

# Python Turtle



- <https://realpython.com/beginners-guide-python-turtle/>
- <https://docs.python.org/3/library/turtle.html>

# What is Resolution?



- Your laptop has a resolution, this is described in terms of how many pixels can be displayed at once.
- A Youtube or TicToc video will have a resolution, described the same way, for instance 720p or 1080p which is also expressed as:
  - $720p = 1280 \times 720$
  - $1080p = 1280 \times 1080$
- The first number is usually the width, the second is the height.
- So a 720p video is 1280 pixels wide and 720 pixels high

# X, Y Coordinates



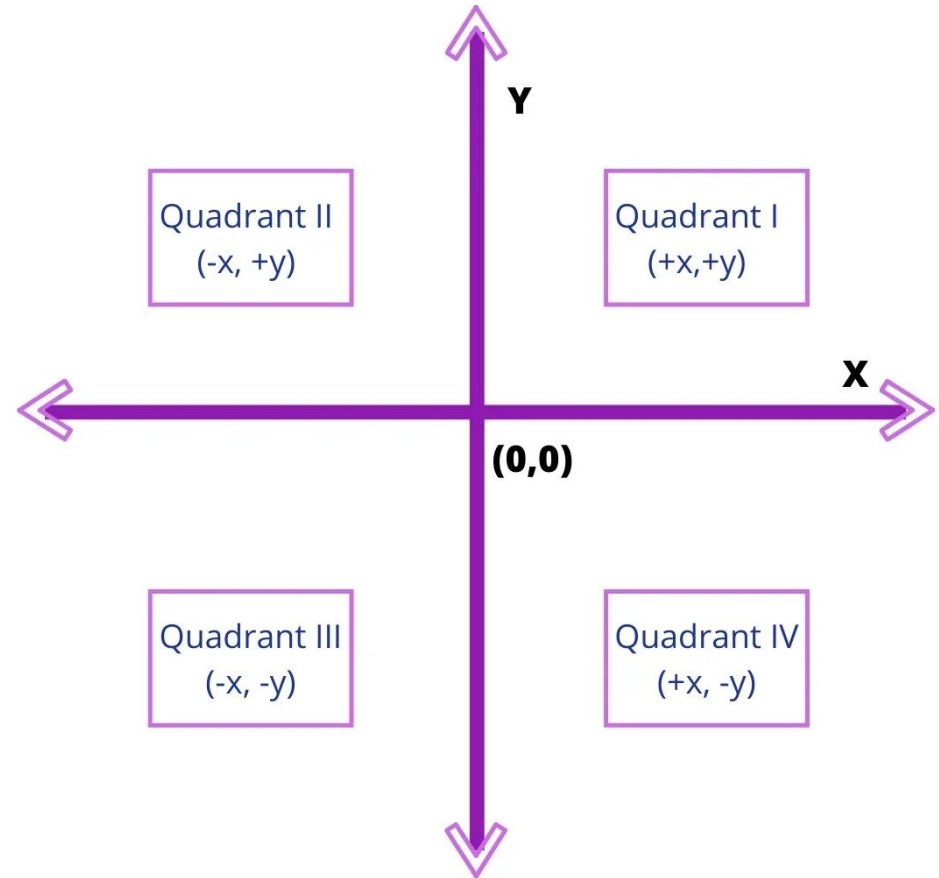
- In Computer Graphics the position of a pixel is expressed as its X, Y coordinates.
- The Y is the position across the screen or windows width, while the X is the position across its height.



# Python Window Coordinates



- The `goto(x, y)` command for turtle positions the turtle in the window.
- The coordinates are a bit weird, when  $X=0$ , and  $Y=0$ , the turtle is in the middle of the window!
- Top left of a 360x360 window is:
  - $X=-160$ ,  $Y=160$
- Bottom right of a 360x360 window is:
  - $X=160$ ,  $Y=-160$



# Samples



- square.py – draws a square (obviously :-)
- Initials.py – try to draw your initials with the turtle
- race.py – race those turtles
- pong.py – a version of the rather ancient game called pong, advanced users might be able to figure out how to make it single player

# Exercises



- Change square.py to draw a different shape, for example a rectangle. See how many shapes you can draw all at once!
- Change race.py:
  - Change the **Finished** text to display the name of the winning turtle, for example change 'Finished' so it says 'Blue Finished First', of course if blue finished first! You will need to think a little about this and perhaps use an if statement with conditions!
  - Rig the race, so that your favourite coloured turtle always wins!
- Change pong to be single player