INTRODUCTION TO COMPUTERS, PROGRAMS, AND PYTHON

INTERNATIONAL COLLEGE, KMITL

PRESSESIONAL COURSE

OVERALL

- Computer
- Programming Languages
- Python
- Programming style and documentation
- Programming errors
- Graphic programming

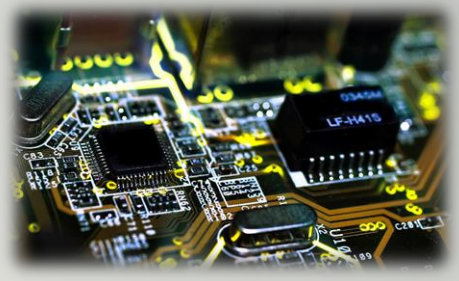
COMPUTER

COMPUTER

A **computer** is an electronic device that stores and processes **data.**

COMPUTER

Computer uses a combination of hardware and software



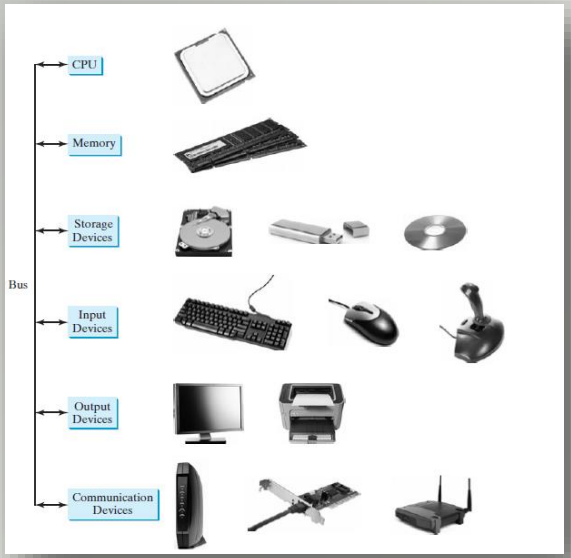
Hard ware is any physical part of the computer, both internal and external components

Software is any set of instructions that tells the Hardware what to do

COMPUTER

A computer consists of the following major hardware components:

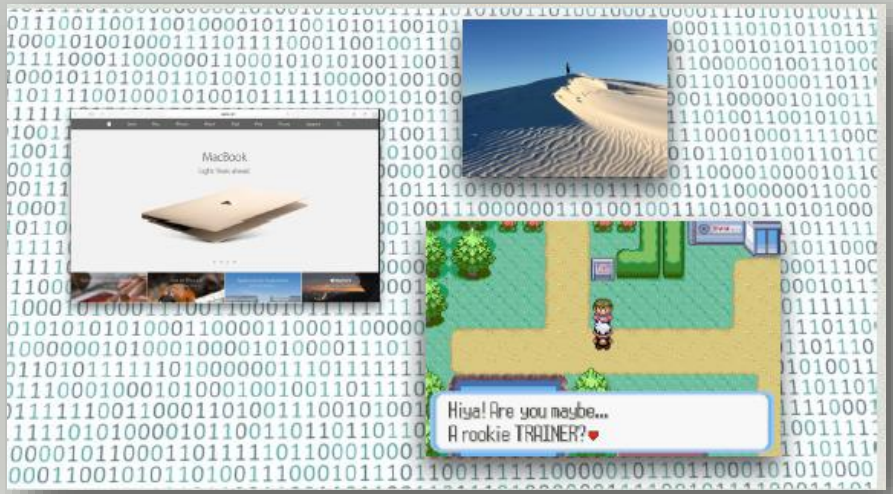
- A central Processing unit (CPU)
- Memory
- Storage devices
- Input devices
- Output devices
- Communication devices



A computer components are interconnected by a subsystem called **bus**

COMPUTER

Computer visualizes data as 0's and 1's because digital devices have two stable electrical states, on and off.



