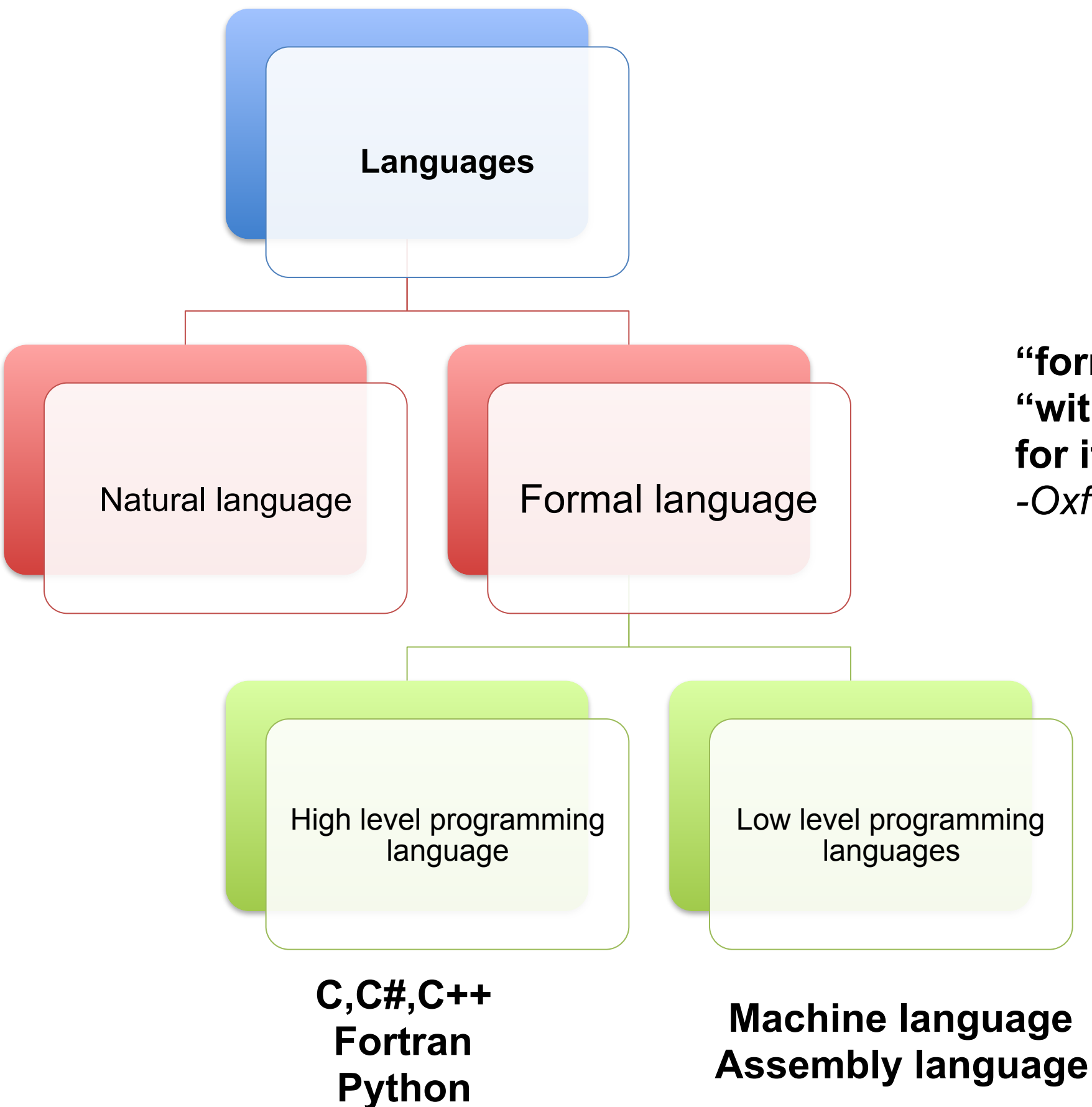


Programming Languages



**“formal language,” a language
“with explicit and precise rules
for its syntax and semantics,”
-Oxford Dictionary of Computing**

A high-level programming language is a [programming language](#) with strong [abstraction](#) from the details of the [computer](#).

A low-level programming language is a [programming language](#) that provides little or no [abstraction](#) from a computer's [instruction set architecture](#)—commands or functions in the language map closely to processor instructions (*[Wikipedia](#)*)

