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Introduction:

Python allows you to turn a series of instructions into useful programs and fun games! In this project you'll learn how to run a Python program, and how to print text to the screen.



Activity Checklist

Follow these **INSTRUCTIONS** one by one



Test your Project

Click on the green flag to **TEST** your code



Save your Project

Make sure to **SAVE** your work now

Step 1: Saying hello

Activity Checklist

1. Let's start by writing a very simple program, just so that you know how to get a Python program running. Open the IDLE program editor:

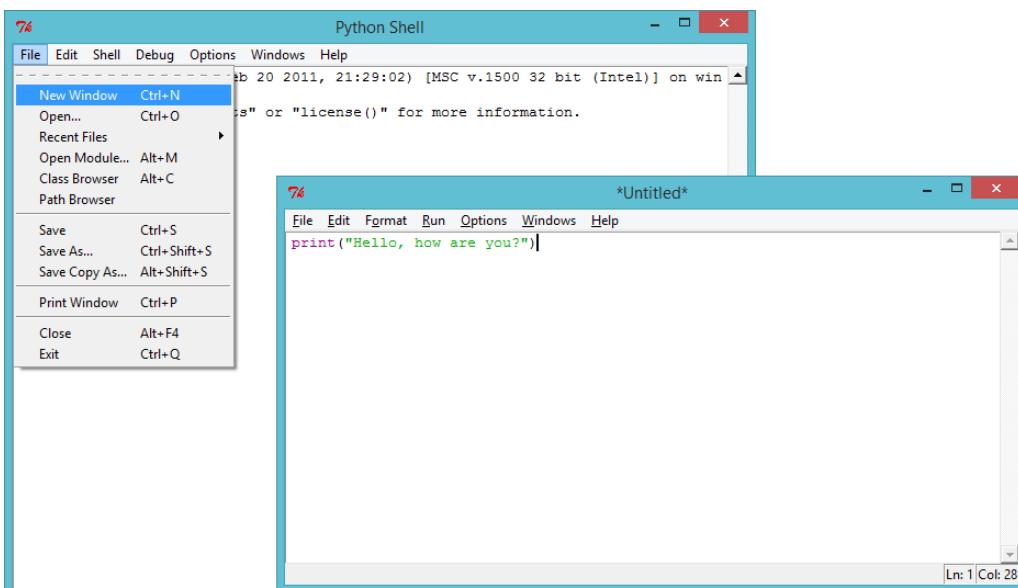
- On Windows, find IDLE in the start menu;
- On Mac, open up Terminal.app and type `idle` and press enter;
- On Linux, open up a Terminal, and type `idle` and press enter.

