ASCII Art w/ functions, loops & types

• Ancient Technology
• Discloses inner workings of modern tech.
• Teach functions w/ parameters & returns, loops, conditionals and types
• Avoids overhead of learning a graphics API (Application Programming Interface) for now
• Teaches some math. of the plane, where roving robots live.
Pre-calculus: real functions have graphs. Real: when x is a real number, fix) is a unique real number called the value of the function at argument x.

(Drawn) graph: Bunch of dots at coordinates \((x_i, f(x_i))\) for some bunch of \(x_i\) values, or a smooth curve connecting them.
Goals

1. Plot the graph of one-variable function, such as the function whose graph is a semicircle. (The function will involve a square root.)

2. (next class) Draw curves or differently textured regions based on the values of 2-variable functions.
from __future__ import print_function
def thing():
    for i in range(10):
        print( 'X', sep='', end='' )
        print( ',', sep='', end='' )

space  nothing
Alternatives, after class comments and my investigation..

```python
for i in range(10):
    print 'X',
```
is no good because it prints a space after each X

```python
from sys import stdout
for i in range(10):
    stdout.write('X')
```
is another way to print one character at a time with no spaces or newlines added anywhere.
(I typed <Space> 27 times, then X, then enter)
Create a Python function to print an X at the position on the line given by the function argument.

• def plot( y ): ( y is the function’s parameter.)
• plot’s body must print y, an integer number, of spaces and then “X”
• You do it!
• TEST IT! (call plot(17), plot(25), plot(0) in the IDLE shell window.

A loop is excellent for making the computer do this task.
The math for the semicircle.

\[ 30 = \sqrt{(x-30)^2 + (y-0)^2} \]

Given \( x \), solve for \( y \):

\[
(30,0)^2 = (x-30)^2 + y^2
\]

\[
(30,0)^2 - (x-30,0)^2 = y^2
\]

From this discussion:

- When \( x = 0 \),
  - \( y \) is equal to 0,
  - and then vertical side of the \( \Delta \) has
    - length 30, and
  - so does the hypotenuse.
- one side = the hypotenuse = the \( \Delta \) side = 30
- the other side is 0! The triangle is degenerate

\[
f(x) = y = \sqrt{(30,0)^2 - (x-30,0)^2}
\]

\[
def \ f(x) := \text{returmsqrt(…)
}\]