Object Oriented Programming with Python

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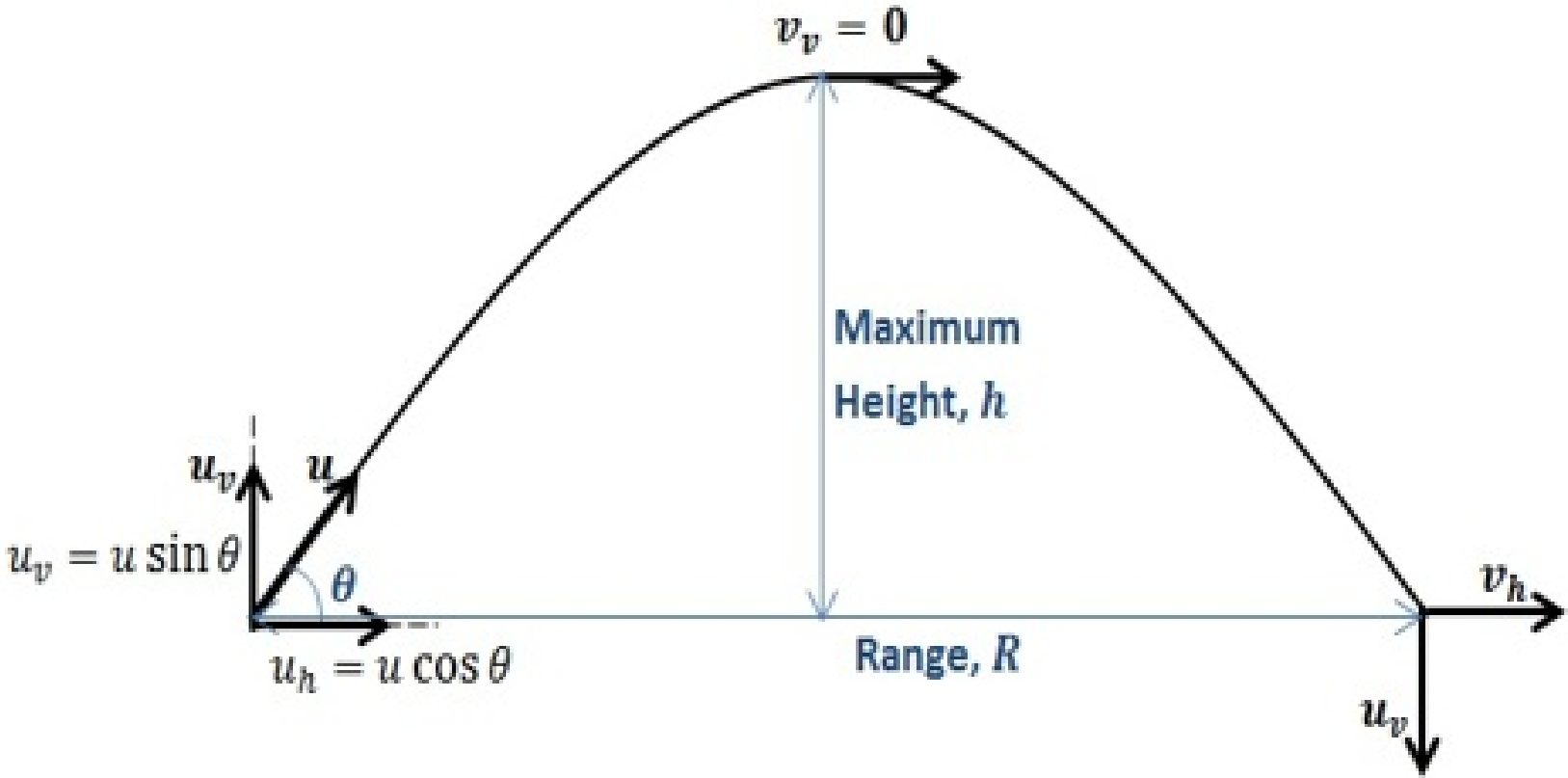
Session 08

Content

- Lets refactor our static functions
- Lets introduce constants
- Use our Physics lib
- Physics in games
- Introducing pygame

