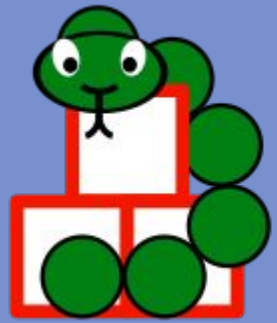
Pymunk - biblioteka fizyczna ułatwiająca tworzenie gier 2D i symulacji rzeczywistości z PyGame

Grzegorz Gołyś


pymunk

matplotlib



pymunk


kivy


matplotlib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matplotlib
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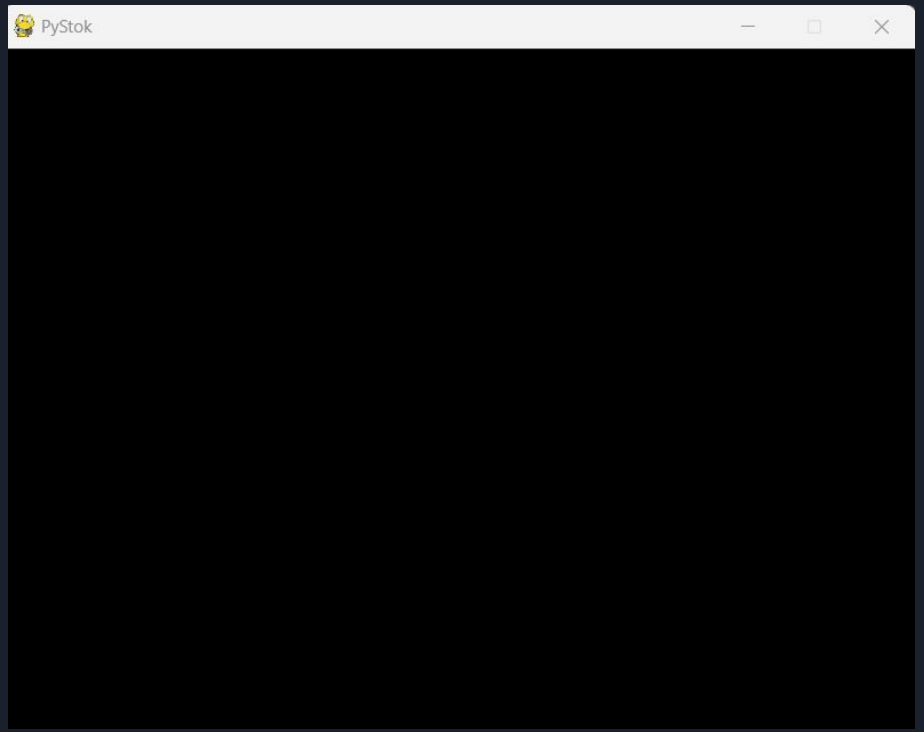
pygame


pygame


pymunk

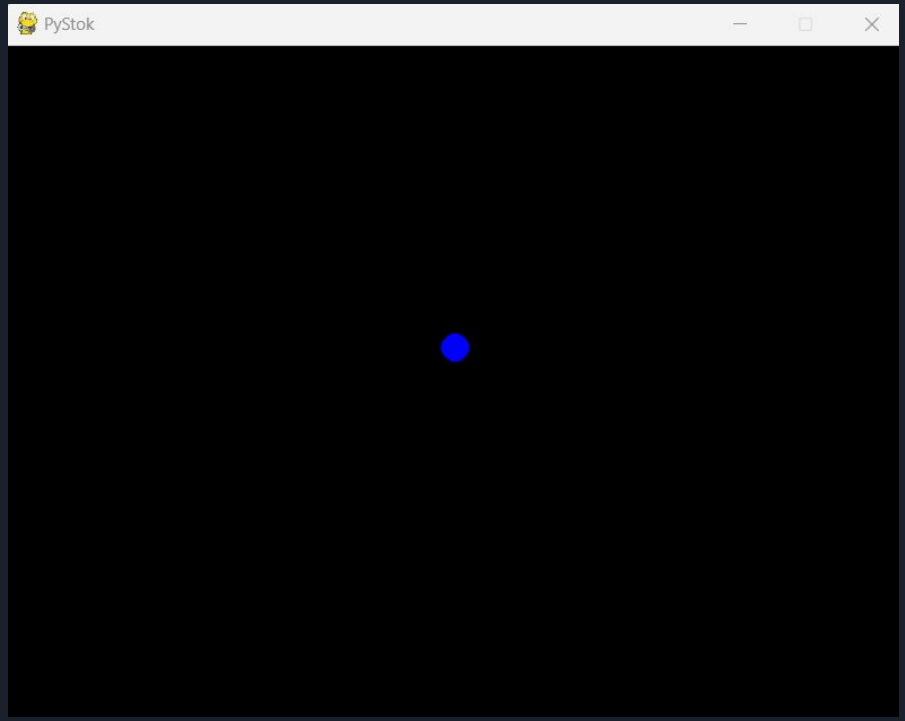
pygame

```python
import pygame
pygame.init()
scena = pygame.display.set_mode((640, 480))
pygame.display.set_caption("PyStok")
run = True
while run:
    scena.fill((0, 0, 0))
    for event in pygame.event.get():
        if event.type == pygame.QUIT:
            run = False
            break
        if event.type == pygame.KEYDOWN:
            if event.key == pygame.K_ESCAPE:
                run = False
                break
    pygame.display.update()
pygame.quit()
```



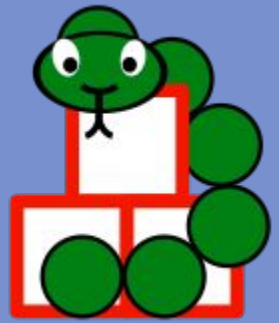
pygame

```python
import pygame
pygame.init()
scena = pygame.display.set_mode((640, 480))
pygame.display.set_caption("PyStok")
run = True
x, y = scena.get_width()/2, 0
t = pygame.time.Clock()
while run:
    scena.fill((0, 0, 0))
    for event in pygame.event.get():
        if event.type == pygame.QUIT:
            run = False
            break
        if event.type == pygame.KEYDOWN:
            if event.key == pygame.K_ESCAPE:
                run = False
                break
    pygame.draw.circle(scena, (0, 0, 255), (x, y), 10)
    y += 1
    pygame.display.update()
    t.tick(60)
pygame.quit()
```



The Pymunk Vision :

“Make 2d physics easy to include in your game”