Computer knows how to combine those 0's and 1's to more complex things

COMPUTER

- The 0s and 1s are interpreted as digits in the binary number system and called **bits**
- A **byte** is composed of 8 bits
- Storage capacity is measured in bytes and multiples of the byte:
    - A kilobyte (KB) is about 1,000 bytes.
    - A megabyte (MB) is about 1 million bytes.
    - A gigabyte (GB) is about 1 billion bytes.
    - A terabyte (TB) is about 1 trillion bytes

PROGRAMMING LANGUAGES

PROGRAMMING LANGUAGES

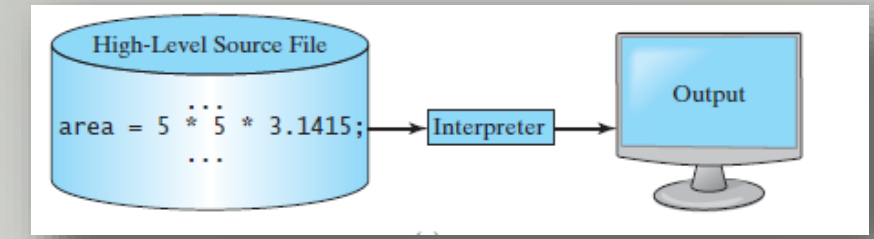
- **Machine language** is a set of built-in primitive instructions which are in the form of binary code (0's and 1's).
- **Assembly Language** uses a short descriptive word to represent each of the machine-language instructions.
- **High-Level Language** are English-like and easy to learn and use.

PROGRAMMING LANGUAGES

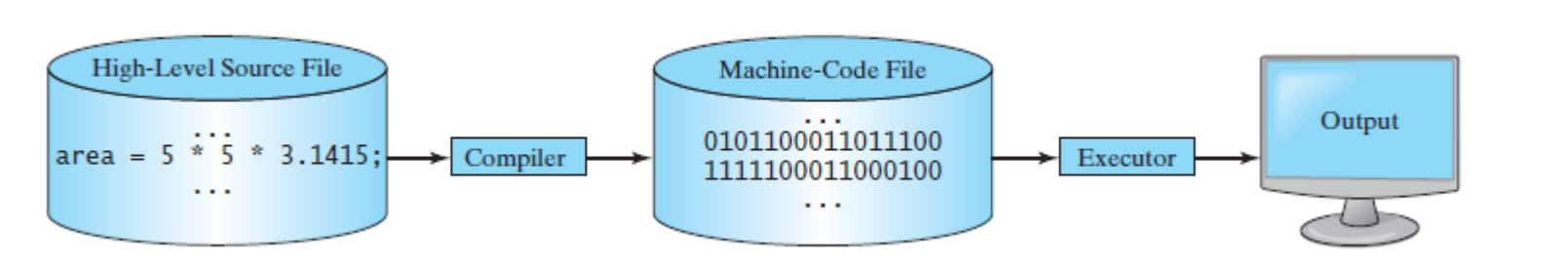
- The instruction in a High-level languages are called **statements.**
- A program written in a high-level languages is called a **source program** or **source code.**
- The translation can be done using another programming tool called an **interpreter** or a **compiler.**

PROGRAMMING LANGUAGES

- An interpreter translate and executes a program one state at a time.



- A compiler translates the entire source program into a machine-language file for execution



PYTHON

GETTING STARTED


WHAT IS python™ USED FOR?
Web Development
Video Game Development
Desktop GUIs (Graphic User Interfaces)
Software Development

Who all are using Python?

