

Python Project:
Snake and Pong Game



by Vasile-Dan Goga

INTRODUCTION

The present project is used to understand the functionality of the Python programming language.

Pong and Snake games delight everyone, and their realization can be achieved through object-oriented programming.

In its realization, principles of object-oriented programming and notions of scripting were used, through which an extremely user-friendly graphical interface was created.

The Python code was written using PyCharm software, an extremely good option for someone at the beginning of the road and to better understand how the programming language can be used.

Introduction in Python

Python is an interpreted high-level general-purpose programming language. Python's design philosophy emphasizes code readability with its notable use of significant indentation. Its language constructs as well as its object-oriented approach aim to help programmers write clear, logical code for small and large-scale projects.

Python is dynamically typed, and garbage collected.

It supports multiple programming paradigms, including structured (particularly, procedural), object-oriented and functional programming. Python is often described as a "batteries included" language due to its comprehensive standard library.

Guido van Rossum began working on Python in the late 1980s, as a successor to the ABC programming language, and first released it in 1991 as Python 0.9.0.

Python 2.0 was released in 2000 and introduced new features, such as list comprehensions and a garbage collection system using reference counting. Python 3.0 was released in 2008 and was a major revision of the language that is not completely backward compatible, and much Python 2 code does not run unmodified on Python 3. Python 2 was discontinued with version 2.7.18 in 2020.

Python consistently ranks as one of the most popular programming languages

Source: [https://en.wikipedia.org/wiki/Python_\(programming_language\)](https://en.wikipedia.org/wiki/Python_(programming_language))

Introduction in OOP (Object-Oriented Programming)

Object-oriented programming (OOP) is a programming paradigm based on the concept of "objects", which can contain data and code: data in the form of fields (often known as attributes or properties), and code, in the form of procedures (often known as methods).

A feature of objects is that an object's own procedures can access and often modify the data fields of itself (objects have a notion of this or self). In OOP, computer programs are designed by making them out of objects that interact with one another.[1][2] OOP languages are diverse, but the most popular ones are class-based, meaning that objects are instances of classes, which also determine their types.

Many of the most widely used programming languages (such as C++, Java, Python, etc.) are multi-paradigm and they support object-oriented programming to a greater or lesser degree, typically in combination with imperative, procedural programming. Significant object-oriented languages include: (list order based on TIOBE index) Java, C++, C#, Python, R, PHP, Visual Basic.NET, JavaScript, Ruby, Perl, Object Pascal, Objective-C, Dart, Swift, Scala, Kotlin, Common Lisp, MATLAB, and Smalltalk.

Source: https://en.wikipedia.org/wiki/Object-oriented_programming

Basic Principles of OOP

There are 4 major principles that make a language Object Oriented. These are Encapsulation, Data Abstraction, Polymorphism, and Inheritance.

These are also called as four pillars of Object-Oriented Programming.

Encapsulation

Encapsulation is the mechanism of hiding of data implementation by restricting access to public methods. Instance variables are kept private and accessor methods are made public to achieve this.

Abstraction

Abstract means a concept or an idea which is not associated with any particular instance.

Using abstract class/Interface we express the intent of the class rather than the actual implementation. In a way, one class should not know the inner details of another in order to use it, just knowing the interfaces should be good enough.



Inheritance

Inheritance expresses “is-a” and/or “has-a” relationship between two objects. Using Inheritance, in derived classes we can reuse the code of existing super classes.

Polymorphism

It means one name many forms. It is further of two types — static and dynamic. Static polymorphism is achieved using method overloading and dynamic polymorphism using method overriding. It is closely related to inheritance. We can write a code that works on the superclass, and it will work with any subclass type as well.

Source:

<https://medium.com/@cancerian0684/what-are-four-basic-principles-of-object-oriented-programming-645af8b43727>

PONG Game

Pong is one of the first computer games that ever created, this simple "tennis like" game features two paddles and a ball, the goal is to defeat your opponent by being the first one to gain 10 points, a player gets a point once the opponent misses a ball.

The game can be played with two human players, or one player against a computer-controlled paddle.