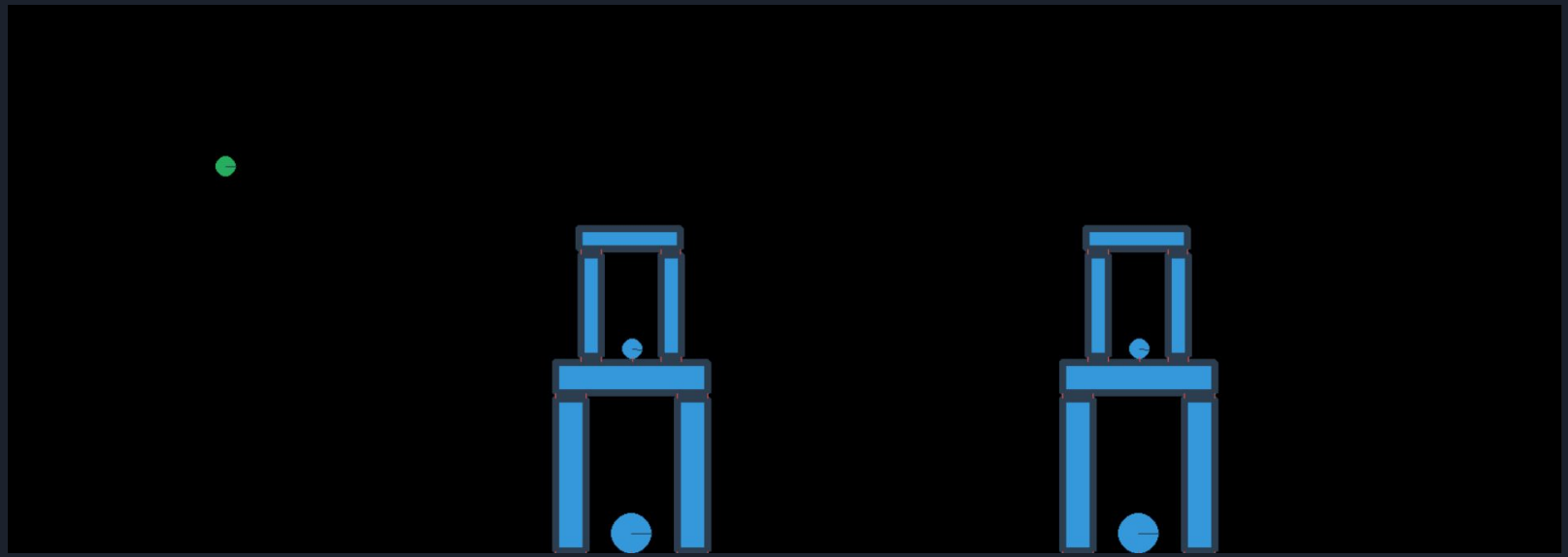


pymunk

```
space = pymunk.Space()
space.gravity = 0, 981
option = pymunk.pygame_util.DrawOptions(scena)
```

```
space.debug_draw(option)
space.step(1/fps)
```

Angry birds



Funkcja tworząca piłke

```
def create_ball(pos, radius, mass, sfera, collision_type=1):
    moment = pymunk.moment_for_circle(mass, 0, radius)
    b = pymunk.Body(mass, moment, body_type=pymunk.Body.KINEMATIC)
    b.position = pos
    circ = pymunk.Circle(b, radius)
    circ.friction = 0.3
    circ.elasticity = 0.1
    circ.collision_type = collision_type
    sfera.add(b, circ)
    return circ
```

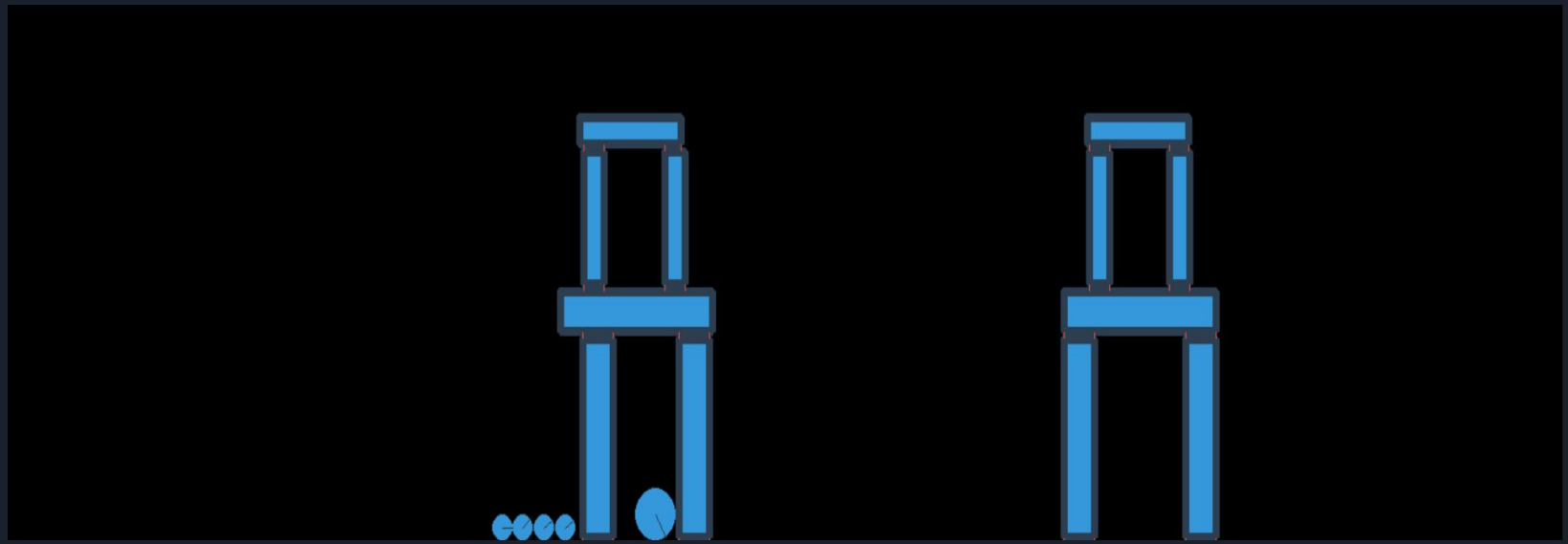
Funkcja tworząca budynki

```
def create_home(mass, fri, elast, col_type, sfera, szerokosc, wysokosc, *pos):
    """mass odpowiedzialny za mase obiektów, fri - to friction, elast
    elastycznosc obiektow, col_type - typ kolizji,sfera to space, pos to pozycja trzech elementow"""
    size = [(szerokosc, wysokosc), (szerokosc, wysokosc), (wysokosc, szerokosc)]
    bl = pymunk.Body(mass)
    bp = pymunk.Body(mass)
    bd = pymunk.Body(mass)
    body = [bl, bp, bd]
    shape = []
    for position, bod, siz in zip(pos, body, size):
        bod.position = position
        pol = pymunk.Poly.create_box(bod, siz, 3)
        pol.friction = fri
        pol.elasticity = elast
        pol.mass = mass
        pol.collision_type = col_type
        shape.append(pol)
    sfera.add(*body, *shape)
    return shape
```

Funkcja tworząca wielokąt

```
def create_poly(mass, friction, elasticity, position, collide_type, sfera, *cor):
    moment = pymunk.moment_for_poly(mass, cor)
    body = pymunk.Body(mass, moment)
    body.position = position
    poly = pymunk.Poly(body, cor)
    poly.friction = friction
    poly.elasticity = elasticity
    poly.collision_type = collide_type
    sfera.add(body, poly)
    return poly
```