NASA YAHOO! Google YouTube

reddit BitTorrent IBM Dropbox

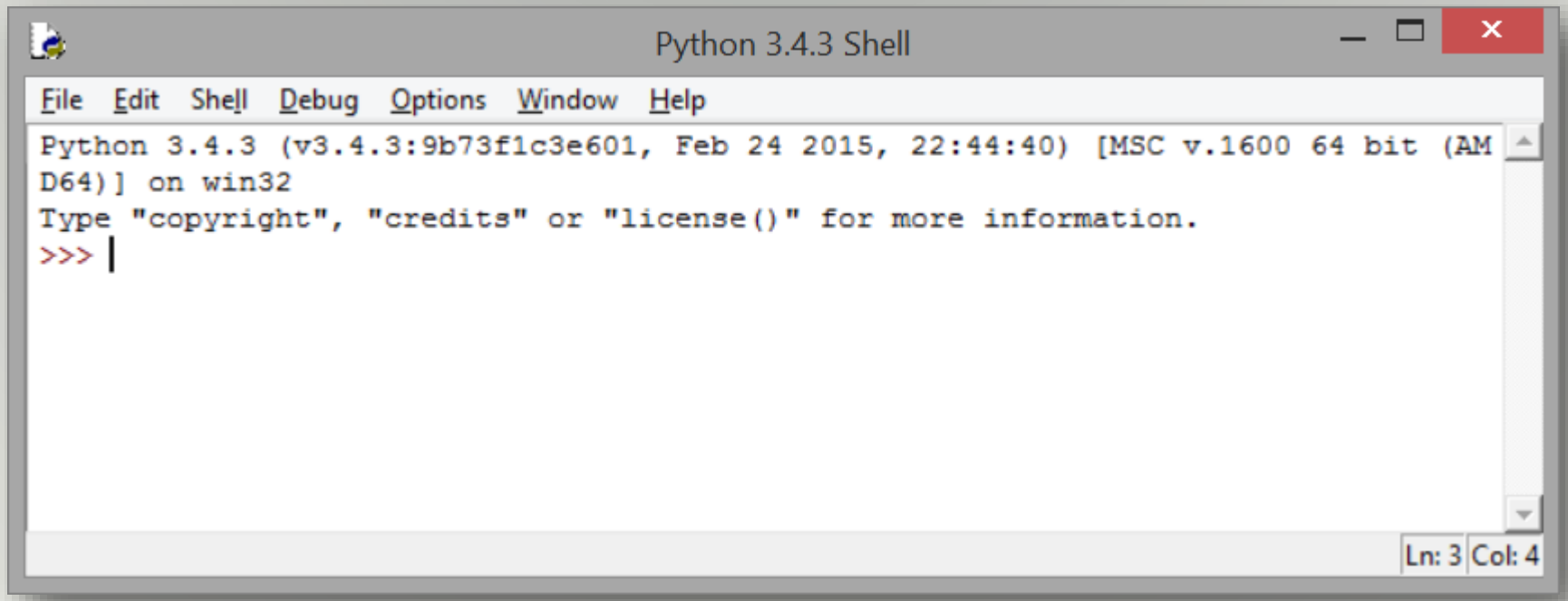
redhat CANONICAL NETFLIX Quora

Pinterest

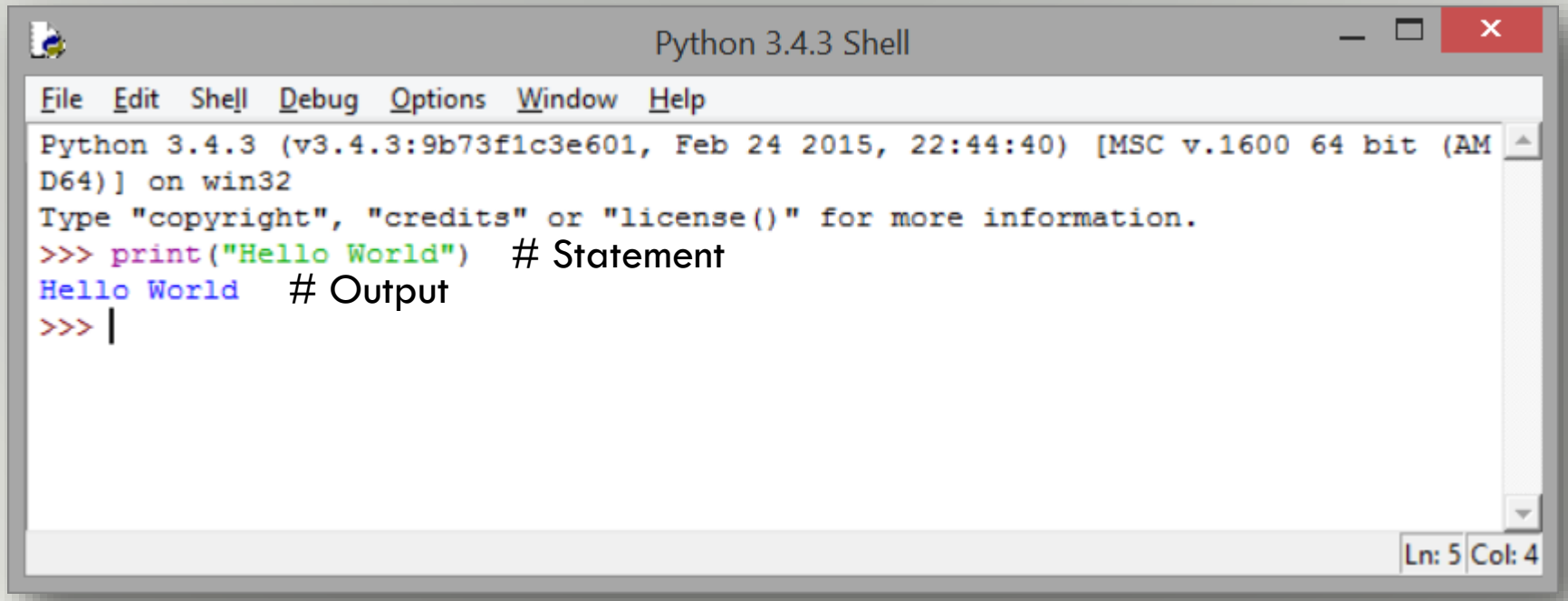
and the list goes on...

