STEMLoyola

Reference Sheet: Python3 Turtle Graphics *(Version 1)*

http://challenges.stemloyola.org and http://www.stemloyola.org

Screen Setup

setup() - Set the size and position of the graphics window

```
setup(width=800, height=800)
setup(width=800, height=600, startx=0, starty=0)
```

title() - Set the title of graphics window

```
title("My first program")
```

bgpic() - Set the background image of the graphics window. Accepts only GIF images

```
bgpic("my-background.gif")
```

clearscreen() - Delete everything from the graphics window and sets a white background
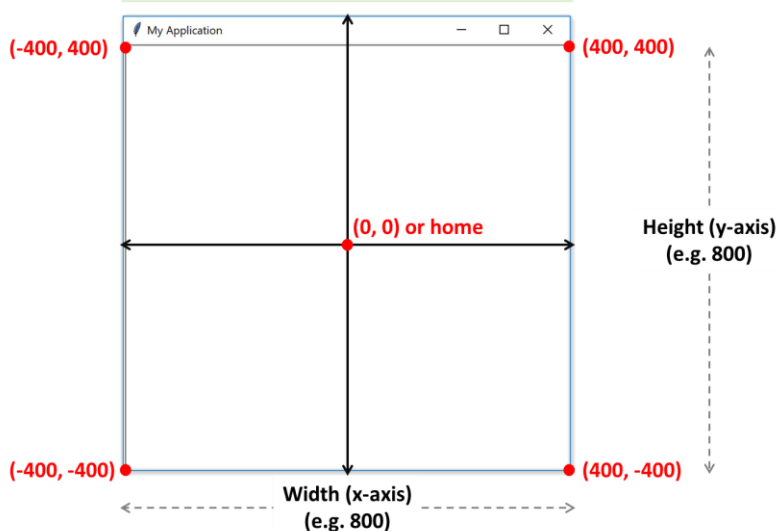
```
clearscreen()
```

exitonclick() - Close the graphics window when the screen is clicked

```
exitonclick()
```

Coordinates

Screen coordinates when you set:
`setup(width=800, height=800)`
(-400, 400) ... (400, 400) ... (0, 0) or home ... (-400, -400) ... (400, -400)
Height (y-axis) (e.g. 800); Width (x-axis) (e.g. 800)

home() – Move turtle to the origin – coordinates (0, 0) – and set its heading to its start-orientation

```
home()
```

goto() - Move turtle to an absolute position without changing turtle's orientation. If the pen is down, draw line

```
goto(200, -100)
```

setx() - Set the turtle's first coordinate (x), leave second coordinate unchanged

```
setx(-50)
```

sety() - Set the turtle's second coordinate (y), leave first coordinate unchanged

```
sety(150)
```

Pen Control

pendown() - Pull the pen down – drawing when moving

```
pendown()
```

penup() - Pull the pen up – no drawing when moving

```
penup()
```

pensize() - Set the line/boundary thickness to the specified width

```
pensize(width=10)
```

hideturtle() - Make the turtle invisible. It's a good idea to do this while you're in the middle of doing some complex drawing, because hiding the turtle speeds up the drawing observably

```
hideturtle()
```

showturtle () - Make the turtle visible

```
showturtle()
```

Writing on Screen

write( ) - Write text at the current turtle position according to *align* ("left", "center" or right") and with the given *font*. A font is a triple specifying *fontname*, *fontsize* and *fonttype*. Font type can be any combination of "bold" or "normal" with "italic" and/or "underline"

```
write("Loyola")
write("Loyola", align="left")
write("Tanzania", align="center", font=("Arial", 16, "bold underline"))
write("Tanzania", align="center", font=("Calibri", 16, "normal italic underline"))
```

Motion and Drawing

dot( ) – Draw a circular dot with diameter *size*, using *color*

```
dot()
dot(50, "red")
```

forward( ) - Move the turtle forward by the specified distance, in the direction the turtle is headed

```
forward(50)
```

backward( ) - Move the turtle backward by distance, opposite to the direction the turtle is headed without changing the turtle's heading/direction

```
backward(60)
```

right( ) - Turn turtle right by specified angle. Units are in degrees by default, but can be set via the *degrees()* and *radians()* functions

```
right(90)
```

left( ) - Turn turtle left by specified angle. Units are in degrees by default, use *radians()* function to specify angles in radians

```
left(120)
```

circle( ) – Draw a circle with given radius. *extent* – an angle – determines which part of the circle is drawn (by default it is 360 degrees. E.g. If extent is 180 degrees, a semi-circle will be drawn

```
circle(100)
circle(100, extent=180)
```

undo( ) - Undo (repeatedly) the last turtle action(s)

```
undo()
```

speed( ) - Set the turtle's speed to an integer value in the range of 0 to10. 1 is the slowest and 10 the fastest. 0 disables animations and turtles move at the fastest speed possible. "fastest": 0, "fast": 10, "normal": 6, "slow": 3, "slowest": 1

```
speed(6)
speed("normal")
```

Input Methods

textinput( ) - Pop up a dialog window for input of a string. Parameter *title* is the title of the dialog window, *prompt* is a text mostly describing what information to input. Return the string input. If the dialog is canceled, return None

```
name = textinput(title="User Details", prompt="Please enter your name")
```

numinput( ) - Pop up a dialog window for input of a number. *title* is the title of the dialog window, *prompt* is a text mostly describing what numerical information to input. *minval* is the minimum value for input and *maxval* is the maximum value for inpu

```
age = numinput(title="Age", prompt="Please enter your age", minval=0, maxval=100)
```

Color Control

bgcolor( ) - Set the background color of the graphics window

```
bgcolor("black")
bgcolor(0, 0, 0)
```

pencolor( ) - Set the pen color (boundary of the drawing)

```
pencolor("white")
pencolor(255, 255, 255) # If the color mode is 255
pencolor(1, 1, 1)       # If the color mode is 1
```

fillcolor( ) - Set the fillcolor (interior of a drawing)

```
fillcolor("black")
fillcolor(0, 0, 0)
```

begin_fill( ) - To be called just before drawing a shape to be filled

```
begin_fill()
```

end_fill( ) – Fill all the shapes that were drawn since the last *begin_fill()*

```
end_fill()
```

Events and States