Obsługa kolizji



Obsługa kolizji

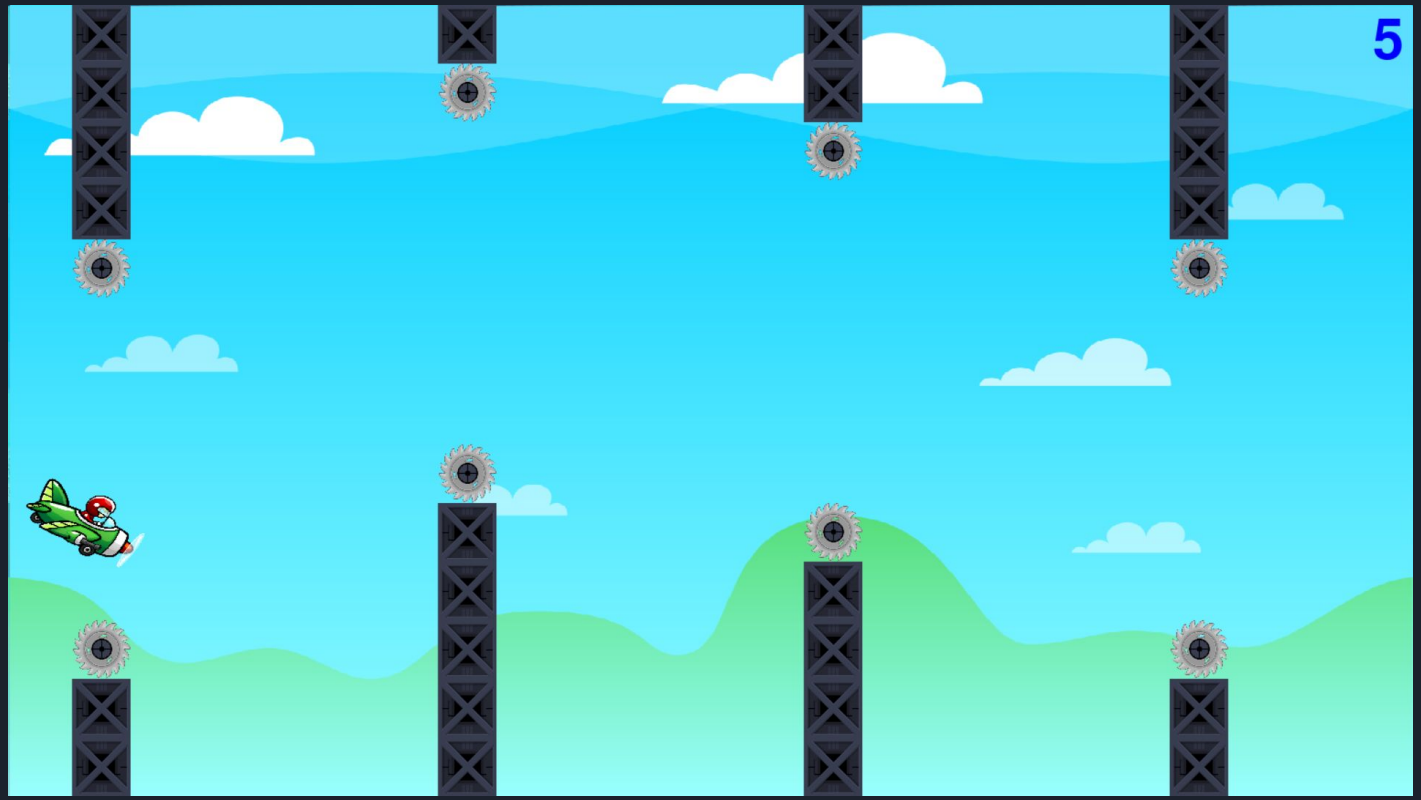
```
k_2_3 = space.add_collision_handler(2, 3)
k_2_3.begin = begin
k_2_3.pre_solve = set_features
k_2_3.post_solve = info
k_2_3.separate = separate
```

```
def begin(arbiter, space, data):
    print("kolizja")
    return True


def set_features(arbiter, space, data):
    arbiter.friction = 1
    arbiter.elasticity = 0.3
    return True


def info(arbiter, space, data):
    print(arbiter.total_ke)
    if arbiter.total_ke > 300000:
        space.remove(arbiter.shapes[0].body, arbiter.shapes[0])
    return True


def separate(arbiter, space, data):
    print("rozlaczyly sie")
```

Impuls

```
if event.type == pygame.MOUSEBUTTONDOWN:
    x, y = pygame.mouse.get_pos()
    rad = math.atan2(ball.body.position[1] - y, ball.body.position[0] - x)
    ball.body.body_type = pymunk.Body.DYNAMIC
    ball.mass = 50
    x = math.cos(rad)
    y = math.sin(rad)
    ball.body.apply_impulse_at_local_point((x * 70000, y * 70000), (0, 0))
```

Bird - Plane

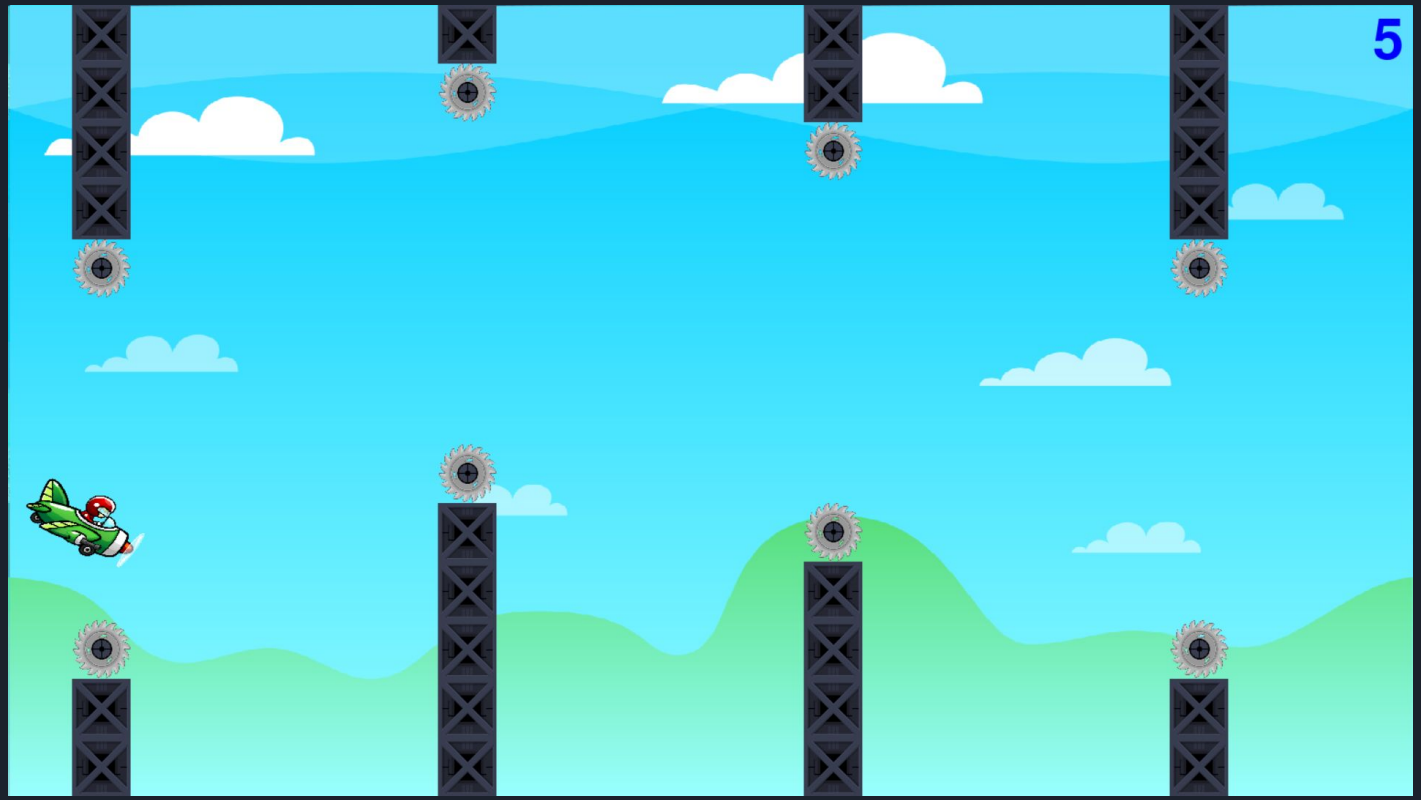


Klasa Plane

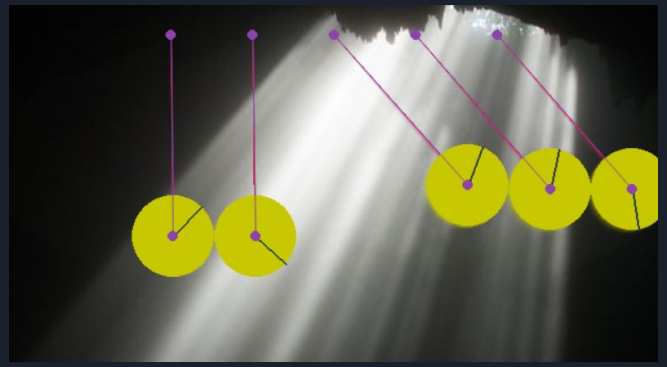
```
class Plane(pygame.sprite.Sprite):
    def __init__(self, shape, pictures):
        super().__init__()
        self.i = 0
        self.pictures = pictures
        self.shape = shape
        self.image = self.pictures[int(self.i)]
        self.rect = self.image.get_rect()
        self.rect.center = self.shape.body.center

    def update(self):
        self.i += 0.15
        if self.i >= len(self.pictures):
            self.i = 0
        self.image = self.pictures[int(self.i)]
        angle = 30 if self.shape.body.velocity[1] < 0 else -30
        self.image = pygame.transform.rotate(self.image, angle)
        self.rect.center = self.shape.body.position
```