GETTING STARTED

1. Open idle

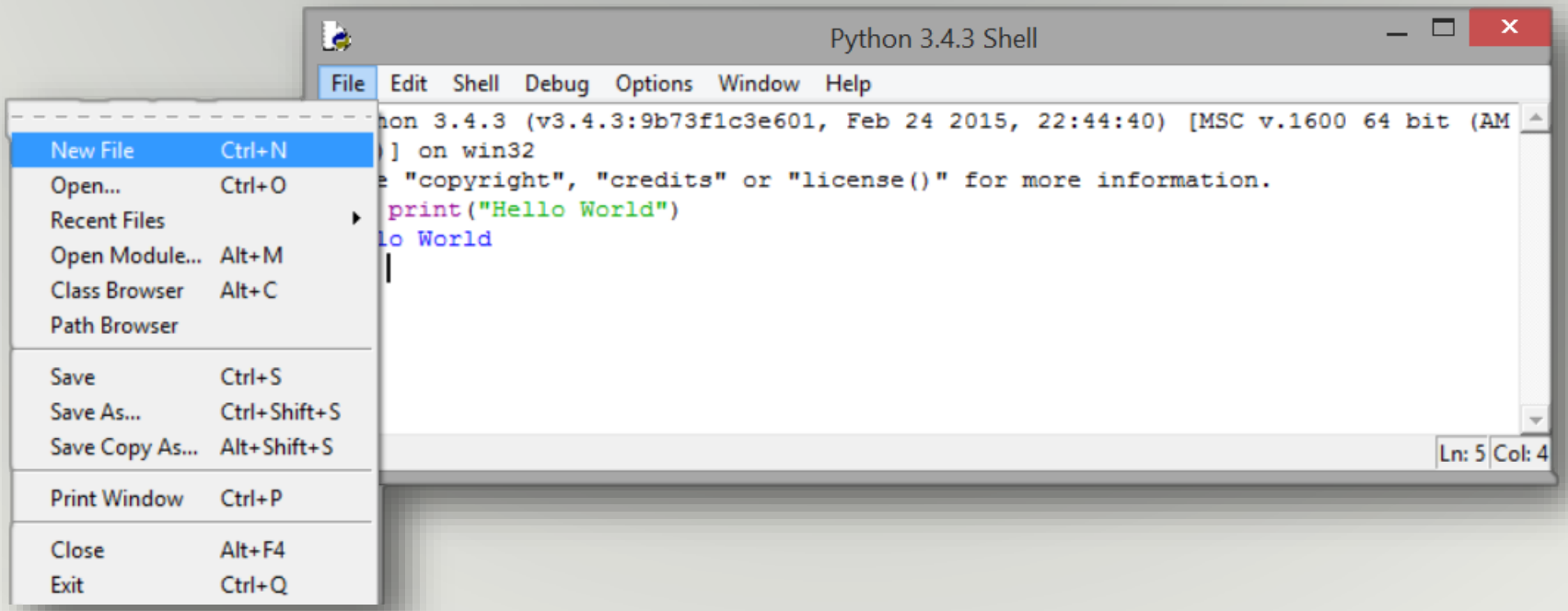


GETTING STARTED :: PRINT



GETTING STARTED :: CREATING NEW FILE

- Python files are named with extension .py



GETTING STARTED :: SAMPLE RUN

*test.py - D:\[KMITL CL...