Physics


$v_v = 0$
Maximum
Height, h
u_v
u
$u_v = u \sin\theta$
θ
$u_h = u \cos\theta$
Range, R
v_h
u_v

Physics formulas

Vox = Vo * cos <angle>

Voy = Vo * sen <angle>

DistX = Vox * time

T = 2Vo sen<angle>

DistY = (Voy * T) + ((-gavity * (T)**2)/2)

Where: Vo = intial velocity Vox = initial velocity in X Voy = initial velocity in Y T = run time DistX = Distance in axis X DistY = Distance in axis Y or height

Refactor Physics Lib

In session-07 we tried to use the library with static function but until use them we need to make some changes into them

Constants

```
# Constants in python use capital letters
# Different ways to deffine into a project
# Could be deffinet out of the class in the top
# or into a different file (constants.py)
GRAVITY = 9.8
```

Static Methods/Functions

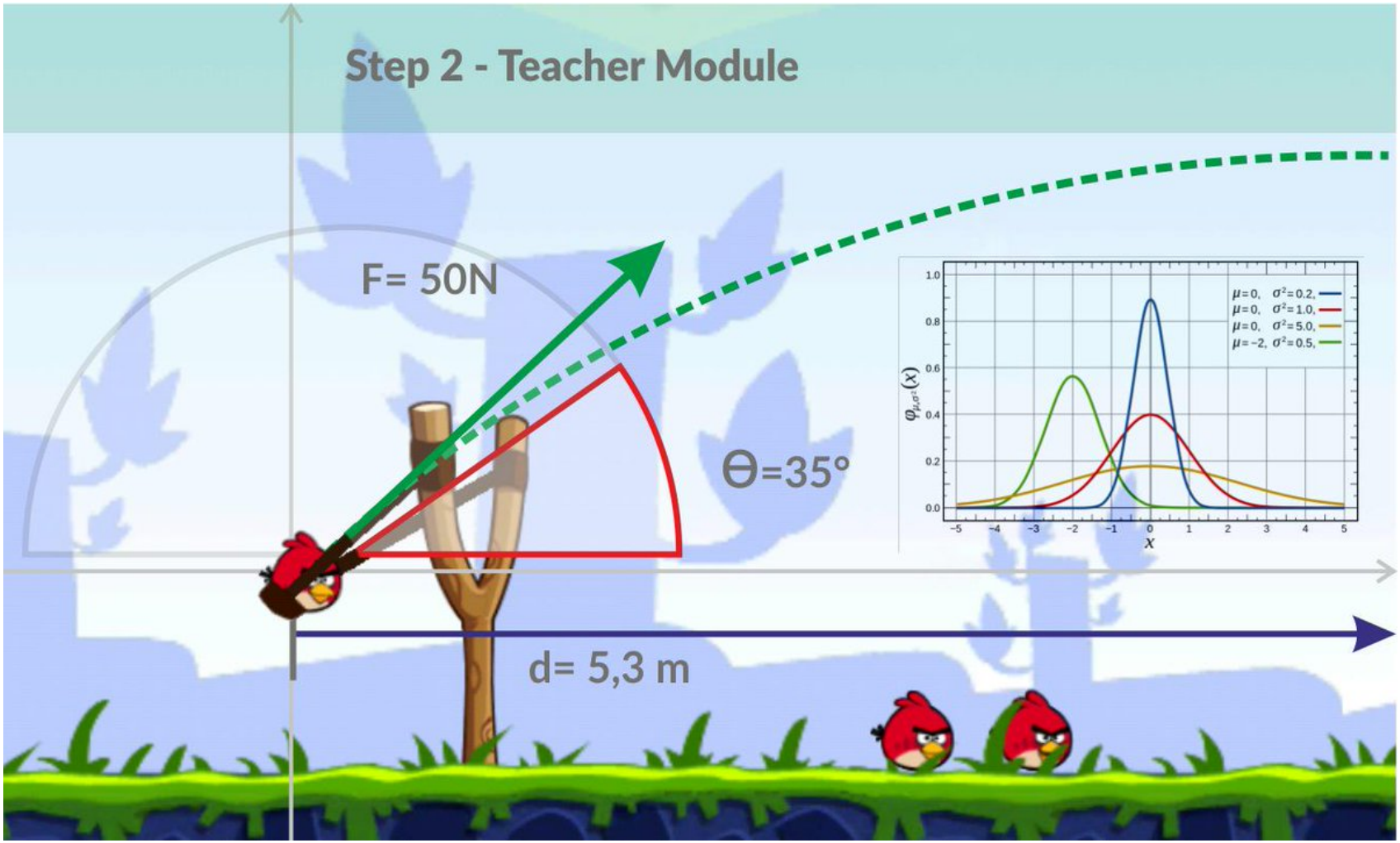
```
# to use static methods you can use the
# following decorator
# Static functions not have the self parameter
@staticmethod
def my_method():
  pass
```

