

Let the PyGames Begin!

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Vocabulary

Algorithm: a set of steps that describe a method of solving a problem. More formally, an algorithm is a well-ordered sequence of unambiguous and effectively computable operations that produces a result and halts in a finite amount of time.

Chip: An integrated circuit that packs millions of transistors and other parts into a tiny package.



Code: A set of commands, written by a human, which can be used to make a computer solve some problem. The code implements one or more algorithms.

Comment: Information included in a computer program that is not used by the computer. Instead, it explains to human readers how the program works. In Python, comments are started with the hash mark or pound sign: #.

Computer: A computer is a machine that takes simple actions in response to commands. The commands can be stored, to be used over and over.

CPU (central processing unit): The part of the computer that actually executes commands. In modern computers, it is a small chip.

Function: Computer code intended to be used more than once at different times during the program's execution. Functions usually perform only one action, such as a calculation or displaying an item on the screen.

Input device: Anything that can provide data to a computer program. Keyboards, mice, and microphones are examples of input devices.

Machine language: A language of only ones and zeros (binary digits, or *bits*) that can be used directly by the CPU.

Memory: Electronic storage connected directly to the CPU. The running program and its data are stored in memory. Also called “main memory” or “RAM (random access memory.)” The contents of memory are lost when power is turned off.

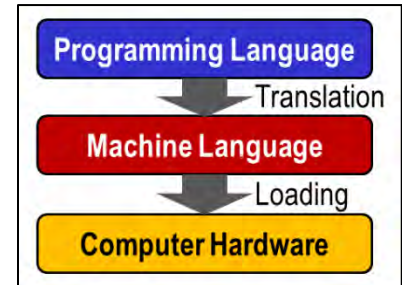
Method: Executable code that is part of an object; methods are the action verbs of objects. A method is a function that's within an object.

Object: computer code that contains both data, called *properties*, and executable instructions, called *methods*.

Output device: Anything to which a computer program can send data. Screens, printers, and speakers are examples of input and output devices.

Program: A set of stored commands that can be run on a computer as often as needed.

Programming language: A structured, but human-readable language that is used to write programs for computers. The programs must be translated to machine language before the CPU can use them. There are many programming languages, including Python, Java, JavaScript, and Makecode.



Python: An object-oriented computer programming language named after the British television show Monty Python's Flying Circus.

Storage: Electronic or magnetic storage that holds programs and data that can be loaded into main memory when needed. A storage device is *both* an input device and an output device. Also called “hard disk.” Flash drives and solid state disks are storage. The contents of storage are *not* lost when power is turned off.

Three Important Things

- Python is case-sensitive, so “Game” and “game” are different.
- Indented lines define a block of code. All lines must be indented by the same amount. Do not mix spaces and tabs.
- A Dutch programmer named Guido van Rossum made Python in 1991. He named it after the television show Monty Python's Flying Circus.

A Program of Your Own

Algorithm:

- Use “import” to get the graphics library.
- Create a function that does this:
 - Define a 100 x 100 window
 - Define a circle within the window
 - Draw the circle
 - Wait for a mouse click
 - Close the graphics window
- Run the function

Code:

Start Thonny with the Windows start key or icon. Type the code into the program area window.

```
from graphics import *

def drawCircle():
    win = GraphWin("My Circle", 100, 100)
    c = Circle(Point(50,50), 10)
    c.draw(win)
    win.getMouse() # pause for click
    win.close()

drawCircle()
```

Click the run icon. You will be asked to save your program. Call it circle.py.

Challenges

- Can you change the size of the window?
- Can you change the size of the circle?
- Can you change where the circle is drawn?

Getting Started with Pong

```
# Import the pygame library and initialise the game engine
import pygame
pygame.init()

# Define some colors
BLACK = (0,0,0)
WHITE = (255,255,255)

# Open a new window
size = (700, 500)
screen = pygame.display.set_mode(size)
pygame.display.set_caption("Pong")

# The loop will carry on until the user exits
# the game (e.g. clicks the close button).
carryOn = True

# The clock will be used to control how fast
# the screen updates
clock = pygame.time.Clock()

# ----- Main Program Loop -----
while carryOn:
    # --- Main event loop
    for event in pygame.event.get():
        # User did something
        if event.type == pygame.QUIT:
            # If user clicked close
            carryOn = False
            # Flag that we are done
            # so we exit this loop

    # --- Game logic will go here
```

```
# --- Drawing code should go here
# First, clear the screen to black.
screen.fill(BLACK)
# Draw the net
pygame.draw.line(screen,
    WHITE, [349, 0], [349, 500], 5)
# --- Update the screen
pygame.display.flip()

# Once we have exited the main program loop
# we can stop the game engine:
pygame.quit()
```



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