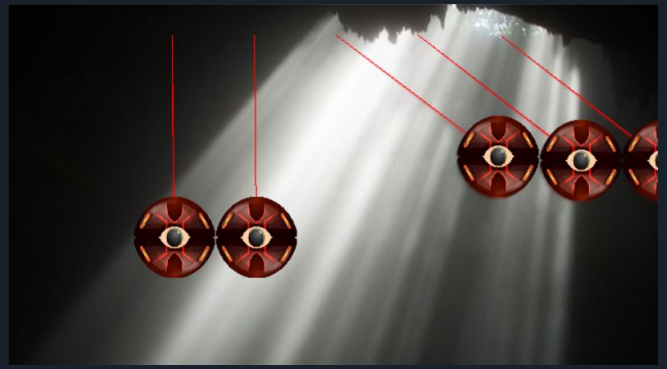
```
pygame.sprite.spritecollide(plane, cubes, False, pygame.sprite.collide_mask)
pygame.sprite.spritecollideany(plane, cubes, pygame.sprite.collide_mask)
pygame.sprite.groupcollide(planes, cubes, False, False, pygame.sprite.collide_mask)
pygame.sprite.groupcollide(planes, cubes, False, False, pygame.sprite.collide_rect)
```

Bird - Plane

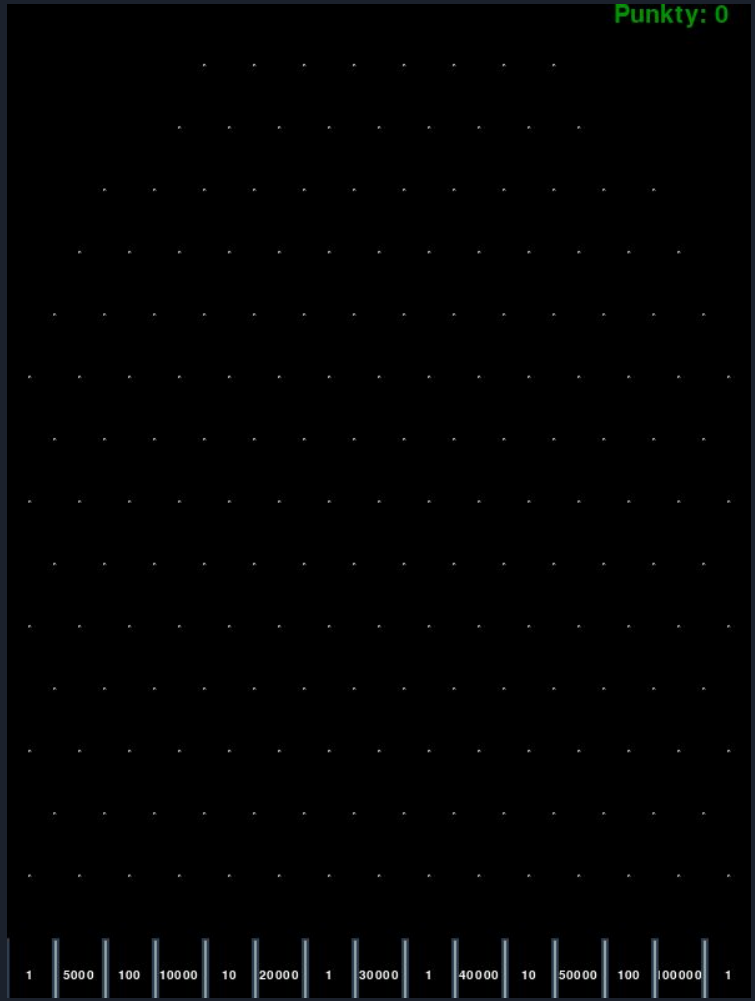


Wahadło Newtona





The Wall. Wygraj marzenia
Gra z rekordową wygraną


Punkty: 0
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10000
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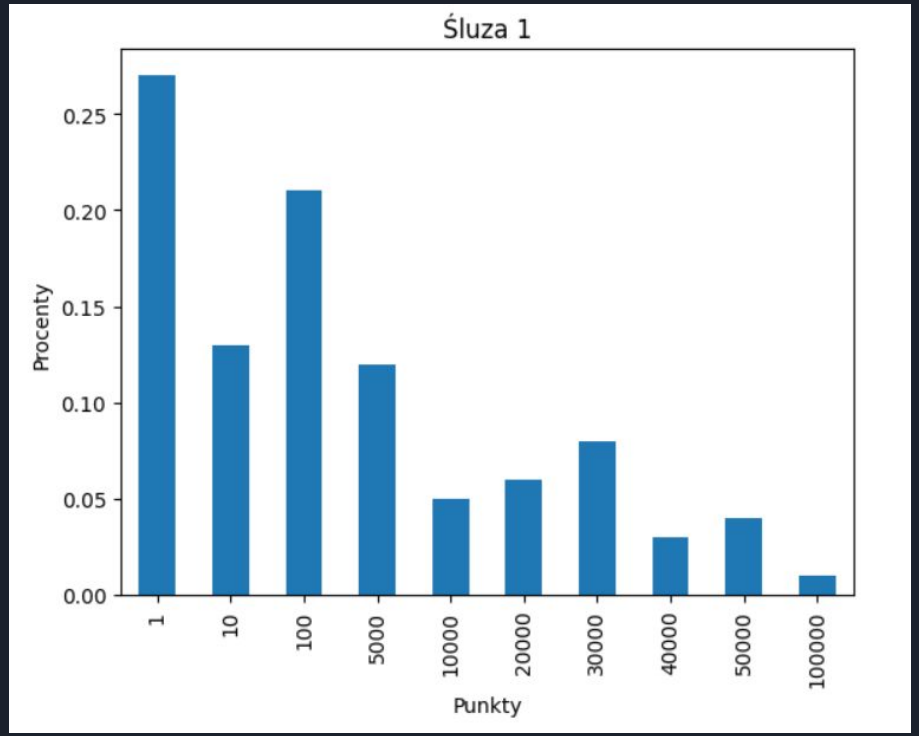
1
30000
1
40000
10
50000
100
100000
1