Use the new Physics lib

A goalkeeper shoot the ball out of his goal with velocity 26 m/s and 40 grade. Calculate:

- The max height
- The distance
- The time that the ball would be in the air

Physics in games



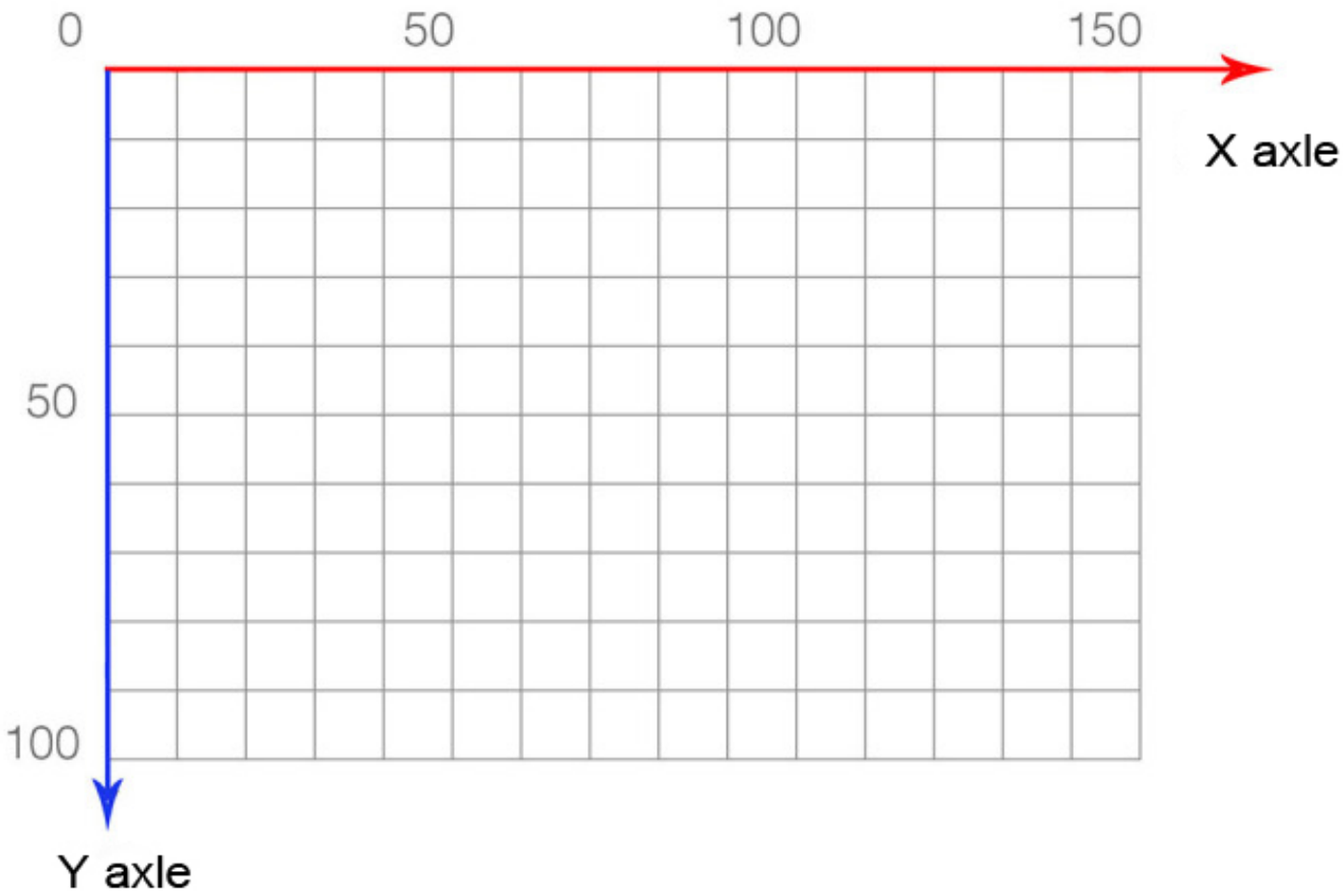
Pygame

"Is a set of python modules designed for writing video games. Pygame adds functionality on top of the excellent SDL (Simple DirectMedia Layer) library"

