**Turtle Graphics with Python**

**Turtle Graphics in Python is an approach with a long history. In this section, I will introduce you to the Python programming language through an advanced program for creating Turtle Graphics .**

**Introduction to Turtle Graphics in Python**

**At first, Turtle was just a physical object. Like a robot that can be placed on a sheet of paper and commanded to move. The Turtle then became a visual display on a high-resolution screen, often depicted in various forms .**

**Even in a purely graphical format, the Turtle concept can make it easier to show the actions taken, and what a program does .**

**Turtle module provides an environment where turtles move on a 2D grid. Turtles have position, orientation (the direction the turtle is facing), a variety of possible states (turtles can draw lines of a certain color when they move, or leave no trace), and possible actions (turn left or right, move forward or back) are**

**A turtle object has many methods of movement that can be grouped into different families. You can learn more about Turtle module methods in the official Python documentation. Now let me introduce you to a free and advanced Python project in the field of Turtle graphics :**

**import turtle as tu**

**roo = tu . Turtle () # Turtle object**

**wn = tu . screen () # Screen Object**

**wn . bgcolor ( "black" ) # Screen Bg color**

**wn . title ( "Fractal Tree Pattern" )**

**roo . left ( 90 ) # moving the turtle 90 degrees towards left**

**roo . speed ( 20 ) # setting the speed of the turtle**

**def draw( l ): # recursive function taking length 'l' as argument**

**if ( l < 10 ):**

**return**

**else :**

**roo . pen size ( 2 ) # Setting pen size**

**roo . pencolor ( "yellow" ) # Setting pen color as yellow**

**roo . forward ( l ) # moving turtle forward by 'l'**

**roo . left ( 30 ) # moving the turtle 30 degrees towards left**

**draw ( 3 \* l / 4 ) # drawing a fractal on the left of the turtle object 'roo' with 3/4th of its length**

**roo . right ( 60 ) # moving the turtle 60 degrees towards right**

**draw ( 3 \* l / 4 ) # drawing a fractal on the right of the turtle object 'roo' with 3/4th of its length**

**roo . left ( 30 ) # moving the turtle 30 degrees towards left**

**roo . pen size ( 2 )**

**roo . backwards ( l ) # returning the turtle back to its original position**

**draw ( 20 ) # drawing 20 times**

**roo . right ( 90 )**

**roo . speed ( 2000 )**

**# recursion**

**def draw( l ):**

**if ( l < 10 ):**

**return**

**else :**

**roo . pen size ( 2 )**

**roo . pencolor ( "magenta" ) # magenta**

**roo . forward ( l )**

**roo . left ( 30 )**

**draw ( 3 \* l / 4 )**

**roo . right ( 60 )**

**draw ( 3 \* l / 4 )**

**roo . left ( 30 )**

**roo . pen size ( 2 )**

**roo . backwards ( l )**

**draw ( 20 )**

**roo . left ( 270 )**

**roo . speed ( 2000 )**

**# recursion**

**def draw( l ):**

**if ( l < 10 ):**

**return**

**else :**

**roo . pen size ( 2 )**

**roo . pencolor ( "red" ) # edit**

**roo . forward ( l )**

**roo . left ( 30 )**

**draw ( 3 \* l / 4 )**

**roo . right ( 60 )**

**draw ( 3 \* l / 4 )**

**roo . left ( 30 )**

**roo . pen size ( 2 )**

**roo . backwards ( l )**

**draw ( 20 )**

**roo . right ( 90 )**

**roo . speed ( 2000 )**

**# recursion**

**def draw( l ):**

**if ( l < 10 ):**

**return**

**else :**

**roo . pen size ( 2 )**

**roo . pencolor ( '#FFF8DC' ) # white**

**roo . forward ( l )**

**roo . left ( 30 )**

**draw ( 3 \* l / 4 )**

**roo . right ( 60 )**

**draw ( 3 \* l / 4 )**

**roo . left ( 30 )**

**roo . pen size ( 2 )**

**roo . backwards ( l )**

**draw ( 20 )**

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**def draw( l ):**

