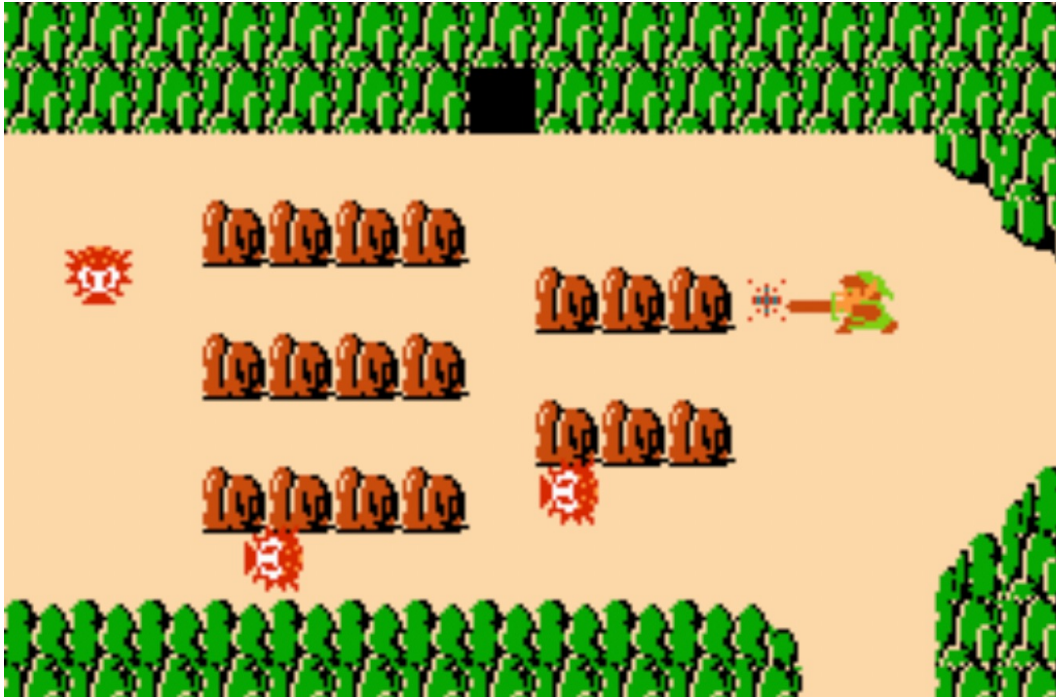


Introduction to Processing

Top-Down Games

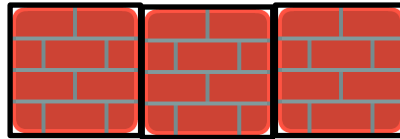
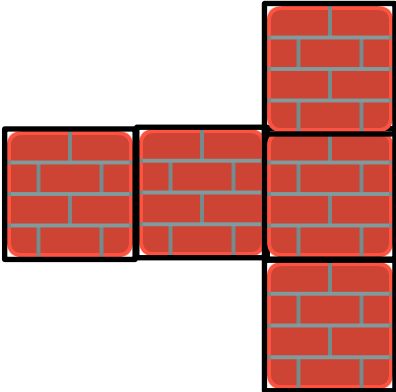
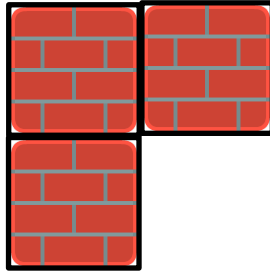
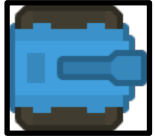
Top-Down Games

Top-down games, also sometimes referred to as **bird's-eye view games**, refers to games where the camera angle that shows players and the areas around them is directly above.



Top-Down Games

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Collision Detection

Assume that we already implemented the two collision detection methods below:

```
def check_for_collision(sprite1, sprite2):  
    # returns whether sprite1 and sprite2 intersects
```

