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**TUGAS INDIVIDU**

1. Cobalah program pada poin C. Kode program pada poin C terdiri dari beberapa Part. Susun bagian-bagian kode tersebut sehingga dapat menjadi satu kesatuan program utuh !

**Jawab :**

*#Part A*

*import pygame, sys, random*

*class Block(pygame.sprite.Sprite):*

*def \_\_init\_\_(self,path,x\_pos,y\_pos):*

*super().\_\_init\_\_()*

*self.image = pygame.image.load(path)*

*self.rect = self.image.get\_rect(center = (x\_pos,y\_pos))*

*#Part E*

*class Player(Block):*

*def \_\_init\_\_(self,path,x\_pos,y\_pos,speed):*

*super().\_\_init\_\_(path,x\_pos,y\_pos)*

*self.speed = speed*

*self.movement = 0*

*def screen\_constrain(self):*

*if self.rect.top <= 0:*

*self.rect.top = 0*

*if self.rect.bottom >= screen\_height:*

*self.rect.bottom = screen\_height*

*def update(self,ball\_group):*

*self.rect.y += self.movement*

*self.screen\_constrain()*

*#Part C*

*class Ball(Block):*

*def \_\_init\_\_(self,path,x\_pos,y\_pos,speed\_x,speed\_y,paddles):*

*super().\_\_init\_\_(path,x\_pos,y\_pos)*

*self.speed\_x = speed\_x \* random.choice((-1,1))*

*self.speed\_y = speed\_y \* random.choice((-1,1))*

*self.paddles = paddles*

*self.active = False*

*self.score\_time = 0*

*def update(self):*

*if self.active:*

*self.rect.x += self.speed\_x*

*self.rect.y += self.speed\_y*

*self.collisions()*

*else:*

*self.restart\_counter()*

*#Part G*

*def collisions(self):*

*if self.rect.top <= 0 or self.rect.bottom >= screen\_height:*

*pygame.mixer.Sound.play(plob\_sound)*

*self.speed\_y \*= -1*

*#untuk mengatur Pandle di ball nya saat memantul*

*if pygame.sprite.spritecollide(self,self.paddles,False):*

*pygame.mixer.Sound.play(plob\_sound)*

*collision\_paddle = pygame.sprite.spritecollide(self,self.paddles,False)[0].rect*

*if abs(self.rect.right - collision\_paddle.left) < 10 and self.speed\_x > 0:*

*self.speed\_x \*= -1*

*if abs(self.rect.left - collision\_paddle.right) < 10 and self.speed\_x < 0:*

*self.speed\_x \*= -1*

*if abs(self.rect.top - collision\_paddle.bottom) < 10 and self.speed\_y < 0:*

*self.rect.top = collision\_paddle.bottom*

*self.speed\_y \*= -1*

*if abs(self.rect.bottom - collision\_paddle.top) < 10 and self.speed\_y > 0:*

*self.rect.bottom = collision\_paddle.top*

*self.speed\_y \*= -1*

*#Part B*

*def reset\_ball(self):*

*self.active = False*

*self.speed\_x \*= random.choice((-1,1))*

*self.speed\_y \*= random.choice((-1,1))*

*self.score\_time = pygame.time.get\_ticks()*

*self.rect.center = (screen\_width/2,screen\_height/2)*

*pygame.mixer.Sound.play(score\_sound)*

*#Part N*

*def restart\_counter(self):*

*current\_time = pygame.time.get\_ticks()*

*countdown\_number = 3*

*if current\_time - self.score\_time <= 700:*

*countdown\_number = 3*

*if 700 < current\_time - self.score\_time <= 1400:*

*countdown\_number = 2*

*if 1400 < current\_time - self.score\_time <= 2100:*

*countdown\_number = 1*

*if current\_time - self.score\_time >= 2100:*

*self.active = True*

*time\_counter = basic\_font.render(str(countdown\_number),True,accent\_color)*

*time\_counter\_rect = time\_counter.get\_rect(center = (screen\_width/2,screen\_height/2 + 50))*

*pygame.draw.rect(screen,bg\_color,time\_counter\_rect)*

*screen.blit(time\_counter,time\_counter\_rect)*

*#Part J*

*class Opponent(Block): #ini adalah bagian opponent AI/Artificial Intelegence*

*def \_\_init\_\_(self,path,x\_pos,y\_pos,speed): #membuat fungsi init yang mengambil posisi dari self,path,x\_pos,y\_pos,speed*

*super().\_\_init\_\_(path,x\_pos,y\_pos)*

*self.speed = speed #membuat properti speed*

*def update(self,ball\_group):*

*if self.rect.top < ball\_group.sprite.rect.y: #jika paddle yang berada di posisi atas maka posisi bola akan memantulkan lawan arah*

*self.rect.y += self.speed #akan bertambah kecepatannya*

*if self.rect.bottom > ball\_group.sprite.rect.y: #jika paddle yang berada di posisi bawah maka posisi bola akan memantul ke atas atau lawan arah*