**if ( l < 10 ):**

**return**

**else :**

**roo . pen size ( 3 )**

**roo . pencolor ( "lightgreen" ) #lightgreen**

**roo . forward ( l )**

**roo . left ( 30 )**

**draw ( 4 \* l / 5 )**

**roo . right ( 60 )**

**draw ( 4 \* l / 5 )**

**roo . left ( 30 )**

**roo . pen size ( 3 )**

**roo . backwards ( l )**

**draw ( 40 )**

**roo . right ( 90 )**

**roo . speed ( 2000 )**

**# recursion**

**def draw( l ):**

**if ( l < 10 ):**

**return**

**else :**

**roo . pen size ( 3 )**

**roo . pencolor ( "red" ) # edit**

**roo . forward ( l )**

**roo . left ( 30 )**

**draw ( 4 \* l / 5 )**

**roo . right ( 60 )**

**draw ( 4 \* l / 5 )**

**roo . left ( 30 )**

**roo . pen size ( 3 )**

**roo . backwards ( l )**

**draw ( 40 )**

**roo . left ( 270 )**

**roo . speed ( 2000 )**

**# recursion**

**def draw( l ):**

**if ( l < 10 ):**

**return**

**else :**

**roo . pen size ( 3 )**

**roo . pencolor ( "yellow" ) # yellow**

**roo . forward ( l )**

**roo . left ( 30 )**

**draw ( 4 \* l / 5 )**

**roo . right ( 60 )**

**draw ( 4 \* l / 5 )**

**roo . left ( 30 )**

**roo . pen size ( 3 )**

**roo . backwards ( l )**

**draw ( 40 )**

**roo . right ( 90 )**

**roo . speed ( 2000 )**

**# recursion**

**def draw( l ):**

**if ( l < 10 ):**

**return**

**else :**

**roo . pen size ( 3 )**

**roo . pencolor ( '#FFF8DC' ) # white**

**roo . forward ( l )**

**roo . left ( 30 )**

**draw ( 4 \* l / 5 )**

**roo . right ( 60 )**

**draw ( 4 \* l / 5 )**

**roo . left ( 30 )**

**roo . pen size ( 3 )**

**roo . backwards ( l )**

**draw ( 40 )**

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**def draw( l ):**

**if ( l < 10 ):**

**return**

**else :**

**roo . pen size ( 2 )**

**roo . pencolor ( "cyan" ) # cyan**

**roo . forward ( l )**

**roo . left ( 30 )**

**draw ( 6 \* l / 7 )**

**roo . right ( 60 )**

**draw ( 6 \* l / 7 )**

**roo . left ( 30 )**

**roo . pen size ( 2 )**

**roo . backwards ( l )**

**draw ( 60 )**

**roo . right ( 90 )**

**roo . speed ( 2000 )**

**# recursion**

**def draw( l ):**

**if ( l < 10 ):**

**return**

**else :**

**roo . pen size ( 2 )**

**roo . pencolor ( "yellow" ) # yellow**

**roo . forward ( l )**

**roo . left ( 30 )**

**draw ( 6 \* l / 7 )**

**roo . right ( 60 )**

**draw ( 6 \* l / 7 )**

**roo . left ( 30 )**

**roo . pen size ( 2 )**

**roo . backwards ( l )**

**draw ( 60 )**

**roo . left ( 270 )**

**roo . speed ( 2000 )**

**# recursion**

**def draw( l ):**

**if ( l < 10 ):**

**return**

**else :**

**roo . pen size ( 2 )**

**roo . pencolor ( "magenta" ) # magenta**

**roo . forward ( l )**

**roo . left ( 30 )**

**draw ( 6 \* l / 7 )**

**roo . right ( 60 )**

**draw ( 6 \* l / 7 )**

**roo . left ( 30 )**

**roo . pen size ( 2 )**

**roo . backwards ( l )**

**draw ( 60 )**

**roo . right ( 90 )**

**roo . speed ( 2000 )**

**# recursion**

**def draw( l ):**

**if ( l < 10 ):**

**return**

**else :**

**roo . pen size ( 2 )**

**roo . pencolor ( '#FFF8DC' ) # white**

**roo . forward ( l )**

**roo . left ( 30 )**

**draw ( 6 \* l / 7 )**

**roo . right ( 60 )**

**draw ( 6 \* l / 7 )**

**roo . left ( 30 )**

**roo . pen size ( 2 )**

**roo . backwards ( l )**

**draw ( 60 )**

**wn . exitonclick ()**

Amirshayan Jalili

[Shayan138190@gmail.com](mailto:Shayan138190@gmail.com)

<https://github.com/Amirshayan2002>