2. Click `File → New Window`, and type the following into the window that appears:

```
print("Hello, how are you?")
```

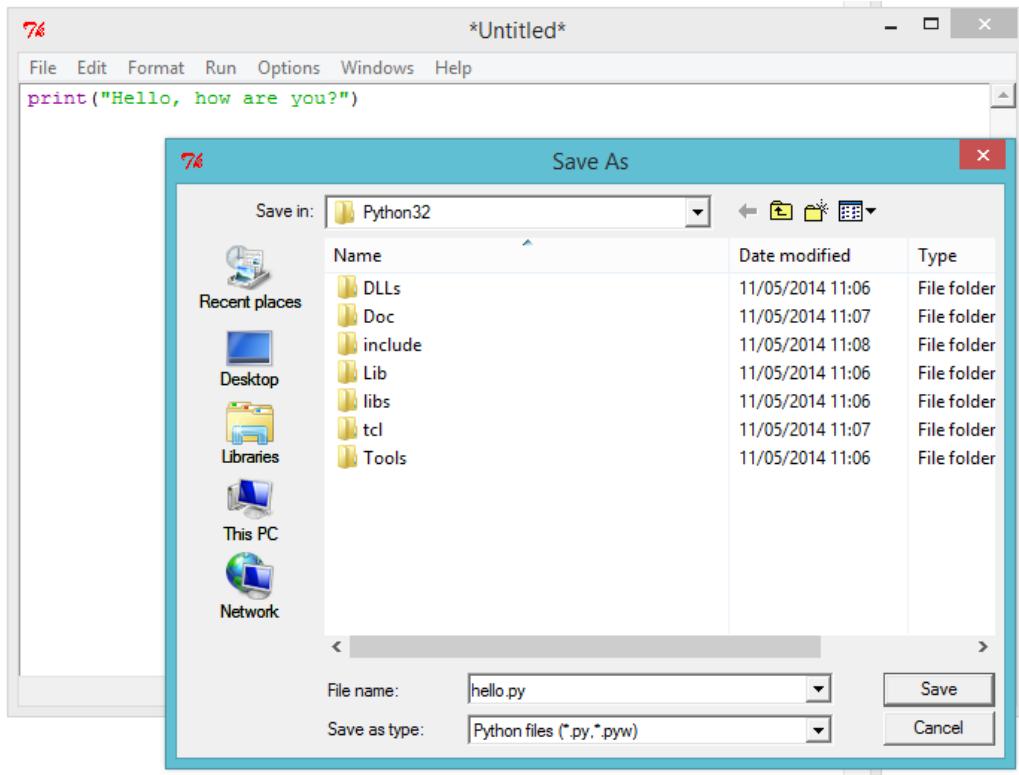
This program will print some text to the screen. Notice that the text you want to print is surrounded by speech marks (`"`).

Here's an image showing what you need to do:

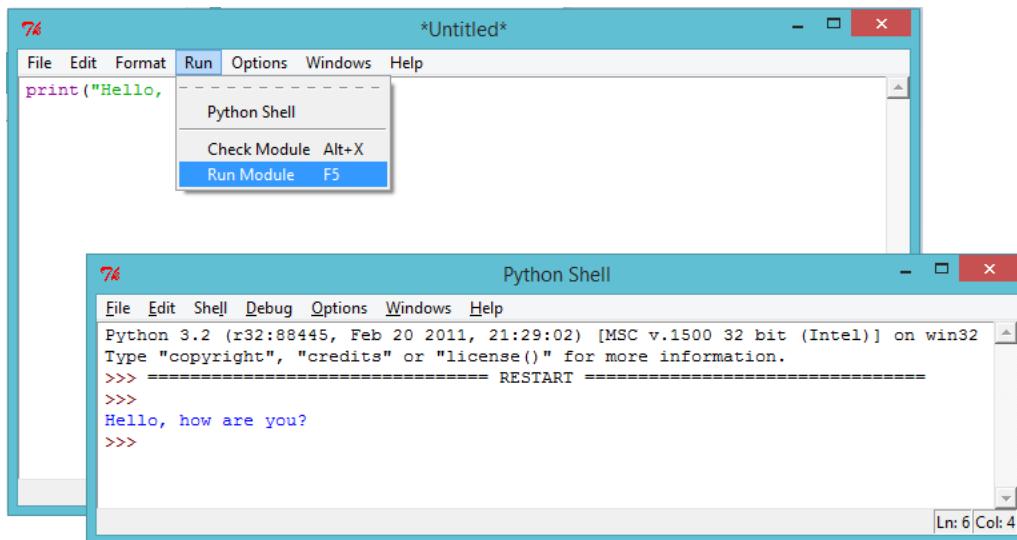


3. Save the file, by clicking `File → Save`, and name the file

`hello.py` or something similar. Don't forget to type the `.py` bit at the end, which tells the computer that it's a Python file. Without it, your program won't be colour coded, which can be really helpful.



4. Run the file by clicking `Run → Run Module`. You should see another window appear, which is the Python shell. This is the place that your program will run. If everything has worked properly, you should see your text printed to the screen.



5. If you've made a mistake, for example missing out a speech

mark (")), then you'll get an error message instead, telling you what went wrong! Try it!

A screenshot of a Windows-style application window titled "hello.py - C:/Python32/hello.py". The menu bar includes File, Edit, Format, Run, Options, Windows, and Help. The main text area contains the Python code: `print("Hello, how are you?")`. A red error bar highlights the closing quote at the end of the string literal. A modal dialog box titled "SyntaxError" appears in the foreground, displaying the error message "EOL while scanning string literal" with an OK button.