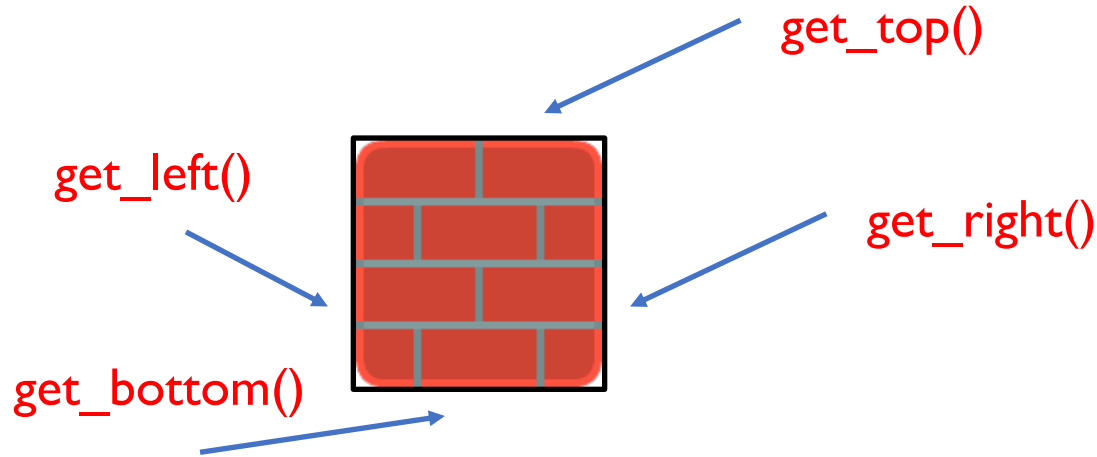
```
def check_for_collision_list(sprite, sprite_list):  
    #returns list of sprites in sprite_list which  
    #intersects with sprite.
```

Sprite Functions

```
def get_left(self):  
    return self.center_x - self.width/2  
def set_left(self, l):  
    self.center_x = l + self.width/2  
def get_right(self):  
    return self.center_x + self.width/2  
def set_right(self, r):  
    self.center_x = r - self.width/2  
def get_top(self):  
    return self.center_y - self.height/2  
def set_top(self, t):  
    self.center_y = t + self.height/2  
def get_bottom(self):  
    return self.center_y + self.height/2  
def set_bottom(self, b):  
    self.center_y = b - self.height/2
```

Sprite “get” functions

Use the `get_left`, `get_right`, `get_top` and `get_bottom` methods to get the respective boundaries of the sprite!



Sprite “set” functions



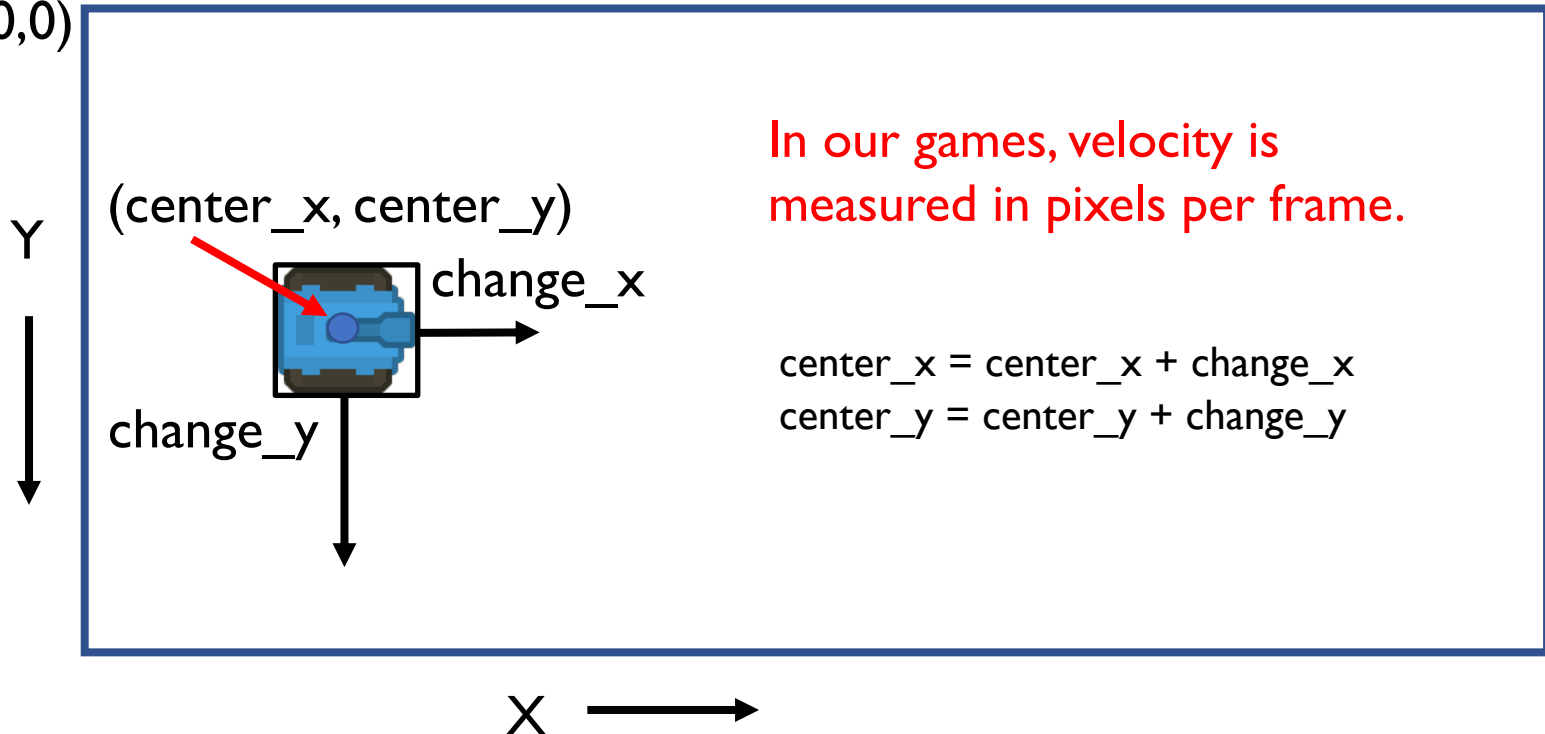
```
sprite1.set_right(sprite2.get_left())
```