File Edit Format Run Options Window Help

```
'''
This is a
very complicated code
'''

#Creating Surce File

print("Hello World")
```

Ln: 13 Col: 0

F5
(run)

Python 3.4.3 Shell

File Edit Shell Debug Options Window Help

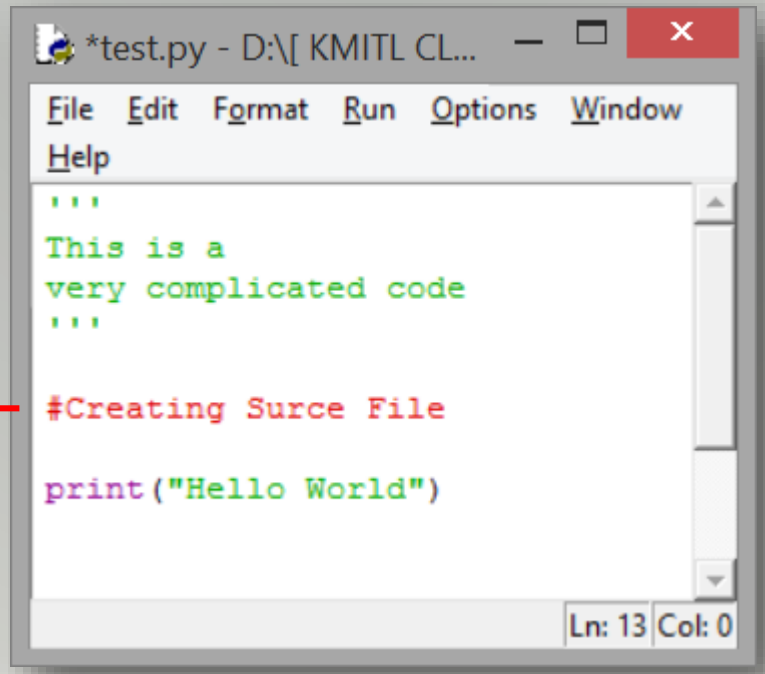
```
Python 3.4.3 (v3.4.3:9b73f1c3e601, Feb 24
2015, 22:44:40) [MSC v.1600 64 bit (AMD64
)] on win32
Type "copyright", "credits" or "license()
" for more information.
>>> ================================ REST
ART ================================
>>>
Hello World
>>>
```

Ln: 6 Col: 4

GETTING STARTED :: COMMENT

Paragraph comment
'''

Line comment
#



GETTING STARTED :: SPECIAL CHARACTER

TABLE 1.2 Special Characters

Character	*Name*	*Description*
( )	Opening and closing parentheses	Used with functions.
#	Pound sign	Precedes a comment line.
" "	Opening and closing quotation marks	Encloses a string (i.e., sequence of characters).
''' '''	Paragraph comments	Encloses a paragraph comment.

GETTING STARTED :: MATHEMATICAL OPERATOR

Name	*Meaning*	*Example*	*Result*
`+`	Addition	`34 + 1`	`35`
`-`	Subtraction	`34.0 - 0.1`	`33.9`
`*`	Multiplication	`300 * 30`	`9000`
`/`	Float Division	`1 / 2`	`0.5`
`//`	Integer Division	`1 // 2`	`0`
`**`	Exponentiation	`4 ** 0.5`	`2.0`
`%`	Remainder	`20 % 3`	`2`

PROGRAMMING STYLE & DOCUMENTATION

APPROPRIATE COMMENTS AND COMMENT STYLES

- Explain what the program does, its key features.
- Introduce each major step
- Explain anything that is difficult to read
- Be concise