Wartość oczekiwana : 8 922.57



pkt	
1	0.27
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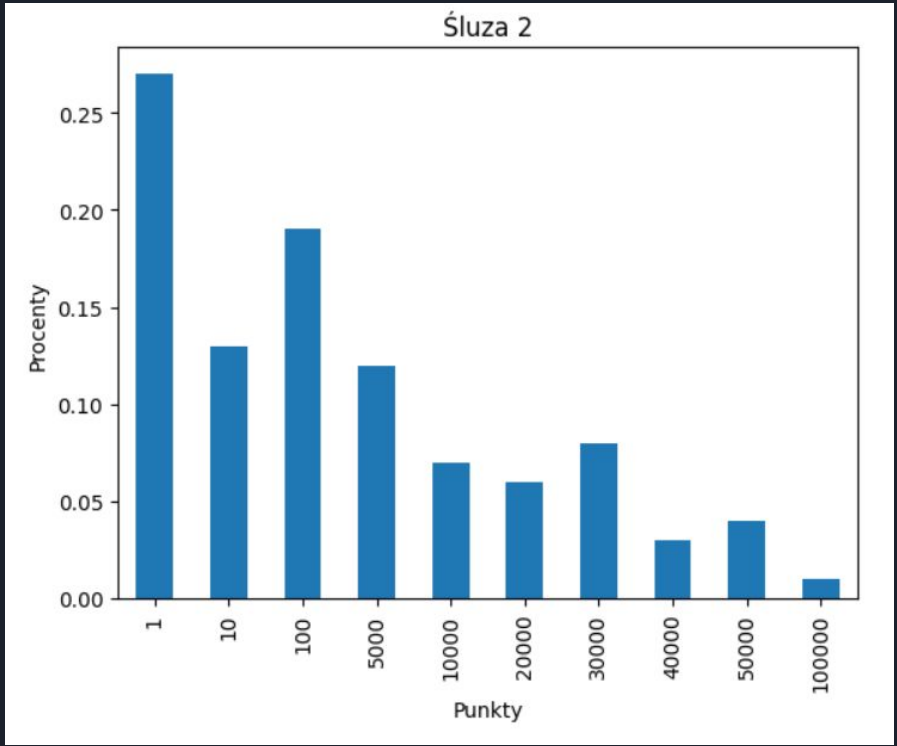
30000	0.08
40000	0.03
50000	0.04
100000	0.01

Wartość oczekiwana : 9 120.57



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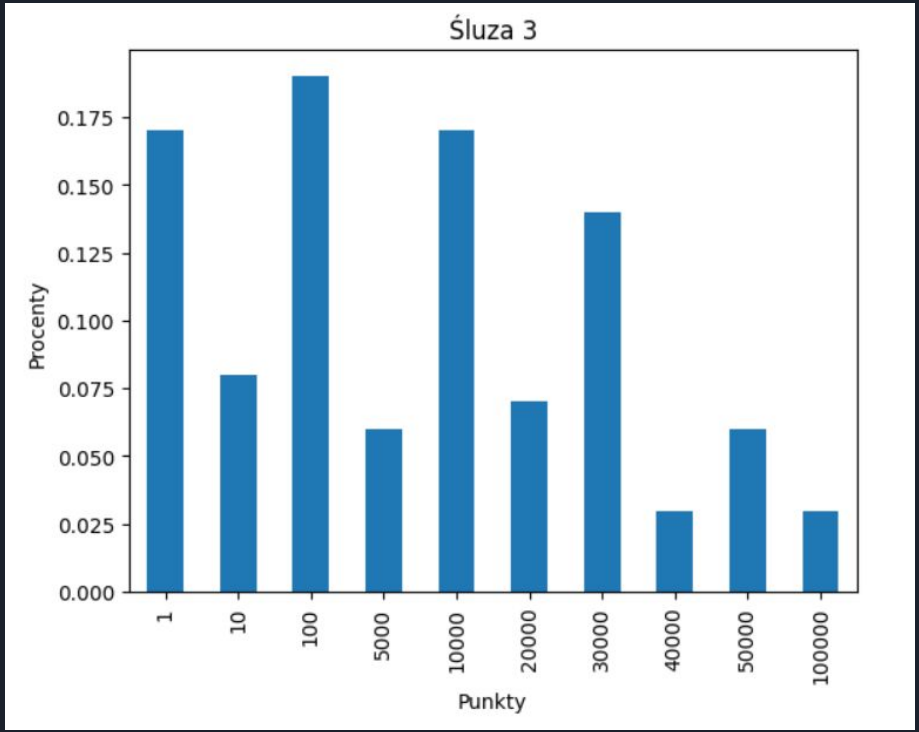
100000	0.01

Wartość oczekiwana : 14 819.97



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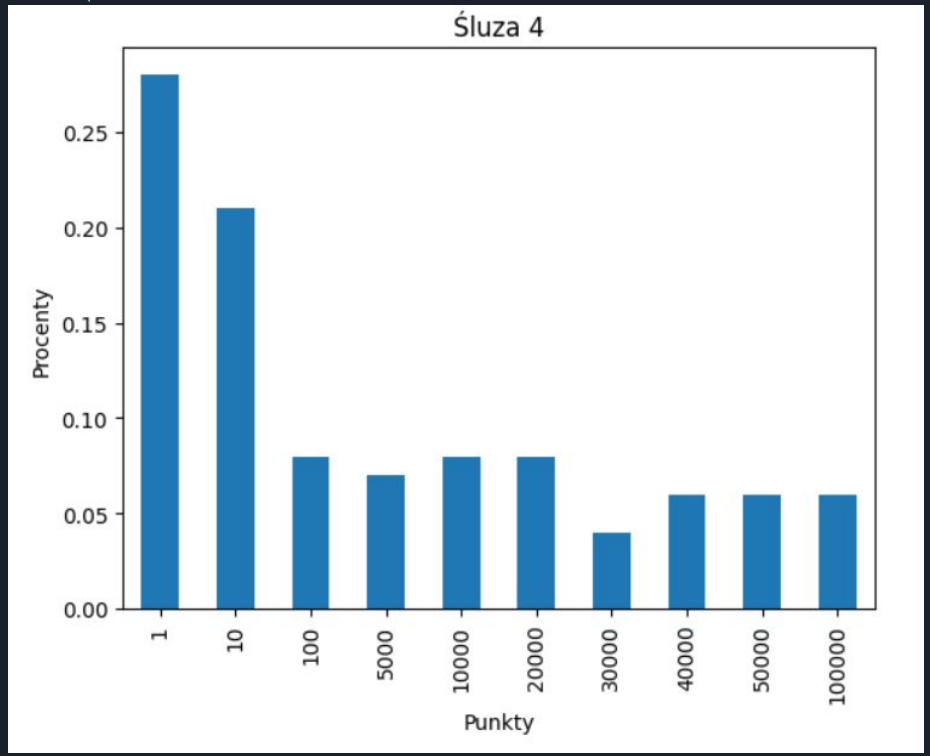
100000	0.03

Wartość oczekiwana : 15 360.38



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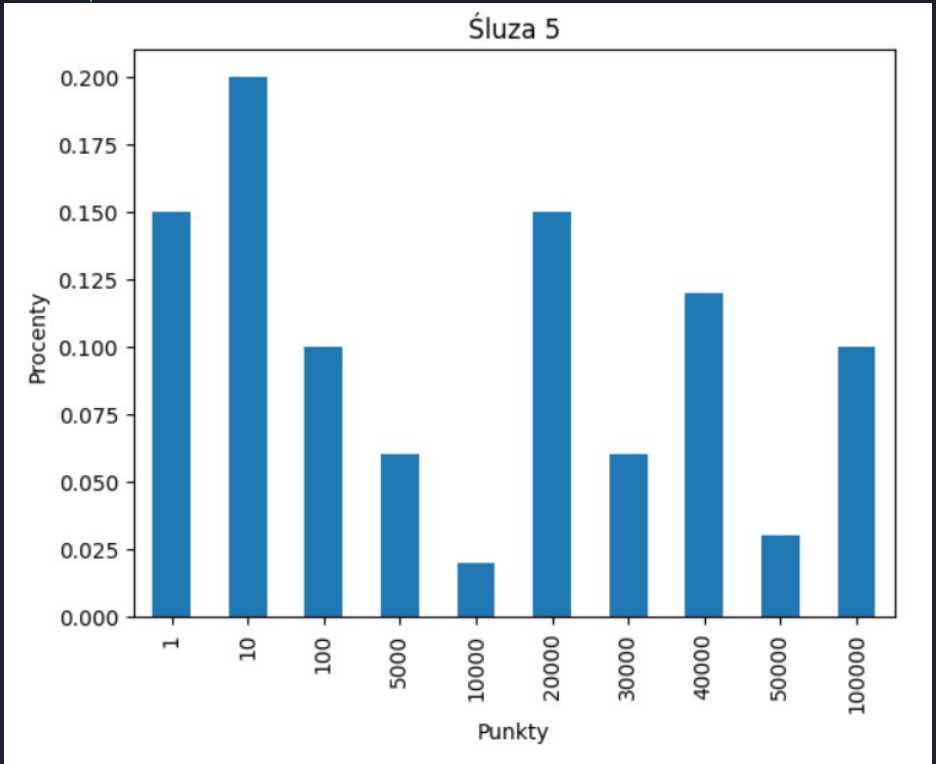
Wartość oczekiwana : 21 612.15