Velocity

Velocity of an object is the rate of change of its position. It is a vector and can be decomposed into a x-component and a y-component.

A Sprite object has attributes `change_x` and `change_y` for its velocity.

Origin (0,0)

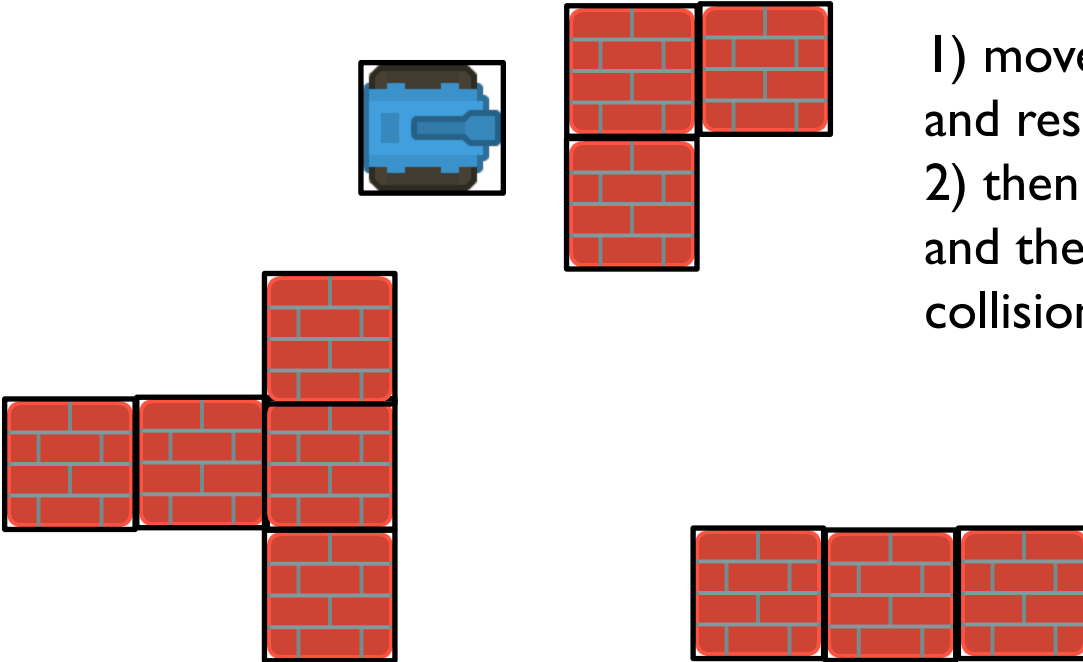


Resolving Top-Down Collisions

`center_x += change_x`
`center_y += change_y`

Instead of moving in both the x and y directions and then try to resolve collisions, it is easier to

- 1) move in x direction, check for and resolve collision
- 2) then move in the y direction and then check for and resolve collision again.