*self.rect.y -= self.speed*

*self.constrain()*

*def constrain(self): #sebagai fungsi pembatas permainan*

*if self.rect.top <= 0: self.rect.top = 0 #ketika musuh berada disisi atas*

*if self.rect.bottom >= screen\_height: self.rect.bottom = screen\_height #ketika musuh berada di sisi bawah dan tidak lebih sama dengan ukuran layar atau self.rect.bottom = screen\_height*

*#Part I*

*class GameManager:*

*def \_\_init\_\_(self,ball\_group,paddle\_group):*

*self.player\_score = 0*

*self.opponent\_score = 0*

*self.ball\_group = ball\_group*

*self.paddle\_group = paddle\_group*

*def run\_game(self):*

*# Memulai*

*self.paddle\_group.draw(screen)*

*self.ball\_group.draw(screen)*

*# Mengupdate Ball*

*self.paddle\_group.update(self.ball\_group)*

*self.ball\_group.update()*

*self.reset\_ball()*

*self.draw\_score()*

*#Part K*

*def reset\_ball(self):*

*if self.ball\_group.sprite.rect.right >= screen\_width:*

*self.opponent\_score += 1*

*self.ball\_group.sprite.reset\_ball()*

*if self.ball\_group.sprite.rect.left <= 0:*

*self.player\_score += 1*

*self.ball\_group.sprite.reset\_ball()*

*def draw\_score(self):*

*player\_score = basic\_font.render(str(self.player\_score),True,accent\_color)*

*opponent\_score = basic\_font.render(str(self.opponent\_score),True,accent\_color)*

*player\_score\_rect = player\_score.get\_rect(midleft = (screen\_width / 2 + 40,screen\_height/2))*

*opponent\_score\_rect = opponent\_score.get\_rect(midright = (screen\_width / 2 - 40,screen\_height/2))*

*screen.blit(player\_score,player\_score\_rect)*

*screen.blit(opponent\_score,opponent\_score\_rect)*

*#Part D*

*# pengaturan umum*

*pygame.mixer.pre\_init(44100,-16,2,512)*

*pygame.init()*

*clock = pygame.time.Clock()*

*# Property ada widhtm height yang di satukan menjadi screen*

*screen\_width = 720*

*screen\_height = 480*

*screen = pygame.display.set\_mode((screen\_width,screen\_height))*

*pygame.display.set\_caption('Pong')*

*# Variabel Global*

*bg\_color = pygame.Color('#2F373F')*

*accent\_color = (27,35,43)*

*basic\_font = pygame.font.Font('freesansbold.ttf', 32) #untuk merubah Jenis font*

*plob\_sound = pygame.mixer.Sound("pong.ogg") #untuk menambahkan sound ketika bola memantul*

*score\_sound = pygame.mixer.Sound("score.ogg") # untuk ketika permainan berhenti atau bola loss*

*middle\_strip = pygame.Rect(screen\_width/2 - 2,0,4,screen\_height)*

*#Part F*

*# Objek Game*

*player = Player('Paddle.png',screen\_width - 20,screen\_height/2,5) #menambahkan object paddle png*

*opponent = Opponent('Paddle.png',20,screen\_width/2,5)#menambahkan object paddle png*

*paddle\_group = pygame.sprite.Group()*

*paddle\_group.add(player)*

*paddle\_group.add(opponent)*

*ball = Ball('Ball.png',screen\_width/2,screen\_height/2,4,4,paddle\_group)*

*ball\_sprite = pygame.sprite.GroupSingle()*

*ball\_sprite.add(ball)*

*game\_manager = GameManager(ball\_sprite,paddle\_group)*

*#Part M*

*#part ini untuk mengatur keyboard agar berfungsi untuk melakukan gerakan pada game menggunakan UP, DOWN, UP, DOWN*

*while True:*

*for event in pygame.event.get():*

*if event.type == pygame.QUIT:*

*pygame.quit()*

*sys.exit()*

*if event.type == pygame.KEYDOWN:*

*if event.key == pygame.K\_UP:*

*player.movement -= player.speed*

*if event.key == pygame.K\_DOWN:*

*player.movement += player.speed*

*if event.type == pygame.KEYUP:*

*if event.key == pygame.K\_UP:*

*player.movement += player.speed*

*if event.key == pygame.K\_DOWN:*

*player.movement -= player.speed*

*#Part L*

*screen.fill(bg\_color) #Membuat Latar Belakang*

*pygame.draw.rect(screen,accent\_color,middle\_strip)#Menggambar Rect dengan Screen Width dan height dan Midle String*

*game\_manager.run\_game() # Untuk menjalankan game*

*pygame.display.flip() # Rendering*

*clock.tick(120)*

1. Langkah selanjutnya adalah, identifikasi pada bagian manakah implementasi AI pada program game tersebut. Jelaskan !

Jawab :

Implementasi AI pada source code tersebut terdapat pada part J. Hal ini karena pada source code J paddle sebelah kiri dapat bergerak secara otomatis dari atas kebawah untuk menangkap/memantulkan ball yang muncul dari sebelah kanan.

1. Jelaskan bagaimana alur AI yang digunakan pada program tersebut !

Jawab :

Source code diatas merupakan game pingpong game ini membuat game melawan komputer game pada game ini ketika musuh atau komputer memasukkan bola ke tempat kita maka poin dari musuh akan bertambah dan sebaliknya.