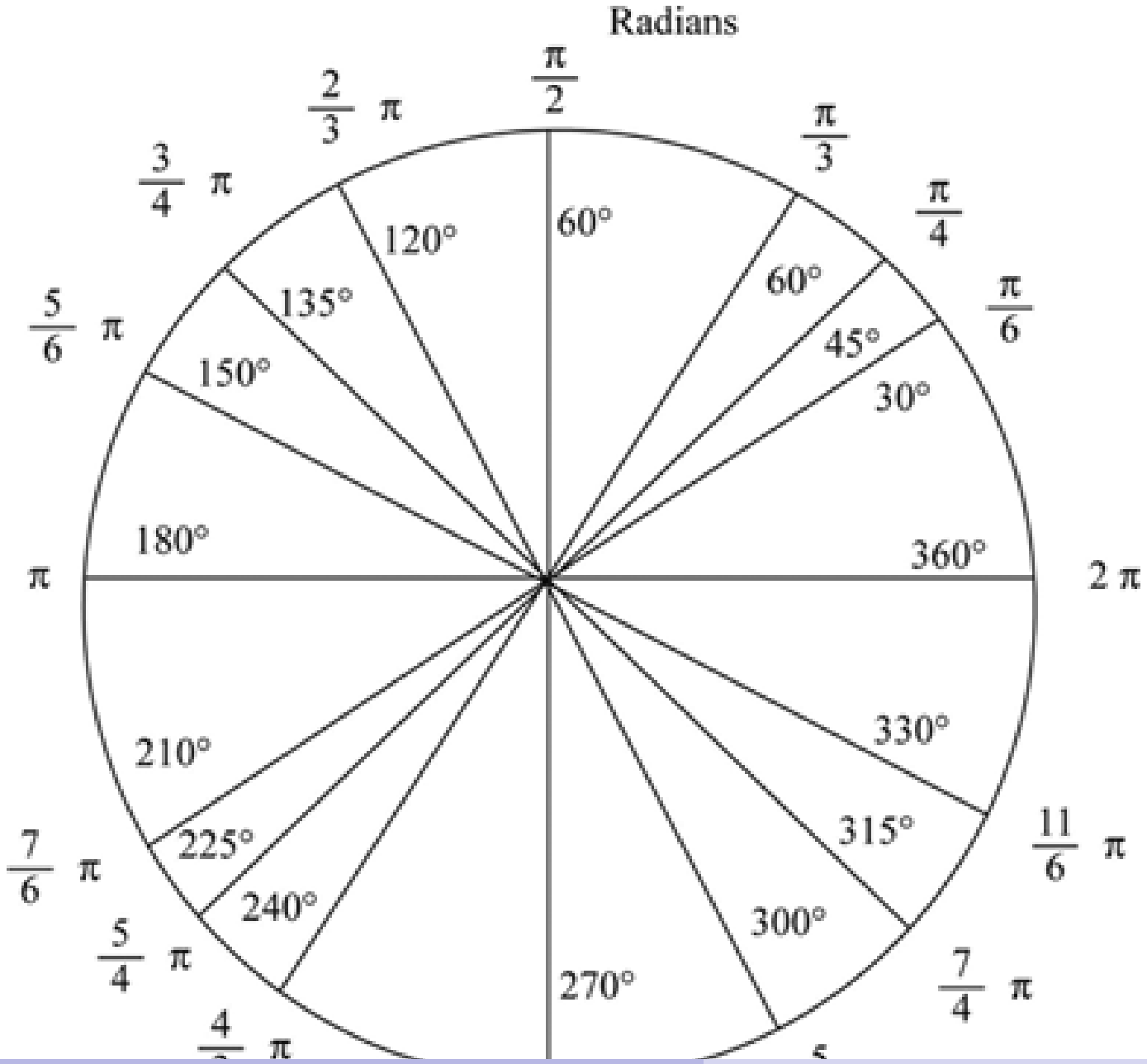
www.pygame.org/wiki/about

Lets start with basics

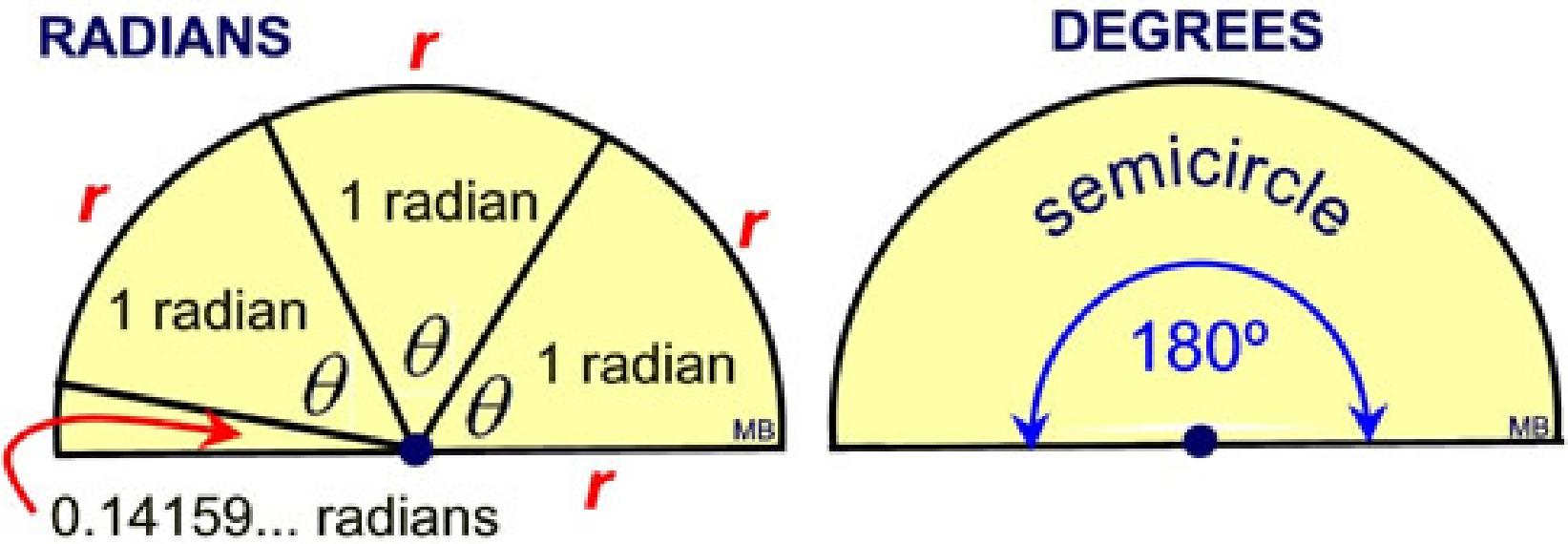
Computer axis



Radians for parabolic movement



Radians used in computer games



$$\underbrace{3.14159...}\ \text{radians} = 180°$$

$$\pi\ \text{radians} = 180°$$

Starting with pygame

Installation

```
pip install pygame
```

Use pygame lib

```
import pygame

# infinite loop
run = True
while run:
  WIN = pygame.display.set_mode(width, height)
  for event in pygame.event.get():
    if event.type == pygame.QUIT:
      run = False
  pygame.quit()
  # Add color to the window
  WIN.fill(COLOR)
```