PROPER SPACING

```
print(3+4*4)
```

Bad style

```
print(3 + 4 * 4)
```

Good style

PROGRAMMING ERRORS

PROGRAMMING ERRORS

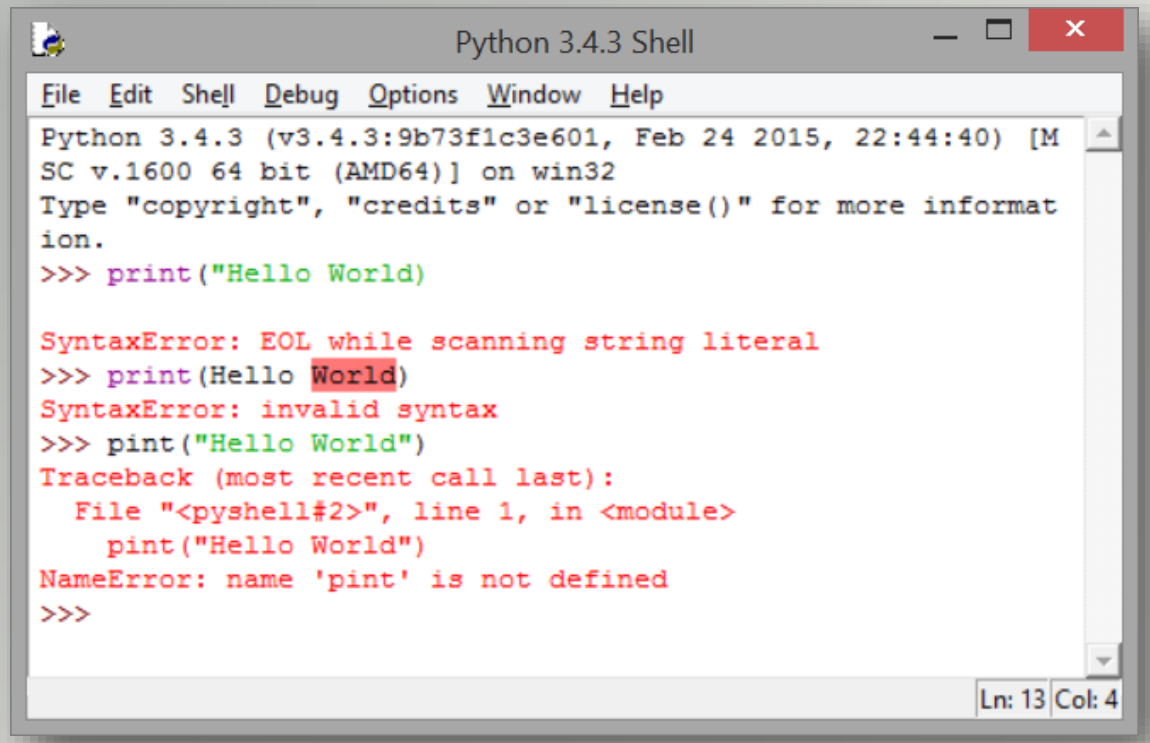
- Syntax Error
- Run-time Error
- Logic Error