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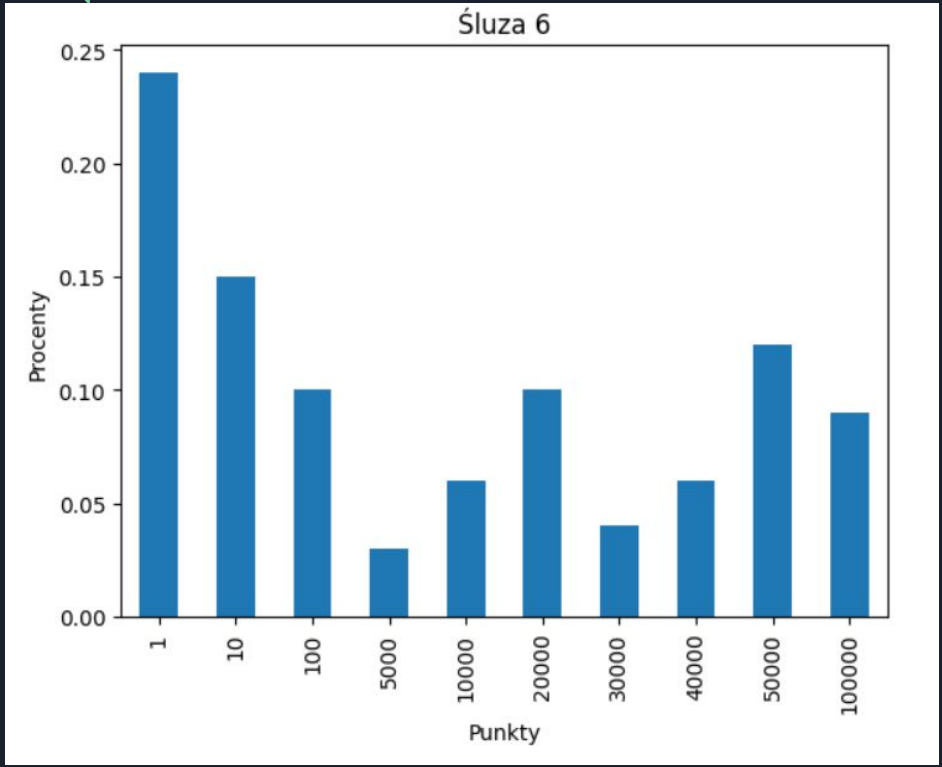

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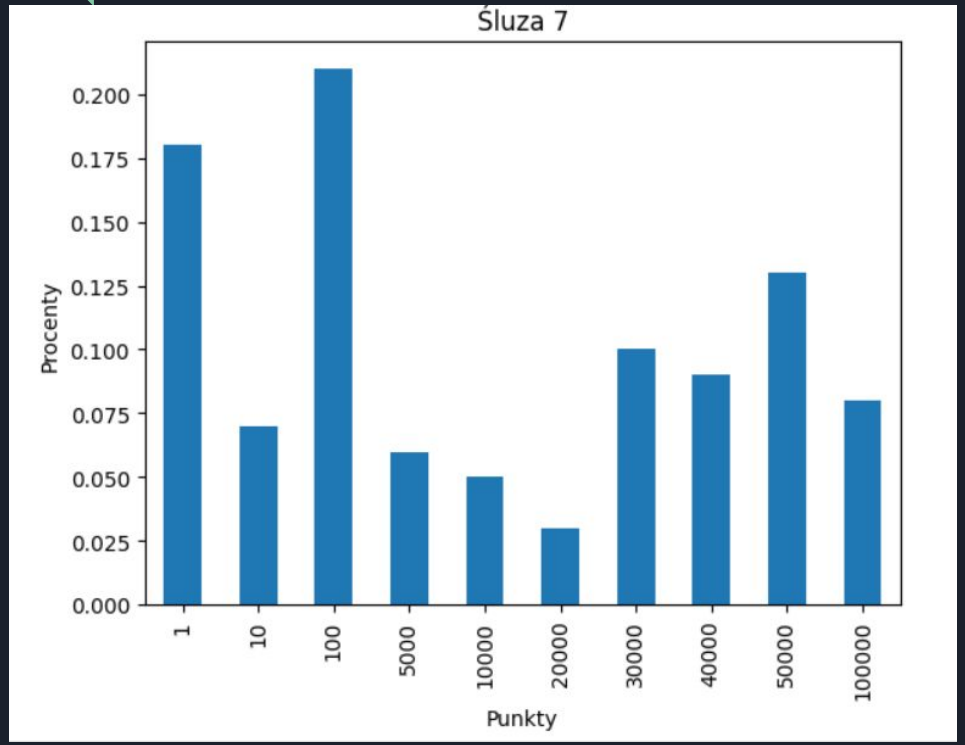
Wartość oczekiwana : 20 421.88



