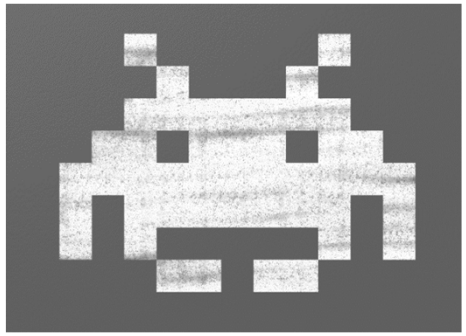
# Python i Pygame

**Programiranje arkadnih igrica u Pythonu koristeći Pygame**

**Sprajtovi (Sprites)**

# Sprajtovi



- Sprajt (Sprite) je dvodimenzionalni objekt koji se koristi u igrici.

- Za primjer ćemo pokazati program "Pokupi blokove" koji koristi sprajtove u obliku blokova (pravokutnika)

  Igrač pomiče crveni blok i skuplja crne blokove proizvoljno raspoređene po ekranu

  Na konzoli se ispisuje broj skupljenih crnih blokova

# Klasa Block

- Za definiciju blokova ćemo koristiti klasu Block koja je dijete klase  Sprite definirane u biblioteci pygame i package-u sprite (pygame.sprite)

```
class Block(pygame.sprite.Sprite):
    # Definicija klase koja predstavlja blokove
    # izvedena je iz klase Sprite Pygame libraryja
```

- Konstruktor klase Block osim self ima parametre color, width, height

```
def __init__(self, color, width, height):
        # Konstruktor prima boju i veličinu bloka
        # Pozovi konstruktor parent klase (Sprite)
        super().__init__()
```

- Unutar konstruktora se kreira i postavlja boja bloka

```
# Kreiraj i oboji blok
self.image = pygame.Surface([width, height])
self.image.fill(color)
```

- Na kraju konstruktora postavljamo x i y koordinate definiranog pravokutnika u varijablu rect

```
# Postavi koordinate prethodno definiranog pravokutnika
# u varijablu rect - rect.x i rect.y
        self.rect = self.image.get_rect()
```

# Pokupi blokove

- Inicijalitiraj Pygame i postavi veličinu ekrana

```
# Inicijaliziraj Pygame
pygame.init()
# Postavi dimenzije ekrana
screen_width = 700
screen_height = 400
screen = pygame.display.set_mode([screen_width, screen_height])
```

- Definiraj liste svih blokova i sprajtova kao objekte klase Group

```
# Definiraj listu svih blokova, kao listu objekata glase Group
block_list = pygame.sprite.Group()
# Definiraj listu svih sprajtova, kao listu objekata glase Group
all_sprites_list = pygame.sprite.Group()
```

# Pokupi blokove – kreiranje blokova

- U for petlji kreiraj 50 crnih blokova širine 20 i visine 15 piksela, postavi slučajne koorinate bloka, i dodaj ga u liste svih blokova i sprajtova

```
for i in range(50):
    # Kreiraj blok
    block = Block(BLACK, 20, 15)
    # Postavi slucajne kordinate bloka
    block.rect.x = random.randrange(screen_width)
    block.rect.y = random.randrange(screen_height)
    # Dodaj blok u listu blokova i sprajtova
    block_list.add(block)
    all_sprites_list.add(block)
```

- Kreiraj crveni blok za igrača i  dodaj ga u listu svih sprajtova

```
# Kreiraj crveni blok za igraca
player = Block(RED, 20, 15)
all_sprites_list.add(player)
```

# Pokupi blokove – glavna petlja

- Pročitaj koordinate miša i pospremi ih u x i y koordinate igračevog bloka

```
# Procitaj koordinate misa
    pos = pygame.mouse.get_pos()
    # Preslikaj koodrinate misa u koordinate igracevog bloka
    player.rect.x = pos[0]
    player.rect.y = pos[1]
```

- Provjeri da li se blok igrača sudara sa nekim drugim blokom iz liste svih blokova. U varijabli block_hit_list će biti spremljeni svi blokovi koji se sudaraju. True definira da će ti blokovi biti maknuti iz liste svih blokova

```
# Provjeri da li se blok igraca sudara sa nekim drugim blokom
blocks_hit_list = pygame.sprite.spritecollide(player, block_list, True)
```

- Povećaj brojač sudara i ispiši ga na konzolu

```
# Povecaj brojac sudara i ispisi na konzolu
for block in blocks_hit_list:
    score += 1
    print(sc
```

- Na kraju iscrtaj sve sprajtove iz liste all_sprites_list na ekran

```
# Iscrtaj sve sprajtove na ekran
all_sprites_list.draw(screen))
```

# Kviz


- Slijedi link ispod:

  http://programarcadegames.com/quiz/quiz.php?file=classes&lang=en

# Kviz odgovori


- P1: What is a Sprite?
  - A very bright color that seems to glow.
  - A sprite is to Tinkerbell as a human is to Bob.
  - A graphic image that he computer can easily track, draw on the screen, and detect collisions with.
  - A function that draws images to the screen.

- P2: Which option best describes how a programmer use sprites in his or her program?
  - Derive a new class from pygame.sprite.Sprite, and then create instances of those sprites and add them to sprite groups.
  - Use functions to draw images directly to the screen
  - Use bitmaps and blit images to the screen.
  - Create instances of pygame.sprite.Sprite and add them to sprite groups.

# Kviz odgovori, nastavak


- P3: What is the standard way to draw sprites in a program
  - Add a sprite to a group. Then call .draw(screen) on the group.
  - Call the sprite's .blit(screen) method.
  - Call the sprite's .update(screen) method.
  - Call the sprite's .draw(screen) method.

- P4: How does a program move a sprite pointed to by mysprite?
  - Set new mysprite.x and mysprite.y values.
  - Call mysprite.move(x,y) with the desired x and y values.
  - Call mysprite.draw(x,y) with the desired x and y values.
  - Set new mysprite.rect.x and mysprite.rect.y values.

# Kviz odgovori, nastavak


- P5: How does a sprite move itself?
  - Create an update() method. Change self.rect.x and self.rect.y values.
  - Create an update() method. Change rect.x and rect.y values.
  - Create an move() method. Change self.x and self.y values.

- P6: If a programmer creates his/her own constructor for a sprite, what must be the first line of that constructor?
  - self.image = pygame.Surface([width, height])
  - self.image.set_colorkey(white)
  - super().__init__()

# Kviz odgovori, nastavak


- P7: If a programmer wants to create a transparent background for a sprite, what type of image should be avoided?
  - png
  - jpg
  - gif

- P8: What does the True do in this line of code?

```
sprites_hit_list = pygame.sprite.spritecollide(sprite, sprite_list, True)
```

  - Creates an sound effect when the sprites collide.
  - Removes any sprite in sprite_list that is overlapping sprite.
  - Removes sprite if any sprite in sprite_list is overlapping.
  - Creates an explosion effect when the sprites collide.

# Kviz odgovori, nastavak


- P9: What is special about a sprite's update() function?
  - There is no special significance to that function.
  - It is called automatically when the code calls update() on any list that sprite is in.
  - It is called automatically each time through the game loop.

- P10: What is the proper command to add a sprite to an instance of pygame.sprite.Group() pointed to by sprite_list?
  - sprite_list.add(my_sprite)
  - sprite_list.insert(my_sprite)
  - sprite_list.append(my_sprite)