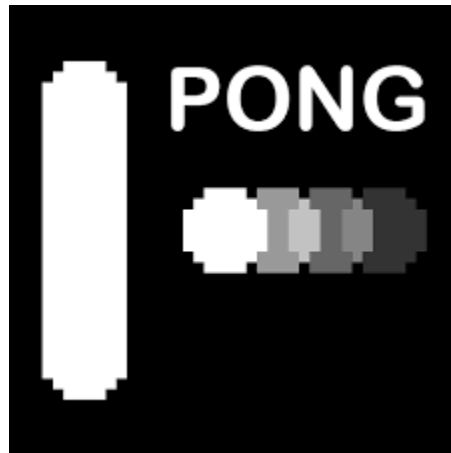
The game was originally developed by Allan Alcorn and released in 1972 by Atari corporations. Soon, Pong became a huge success, and became the first commercially successful game, on 1975, Atari release a home edition of Pong (the first version was played on Arcade machines) which sold 150,000 units. Today, the Pong Game is considered to be the game which started the video games industry, as it proved that the video games market can produce significant revenues.

Nolan Bushnell founded Atari at 1972 in order to create games and ideas and license them to other companies for mass production. Pong was actually a training exercise for one of Atari's employees - Allan Alcorn, once it was finished, Nolan made few adjustments in order to make the game more interesting (like changing the ball's return angle) and added simple sound effects.

The first Pong Arcade machine was installed on a local bar, and it was so successful that Atari decided to produce and sell the game by themselves, rather than licensing it to other companies. In 1973 the company finally got a line of credit from Wells Fargo and started an assembly line, by the end of the year, Pong arcade machines were shipped to location all over the U.S. as well as to other countries.

Atari sold more than 35000 Pong machines, this figure is only about one third of the total number of Pong machines that were sold globally, since many Pong clones appeared shortly after the debut of the original Atari Pong game. The way Atari chose to compete with the Pong Game clones was to produce more innovative games such as "Double Pong" which was a pong game with four players, two in every side and a bigger screen.

Source: <https://www.ponggame.org/>



SNAKE Game

Snake is the common name for a video game concept where the player maneuvers a line which grows in length, with the line itself being a primary obstacle.

The concept originated in the 1976 arcade game Blockade, and the ease of implementing Snake has led to hundreds of versions (some of which have the word snake or worm in the title) for many platforms. After a variant was preloaded on Nokia mobile phones in 1998, there was a resurgence of interest in the snake concept as it found a larger audience. There are over 420 Snake-like games for iOS alone.

The Snake design dates to the arcade game Blockade, developed and published by Gremlin in 1976.

It was cloned as Bigfoot Bonkers the same year. In 1977, Atari released two Blockade-inspired titles: the arcade game Dominos and Atari VCS game Surround.[6] Surround was one of the nine Atari VCS launch titles in the US. It was sold by Sears under the name Chase. That same year, a similar game was launched for the Bally Astrocade as Checkmate.

The first known home computer version, titled Worm, was programmed in 1978 by Peter Trefonas of the US on the TRS-80 and published by CLOAD magazine in the same year. This was followed shortly afterwards with versions from the same author for the Commodore PET and Apple II. A clone of the Hustle arcade game, itself a clone of Blockade, was written by Peter Trefonas in 1979 and published by CLOAD.[8] An authorized version of Hustle was published by Milton Bradley for the TI-99/4A in 1980.

In 1982's Snake for the BBC Micro, by Dave Bresnen, the snake is controlled using the left and right arrow keys relative to the direction it is heading in. The snake increases in speed as it gets longer, and there's only one life.

Nibbler (1982) is a single-player arcade game where the snake fits tightly into a maze, and the gameplay is faster than most snake designs. Another single-player version is part of the 1982 Tron arcade game, themed with light cycles. It reinvigorated the snake concept, and many subsequent games borrowed the light cycle theme.

Starting in 1991, Nibbles was included with MS-DOS for a period of time as a QBasic sample program. In 1992, Rattler Race was released as part of the second Microsoft Entertainment Pack.

It adds enemy snakes to the familiar apple-eating gameplay.