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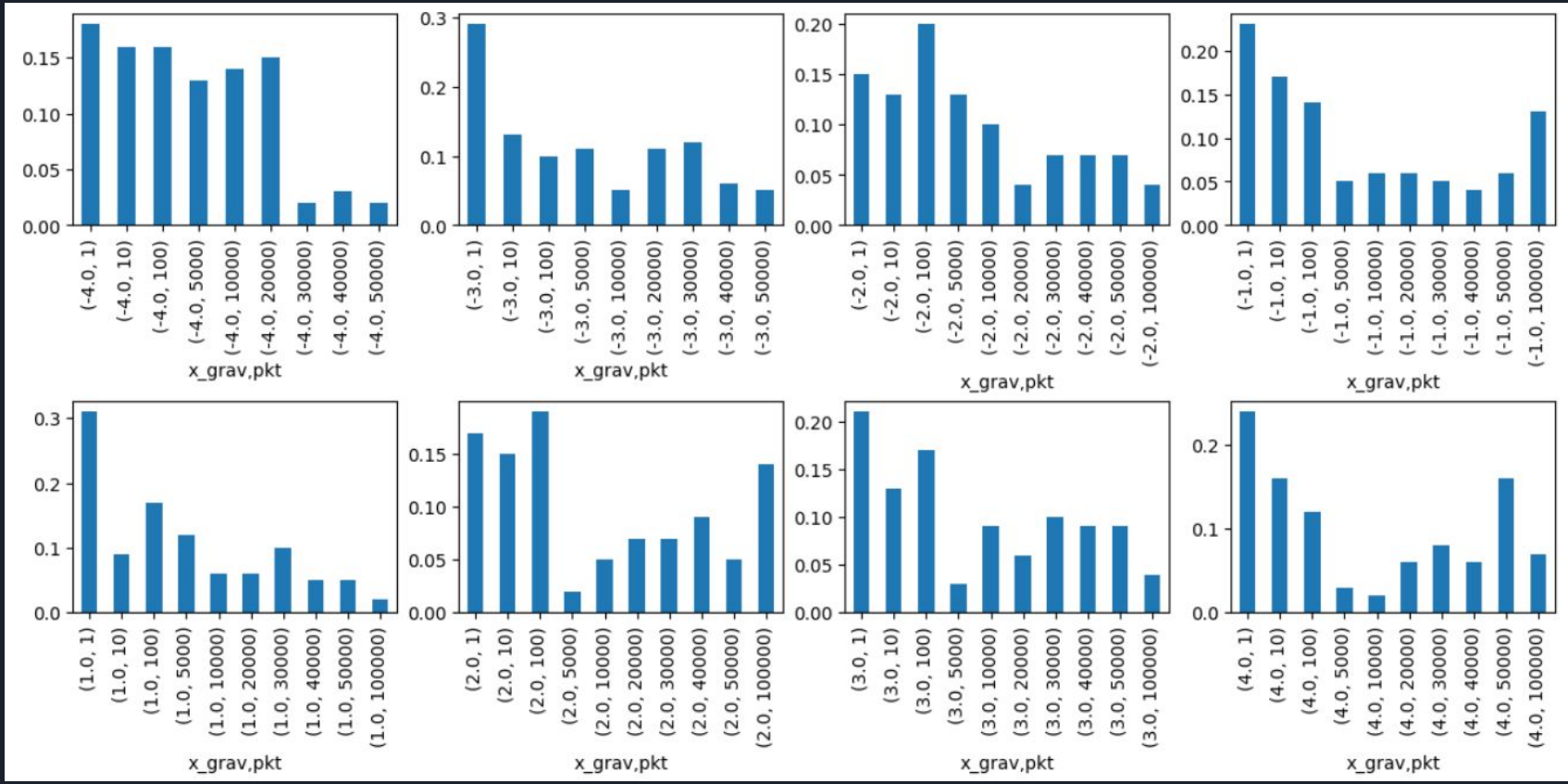
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x_grav,pkt
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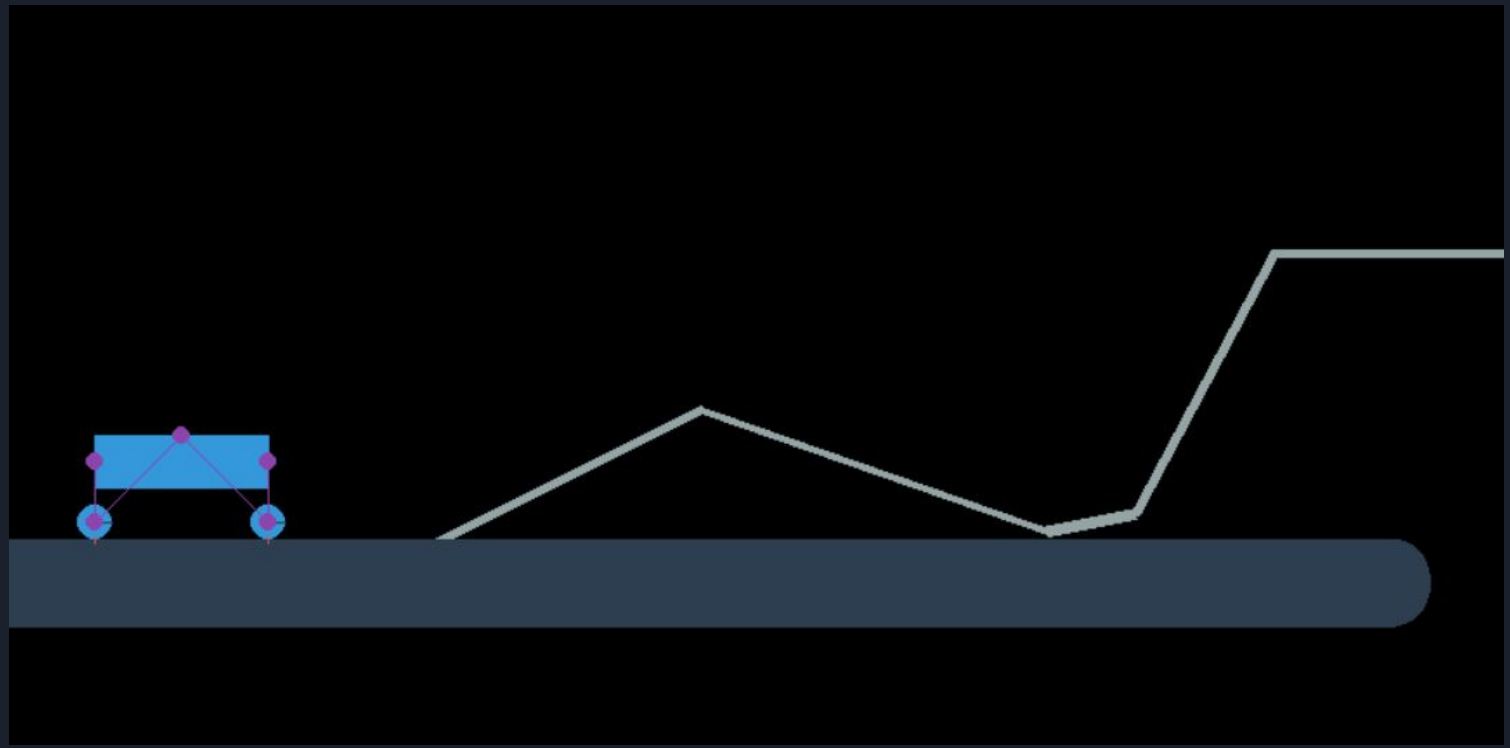
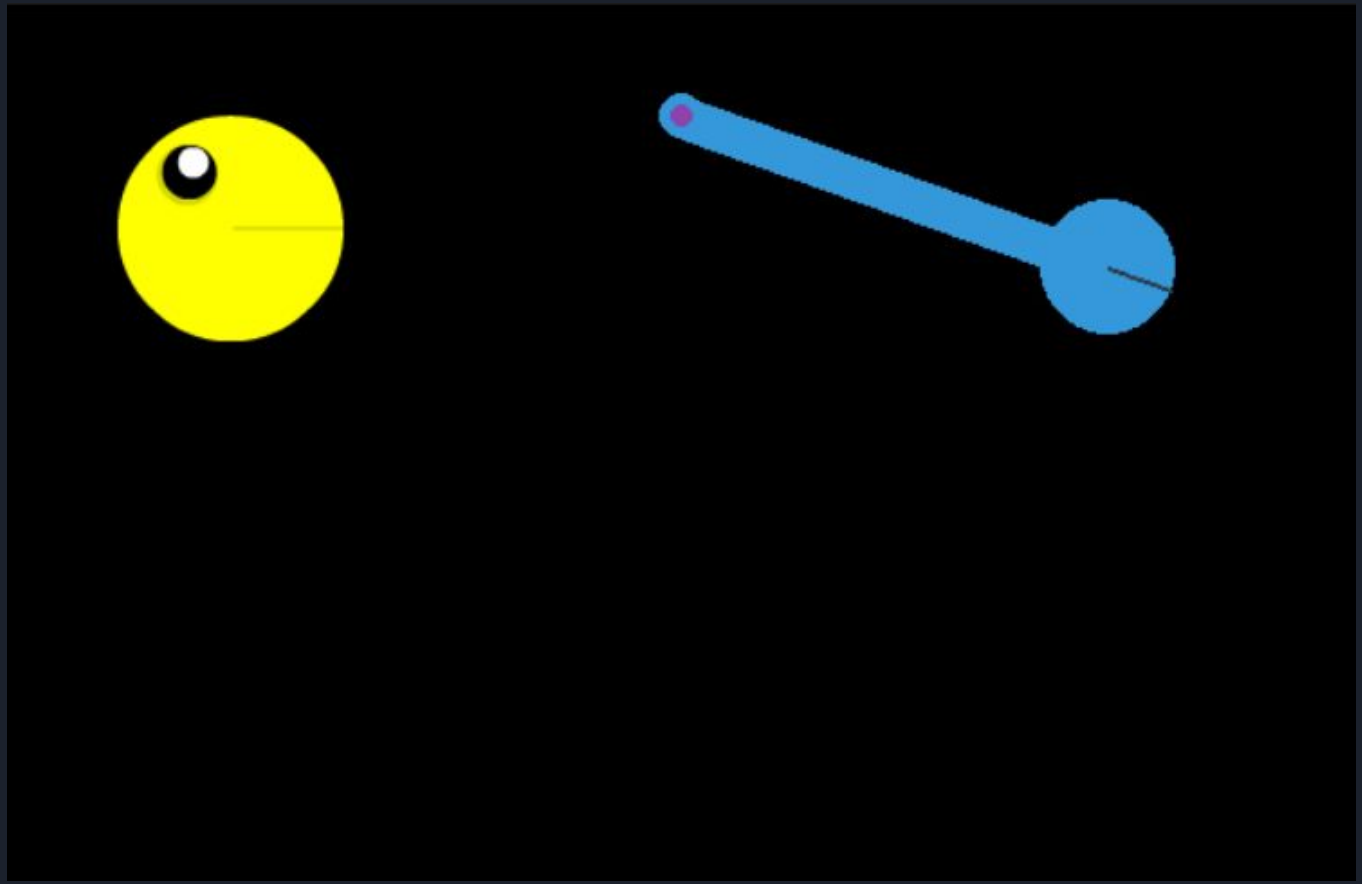
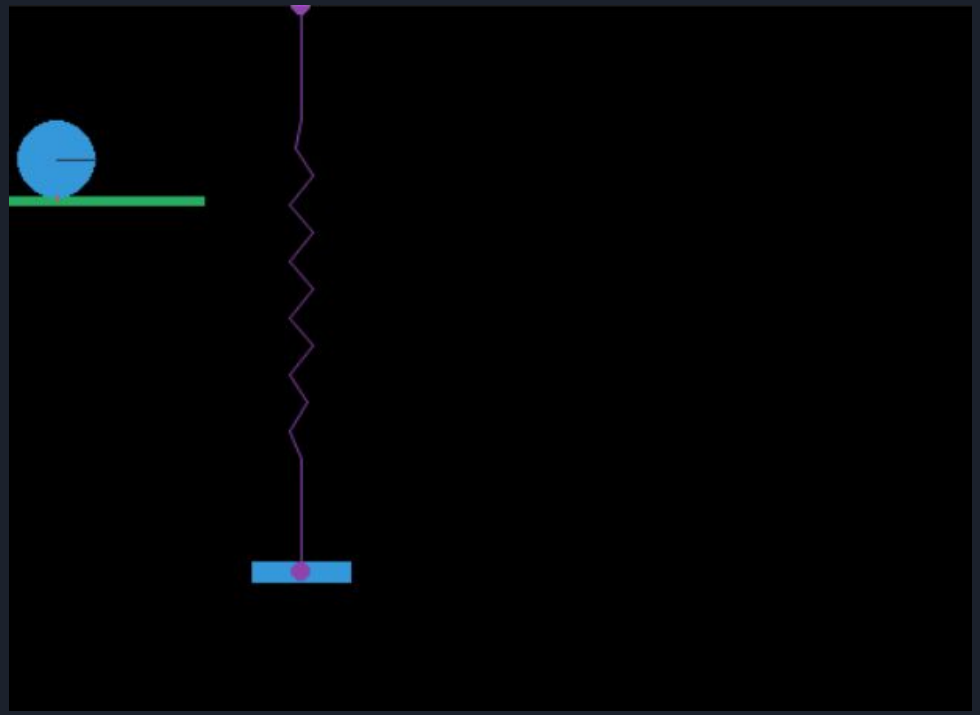
x_grav,pkt