Cause program to terminate

Lead to unexpected output

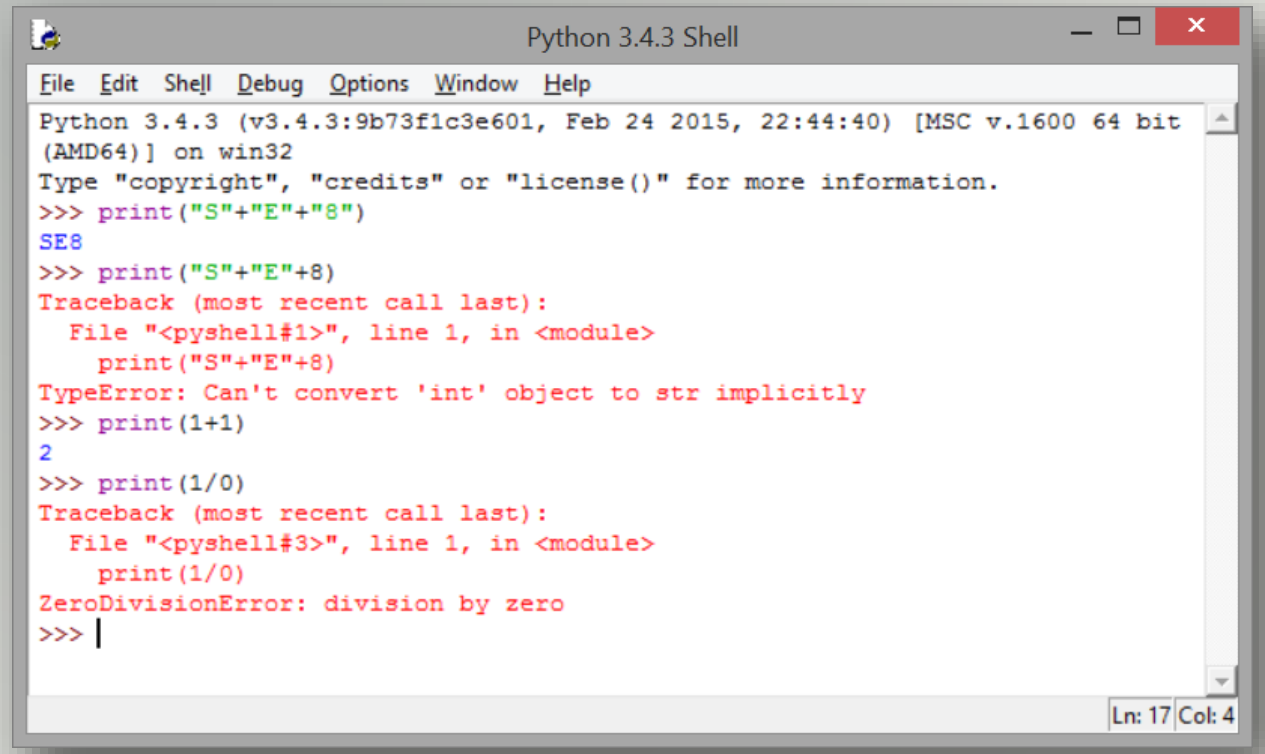
SYNTAX ERRORS

- Mistyping a statement
- Incorrect indentation
- Omitting some necessary punctuation
- Incomplete parenthesis format



RUN-TIME ERROR

- Input Error
- Mathematic Error
- Variable's type conflict



LOGIC ERROR

- Difficult to located
- Provided unexpected outcome
- Program still compiled

```
>>> PI = 3.14
>>> r = 2
>>> area = (PI * r) ** 2
>>> area
39.4384
```

Wrong Answer

```
>>> PI = 3.14
>>> r = 2
>>> area = PI * (r ** 2)
>>> area
12.56
```

Correct Answer

GRAPHIC PROGRAMMING

AKA. TURTLE

TURTLE :: IMPORT MODULE

```
>>>
>>> import turtle          >>> turtle.forward(100)
>>>
>>> import turtle as t     >>> t.forward(100)
>>>
>>> from turtle import * >>> forward(100)
>>>
```

TURTLE :: METHODS

MOVE AND DRAW

Method	Description	Parameter
forward()	Move turtle forward	1
backward()	Move turtle backward	1
right()	Turn right	1
left()	Turn left	1
goto()	Move to coordinate	2
home()	Move to point(0,0)	None
circle()	Draw a circle	…

TURTLE :: METHODS

PEN CONTROL

Method	Description	Parameter
pendown()	Pull the pen down	None
penup()	Pull the pen up	None
pensize()	Set the line thickness	1
color()	Set color to be filled	1
pencolor()	Set pen color	1
begin_fill()	Called before filling color of shape	None
end_fill()	Used to end begin_fill()	None
clear()	Delete all turtle's drawings	None
write()	Write text	…

TURTLE :: METHODS

TURTLE CONTROL

Method	Description	Parameter
speed()	Specify turtle's speed	1
showturtle()	Display turtle (arrow)	None
hideturtle()	Hide turtle (arrow)	None
done()	Causes program to pause for displaying the graphic	None

TURTLE :: EXAMPLE