Source: [https://en.wikipedia.org/wiki/Snake_\(video_game_genre\)](https://en.wikipedia.org/wiki/Snake_(video_game_genre))

Project Info: Snake Game and Pong Game

Game requirements:

Minimum System Requirements:

Processor: Intel Atom or Intel Core i3

Memory: at least 2GB of RAM

Disk space: 1GB

Operating system: Windows 7 or later, macOS and Linux

Python versions: 2.7.X, 3.6.X

Recommended System Requirements:

Processor: Intel Core i5 4300M or later

Memory: at least 2GB of RAM

Disk space: 2 to 3 GB

Operating system: Windows 10, macOS and Linux

Python versions: any version

Graphics card: Python is not GPU heavy so any graphics card will be ok

Class Diagrams: Pong Game

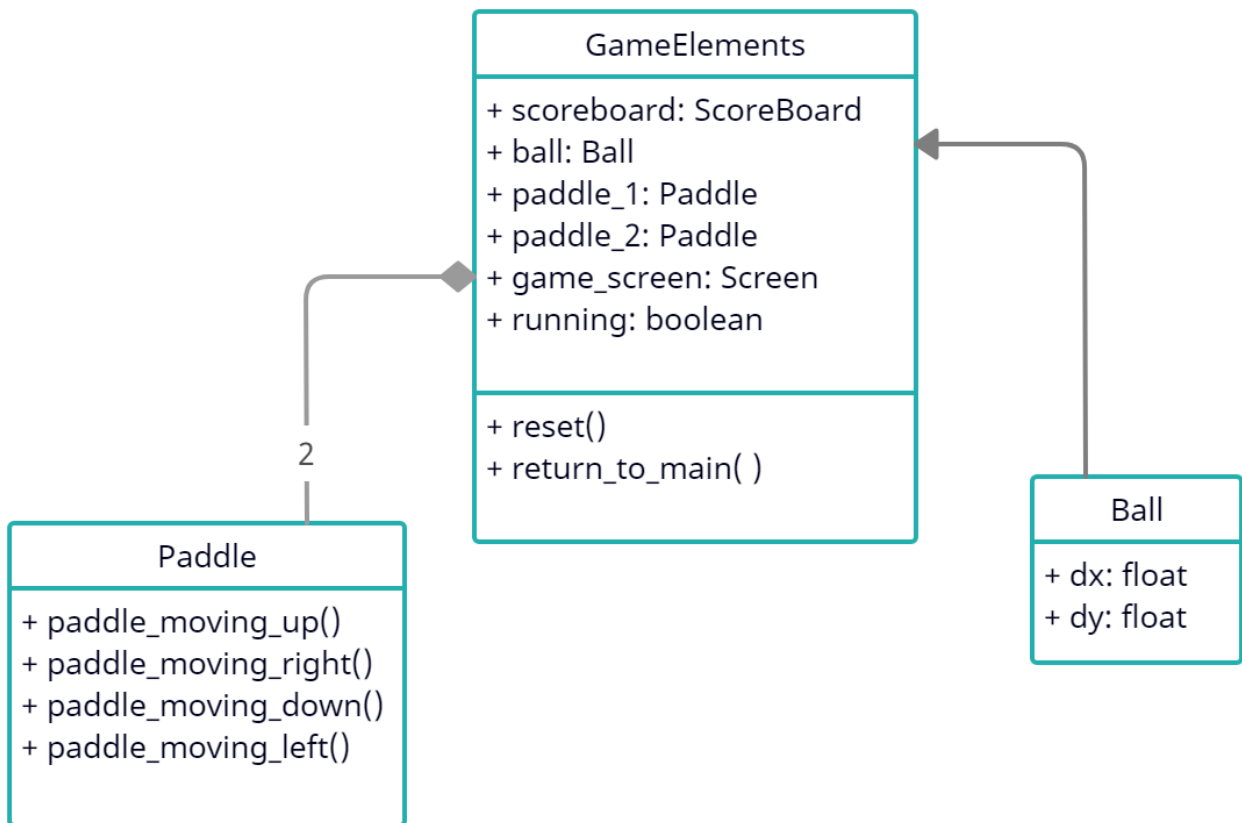


Fig.1 Pong Class Diagrams

Class Diagrams: Snake Game

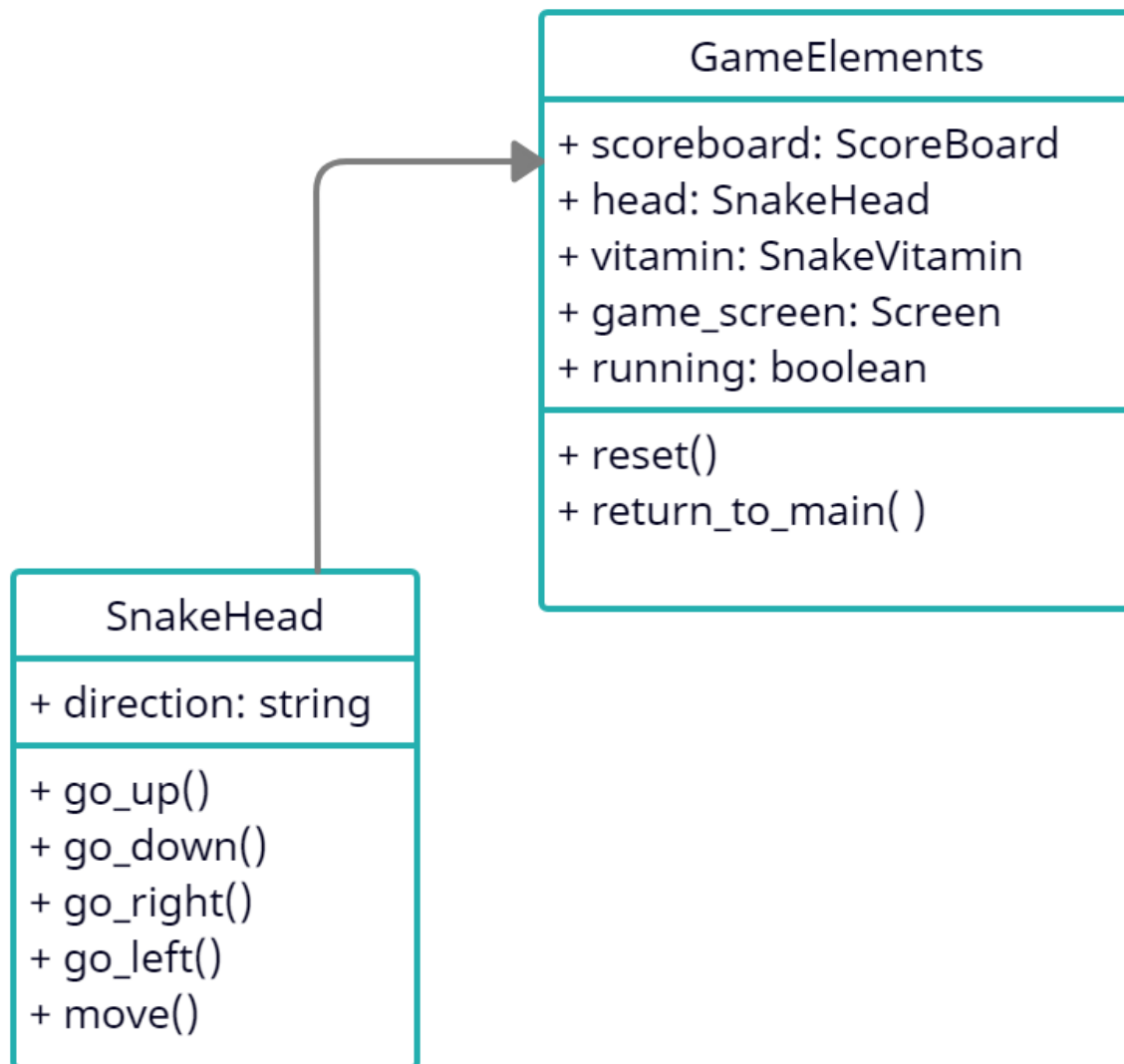


Fig.2 Snake Class Diagrams

Pong and Snake Game: Essentials Links

GIT HUB LINK:

https://github.com/VasileDan92/ProjectUpdated_August2021

JIRA LINK:

<https://pongsnakegame.atlassian.net/jira/software/projects/PG/boards/1>