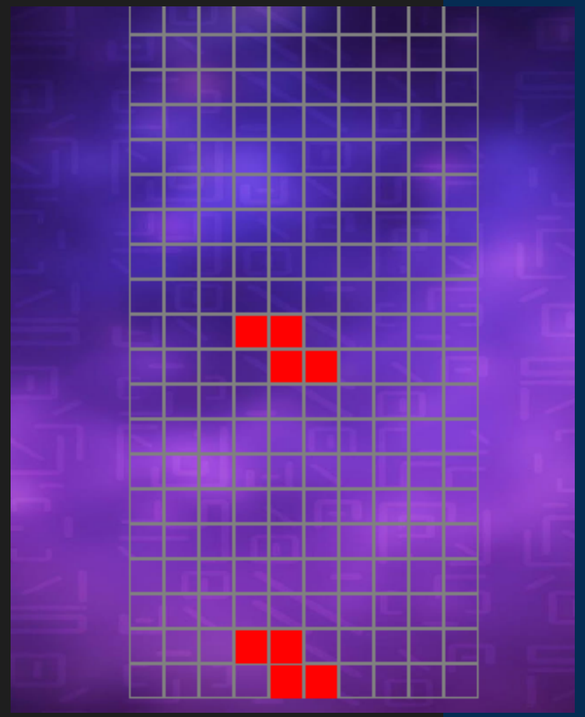
0	1	2	3
4	5	6	7
8	9	10	11
12	13	14	15

```
or j + self.figure.x < 0 or self.field[i + self.figure.y][j + self.figure.x] >= 0:
```

```python
def break_lines(self):
    lines = 0
    for i in range(1, self.height):
        zeros = 0
        for j in range(self.width):
            if self.field[i][j] == -1:
                zeros += 1
        if zeros == 0:
            lines += 1
            for i1 in range(i, 1, -1):
                for j in range(self.width):
                    self.field[i1][j] = self.field[i1 - 1][j]
    self.score += lines ** 2
def go_space(self):
    while not self.intersects():
        self.figure.y += 1
    self.figure.y -= 1
    self.freeze()
def go_down(self):
    self.figure.y += 1
    if self.intersects():
        self.figure.y -= 1
        self.freeze()
```

-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
2	3	4	1	2	3	4	5	6	3

-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
-1	-1	-1	-1	-1	-1	-1	-1	-1	-1



```
def freeze(self):
    for i in range(4):
        for j in range(4):
            if i * 4 + j in self.figure.image():
                self.field[i + self.figure.y][j + self.figure.x] = self.figure.type
    self.break_lines()
    self.new_figure()
    if self.intersects():
        self.state = "gameover"
def go_side(self, mov_x):
    old_x = self.figure.x
    self.figure.x += mov_x
    if self.intersects():
        self.figure.x = old_x
def rotate(self):
    old_rotation = self.figure.rotation
    self.figure.rotate()
    if self.intersects():
        self.figure.rotation = old_rotation
```

0	1	2	3
4	5	6	7
8	9	10	11
12	13	14	15

-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
-1	-1	-1	-1	-1	-1	3	-1	-1	-1
-1	-1	-1	-1	3	3	3	-1	-1	-1

clase Juego

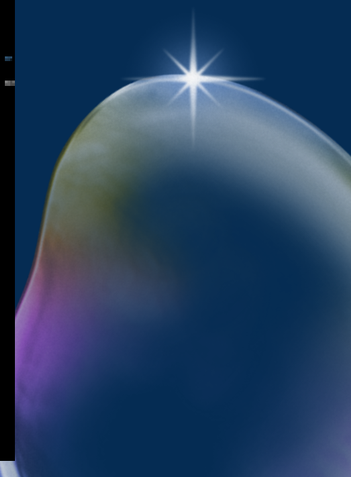
```
class Juego:
    def __init__(self):…
    def quit(self):…
    def play(self,mievento):…
    def menu(self):…
```

```
def __init__(self):
    self.size=(400, 500)
    self.screen = pygame.display.set_mode(self.size)
    pygame.display.set_caption("Tetris")
    self.fondo=pygame.image.load('fondo.jpg')
    self.fondo=pygame.transform.scale(self.fondo,self.size)
    pygame.mixer.music.load("music_base.mp3")
    self.done=False
    self.fps=5
    self.contador=0
    self.pressing_down=False
```

```
class Juego:
    def __init__(self):...
    def quit(self):...
    def play(self,mievento):...
    def menu(self):...
```

```
def quit(self):
    pygame.quit()
    sys.exit()
```

```
def menu(self):
    pygame.mixer.music.play(9)
    while not self.done:
        self.screen.blit(self.fondo,(0,0))
        MENU_MOUSE_POS = pygame.mouse.get_pos()
        PLAY_BUTTON = Button(image=pygame.transform.scale(pygame.image.load("assets/Play Rect.png"),(200,75)
        |   |   |   |   text_input="PLAY", font=pygame.font.Font("assets/font.ttf", 30), base_color="Black",
        QUIT_BUTTON = Button(image=pygame.transform.scale(pygame.image.load("assets/Quit Rect.png"),(200,75)
        |   |   |   |   text_input="QUIT", font=pygame.font.Font("assets/font.ttf", 30), base_color="Black",
        for button in [PLAY_BUTTON,QUIT_BUTTON]:
            button.changeColor(MENU_MOUSE_POS)
            button.update(self.screen)
        for event in pygame.event.get():
            if event.type == pygame.QUIT:
                self.quit()
            if event.type == pygame.MOUSEBUTTONDOWN:
                if PLAY_BUTTON.checkForInput(MENU_MOUSE_POS):
                    self.play(event)
                if QUIT_BUTTON.checkForInput(MENU_MOUSE_POS):
                    self.quit()
        pygame.display.update()
```