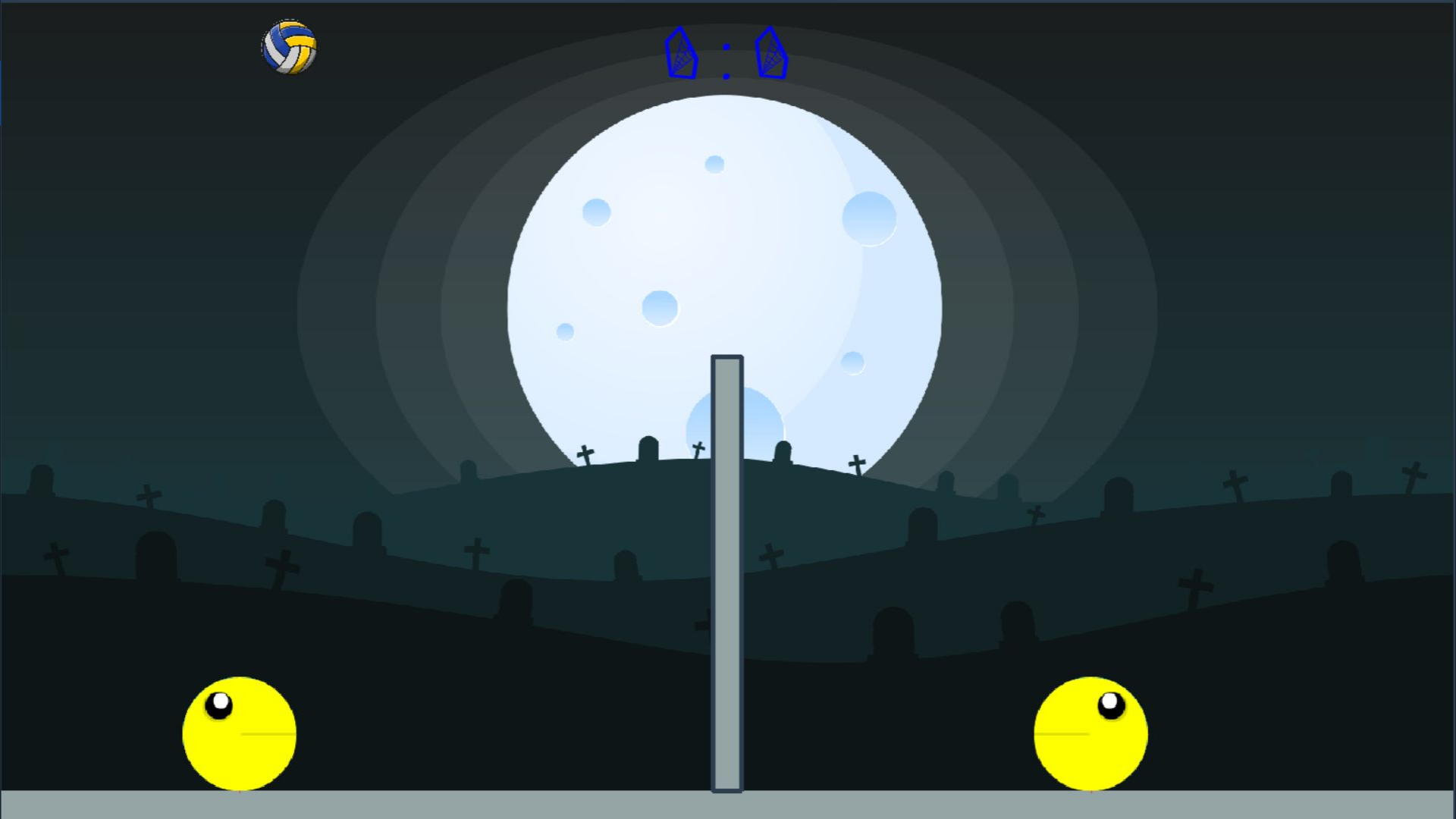
Przykłady







Przeciwnicy: 4



Dziękuję

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YouTube: Nauka z Gołym