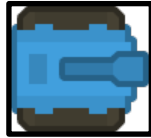


Resolving Top-Down Collisions

move in horizontal direction

center_x += change_x

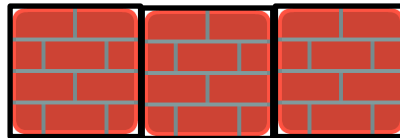
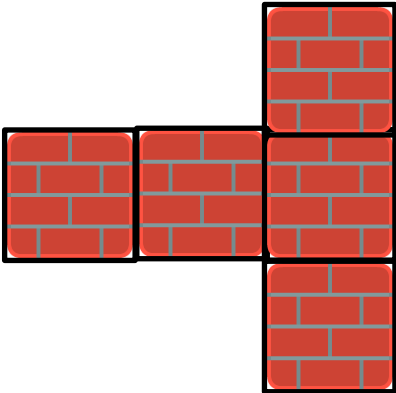
resolve collisions



move in vertical direction

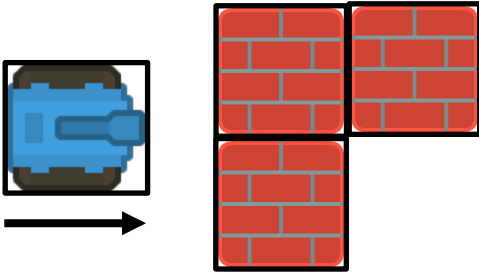
center_y += change_y

resolve collisions



Horizontal Direction

move in horizontal direction



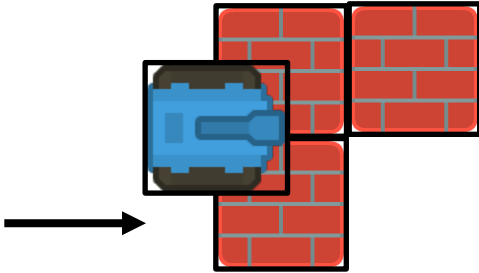
Horizontal Direction

move in horizontal direction

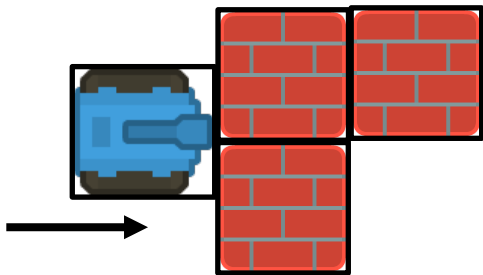
compute list of all platforms which collide with player

if list not empty:

if player is moving right:



Horizontal Direction



move in horizontal direction

compute list of all platforms which collide with player

if list not empty:

if player is moving right:

set right side of player = left side of a
collided platform

Horizontal Direction

move in horizontal direction

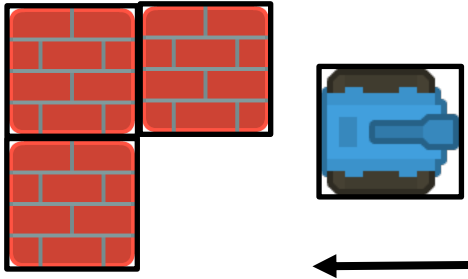
compute list of all platforms which collide with player

if list not empty:

if player is moving right:

set right side of player = left side of a
collided platform

if player is moving left:



Horizontal Direction

move in horizontal direction

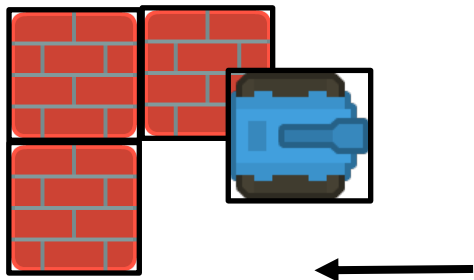
compute list of all platforms which collide with player

if list not empty:

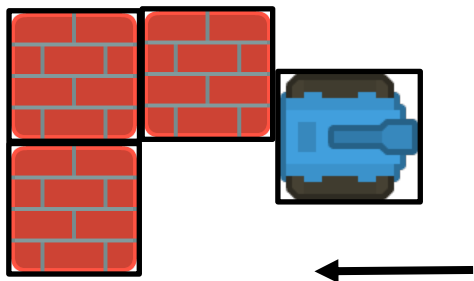
if player is moving right:

set right side of player = left side of a
collided platform

if player is moving left:



Horizontal Direction



move in horizontal direction

compute list of all platforms which collide with player

if list not empty:

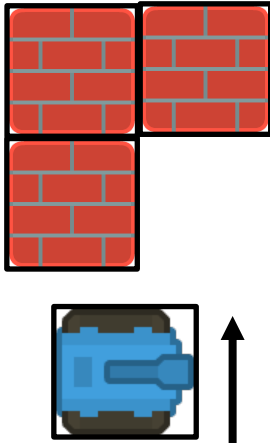
if player is moving right:

set right side of player = left side of a
collided platform

if player is moving left:

set left side of player = right side of a
collided platform

Vertical Direction



Similarly for the vertical direction:

move in vertical direction

compute list of all platforms which collide with player

if list not empty:

if player is moving up:

set top side of player = bottom side of a
collided platform

if player is moving down:

set bottom side of player = top side of a
collided platform