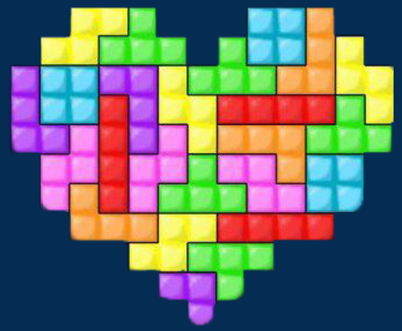
```
class Juego:
    def __init__(self):...
    def quit(self):...
    def play(self,mievento):...
    def menu(self):...
```

```
def play(self,mievento):
    clock=pygame.time.Clock()
    self.new_fondo=pygame.image.load('fondo_juego.jpg')
    self.new_fondo=pygame.transform.scale(self.new_fondo,self.size)
    game=Tetris(20,10)
```

```
while True:
    self.screen.blit(self.new_fondo,(0,0))
    if game.figure is None:
        game.new_figure()
    self.contador=+1
    if self.contador>1000000:
        self.contador=0
    if self.contador % (self.fps // game.level // 2) == 0 or self.pressing_down:
        if game.state == "start":
            game.go_down()
    for event in pygame.event.get():
        if event.type == pygame.QUIT:
            self.quit()
        if event.type == pygame.KEYDOWN:
            if event.key == pygame.K_UP:
                game.rotate()
            if event.key == pygame.K_DOWN:
                self.pressing_down = True
            if event.key == pygame.K_LEFT:
                game.go_side(-1)
            if event.key == pygame.K_RIGHT:
                game.go_side(1)
            if event.key == pygame.K_SPACE:
                game.go_space()
            if event.key == pygame.K_ESCAPE:
                game.__init__(20, 10)
```

```
        if mievento.type == pygame.KEYUP:
            if mievento.key == pygame.K_DOWN:
                self.pressing_down = False
        for i in range(game.height):#gradilla
            for j in range(game.width):
                pygame.draw.rect(self.screen, (128,128,128), [game.x + game.zoom * j, game.y + game.zoom * i
                if game.field[i][j] >= 0:
                    pygame.draw.rect(self.screen, colors[game.field[i][j]],
                                     [game.x + game.zoom * j + 1, game.y + game.zoom * i + 1, game.zoom - 2,
        if game.figure is not None:#pintar pantalla
            for i in range(4):
                for j in range(4):
                    p = i * 4 + j
                    if p in game.figure.image():
                        pygame.draw.rect(self.screen, colors[game.figure.type],
                                         [game.x + game.zoom * (j + game.figure.x) + 1,
                                         game.y + game.zoom * (i + game.figure.y) + 1,
                                         game.zoom - 2, game.zoom - 2])
        font = pygame.font.SysFont('Arial', 25, True, False)
        font1 = pygame.font.SysFont('Arial', 65, True, False)
        text = font.render("Score: " + str(game.score), True, (1,1,250))
        text_game_over = font1.render("Game Over", True, (125, 125, 125))
        text_game_over1 = font1.render("Press ESC", True, (0, 0, 0))
        self.screen.blit(text, [5, 5])
        if game.state == "gameover":
            self.screen.blit(text_game_over, [20, 200])
            self.screen.blit(text_game_over1, [25, 265])
        pygame.display.update()
        clock.tick(self.fps)
```

```
def main():
    pygame.init()
    miJuego=Juego()
    miJuego.menu()
    pygame.quit()
main()
```



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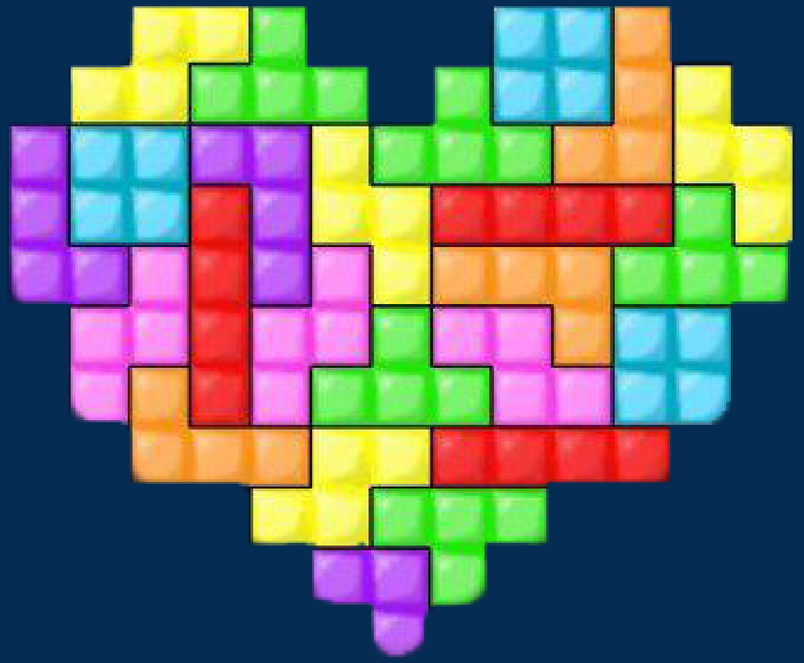
Rodrigo Miguel Palacios Salas

PINTADO , MUSICA E INTERFAZ DEL JUEGO



GRACIAS