6. Congratulations, you are now officially a Python programmer!
Give yourself a pat on the back (or if you're feeling lazy, get someone else to do it for you).



Save Your Project

Challenge: What's on your mind?

Change the program above to print something more interesting to the screen!

A screenshot of a Windows-style application window titled "Python Shell". The menu bar includes File, Edit, Shell, Debug, Options, Windows, and Help. The text area shows the Python shell prompt and a user input: `>>> I'm hungry!`. The status bar at the bottom right indicates "Ln: 6 Col: 4".



Save Your Project

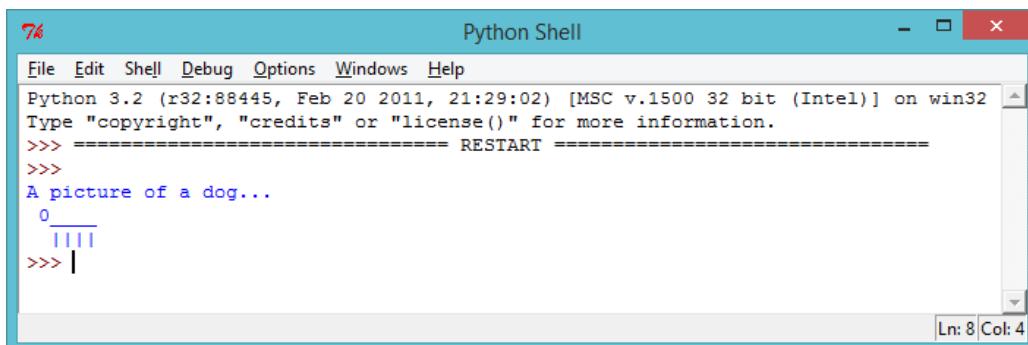
Step 2: About yourself

Activity Checklist

1. Let's print something much more fun than text... ASCII art!



ASCII art is creating pictures out of text. Here's an example - it's meant to be a dog!



A screenshot of a Windows-style Python Shell window titled "Python Shell". The window shows the following text:
File Edit Shell Debug Options Windows Help
Python 3.2 (r32:88445, Feb 20 2011, 21:29:02) [MSC v.1500 32 bit (Intel)] on win32
Type "copyright", "credits" or "license()" for more information.
>>> ===== RESTART =====
>>>
A picture of a dog...
 0_____
 |||||
>>> |
Ln: 8 Col: 4

To make this masterpiece, you can type the following into the IDLE editor and run the program:

```
print("A picture of a dog...")  
print(" 0____ ")  
print(" ||||| ")
```

2. If you prefer, you can use 3 single quotes ('''') instead of speech marks, which allows you to print multiple lines of text with 1 print statement. Like this:



```
print('''  
A picture of a dog...  
 0_____  
 |||||  
''')
```

If you run this program, you'll see it prints the same dog as before.



Challenge: About yourself

Write a Python program to tell others about yourself, by using text and ASCII art. You can create images of your hobbies, friends, family... anything you want! Here's an example:

76 Python Shell

File Edit Shell Debug Options Windows Help

Python 3.2.5 (default, May 15 2013, 23:06:03) [MSC v.1500 32 bit (Intel)] on win32

Type "copyright", "credits" or "license()" for more information.

>>> ===== RESTART =====

>>>

My favourite animals are sheep:

o-###-

 | | #

I live in Glasgow:

 |_ _

 | # |

 | | |_ _

 | # | # |

 | | # |

>>>



Step 3: Calculating text



Activity Checklist

1. Python can also do calculations using text! What do you get if you multiply `"hello"` by 5? Let's ask Python, by running this program:

```
print("hello" * 5)
```

The star `*` in the program above is a multiply sign. Run the program above, and you should see the answer:

A screenshot of a Windows desktop showing a Python development environment. At the top is a window titled "numbers.py - C:\Python32\numbers.py" with a menu bar: File, Edit, Format, Run, Options, Windows, Help. Below it is a "Python Shell" window with its own menu bar: File, Edit, Shell, Debug, Options, Windows, Help. The shell window displays the Python version (3.2) and a "RESTART" message. It then shows the command `>>> print("hello" * 5)` and its output: `hellohellohellohellohello`. The status bar at the bottom of the shell window indicates "Ln: 6 Col: 4". The status bar at the bottom of the entire application indicates "Ln: 1 Col: 18".

2. You can make the printed text above easier to read, by putting a space after the word `"hello"` in your program:

```
print("hello " * 5)
```

Run this program and you'll see that the output is a little easier to read than before.

3. If `"hello "` multiplied by 5 is `"hello hello hello hello hello "`, then what is `"hello" - 7`? Does this calculation even make sense?

The screenshot shows a Python 3.2 environment. The code editor window has the title "numbers.py - C:/Python32/numbers.py". It contains the line `print("hello" - 7)`. The Python Shell window below it shows the following output:

```
Python 3.2 (r32:88445, Feb 20 2011, 21:29:02) [MSC v.1500 32 bit (Intel)] on win32
Type "copyright", "credits" or "license()" for more information.
>>> ===== RESTART =====
=====
>>>
Traceback (most recent call last):
  File "C:/Python32/numbers.py", line 1, in <module>
    print("hello" - 7)
TypeError: unsupported operand type(s) for -: 'str' and 'int'
>>> |
```

The error message indicates that you cannot subtract a string ("hello") from an integer (7).

Oops, you've broken it! Instead of an answer, we get an error message. It looks like that calculation doesn't make sense in Python!

4. How about addition? What answer do you think `"hello" + "world"` would give? Try it out, by running the following program:

```
print("hello" + "world")
```

The screenshot shows a Python 3.2 environment. The code editor window has the title "numbers.py - C:/Python32/numbers.py". It contains the line `print("hello" + "world")`. The Python Shell window below it shows the following output:

```
Python 3.2 (r32:88445, Feb 20 2011, 21:29:02) [MSC v.1500 32 bit (Intel)] on win32
Type "copyright", "credits" or "license()" for more information.
>>> ===== RESTART =====
=====
>>>
hello world
>>> |
```

The output shows the strings "hello" and "world" joined together as "hello world".

Does it give you the answer you expected?



Save Your Project

Challenge: Words and numbers

What does the following program print to the screen? See if you can guess correctly before running the program.

```
print("ha "*4)
print("ba" + "na"*2)
print("He" + "l"*2 + "o" + "!"*10)
```

Can you make up any words of your own?



Save Your Project

Step 4: ASCII patterns



Activity Checklist

- Now that you know how to do calculations on text, now what?



Why is it useful? Well, let's say you wanted to draw an ASCII art rectangle that is 30 characters long and 3 characters high. You could either draw it the hard way, like this:

```
print("#####")
print("#####")
print("#####")
```

Or you could save time and draw it the easy way, like this:

```
print("#" * 30)
print("#" * 30)
print("#" * 30)
```

Both give you exactly the same rectangle printed to the screen:

The screenshot shows two windows. The top window is titled "numbers.py - C:\Python32\numbers.py" and contains the following code:

```
print("The hard way...")
print("#####")
print("#####")
print("#####")

print("The easy way...")
print("#" * 30)
print("#" * 30)
print("#" * 30)
```

The bottom window is titled "Python Shell" and shows the output of running the script. It prints "The hard way..." followed by three lines of hash symbols, and then "The easy way..." followed by three lines of hash symbols.

2. You could even use calculations to make interesting patterns, like this wave:

```
print("/\" *10)
print(" \\"*10)
```

The screenshot shows the Python Shell window again. It prints a wave pattern consisting of ten diagonal lines pointing up and down, followed by a single vertical line at the end.



Challenge: Code a scarf

Your best friend is having an 11th birthday party, and as a gift you've decided to code them a scarf! Use calculations wherever possible to make your own scarf pattern.

If you're feeling generous, you could even code them a cake (including 11 candles) to go with it!