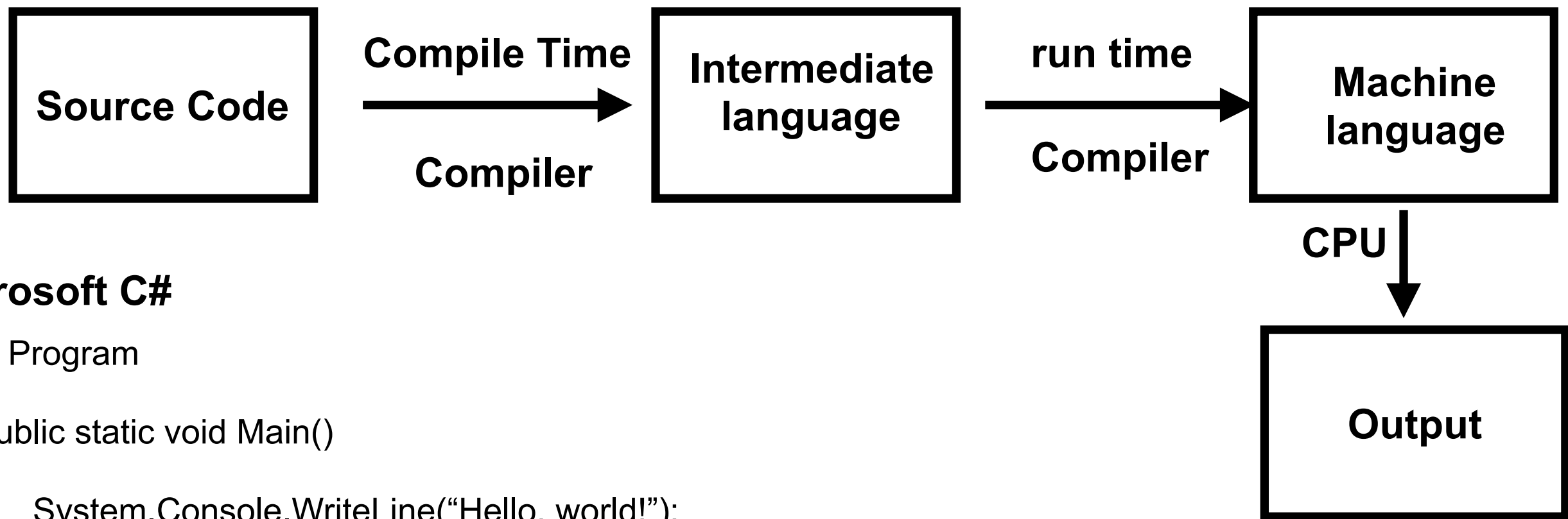
GEEK SUBLIME

The Beauty of Code, the Code of Beauty

VIKRAM CHANDRA

"A compendium of delight. . . .
An extraordinary thesis that is
part autobiography, part crash
course in coding and
unfailing an ode to language."
—Nicola Davis, *The Observer*

Compilers vs Interpreters



Microsoft C#

```
"class Program
{
    public static void Main()
    {
        System.Console.WriteLine("Hello, world!");
    }
}
```

Common Intermediate language

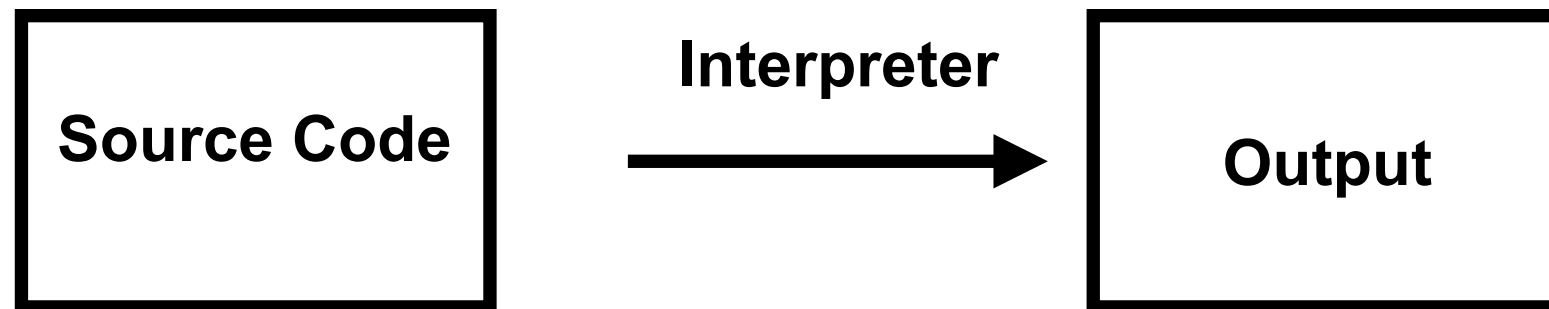
```
{
.entrypoint
// Method begins at RVA 0x2050
// Code size      13 (0xd)
.maxstack 8
IL_0000: /* 00      |          */ nop
IL_0001: /* 72      | (70)000001 */ ldstr
        "Hello, world!" /* 70000001 */
IL_0006: /* 28      | (0A)000011 */ call      void
        [mscorlib/*23000001*/]System.Console/*01000013*/::WriteLine(string) /* 0A000011 */
IL_000b: /* 00      |          */ nop
IL_000c: /* 2A      |          */ ret
} // end of method Program::Main
```

Machine code

```
55
8B EC
83 3D 78 81 B0 04 00
74 05
E8 B6 92 A2 65
90
8B 0D 94 3A B0 03
FF 15 C4 70 89 02
90
90
5D
C3
```

Assembly language

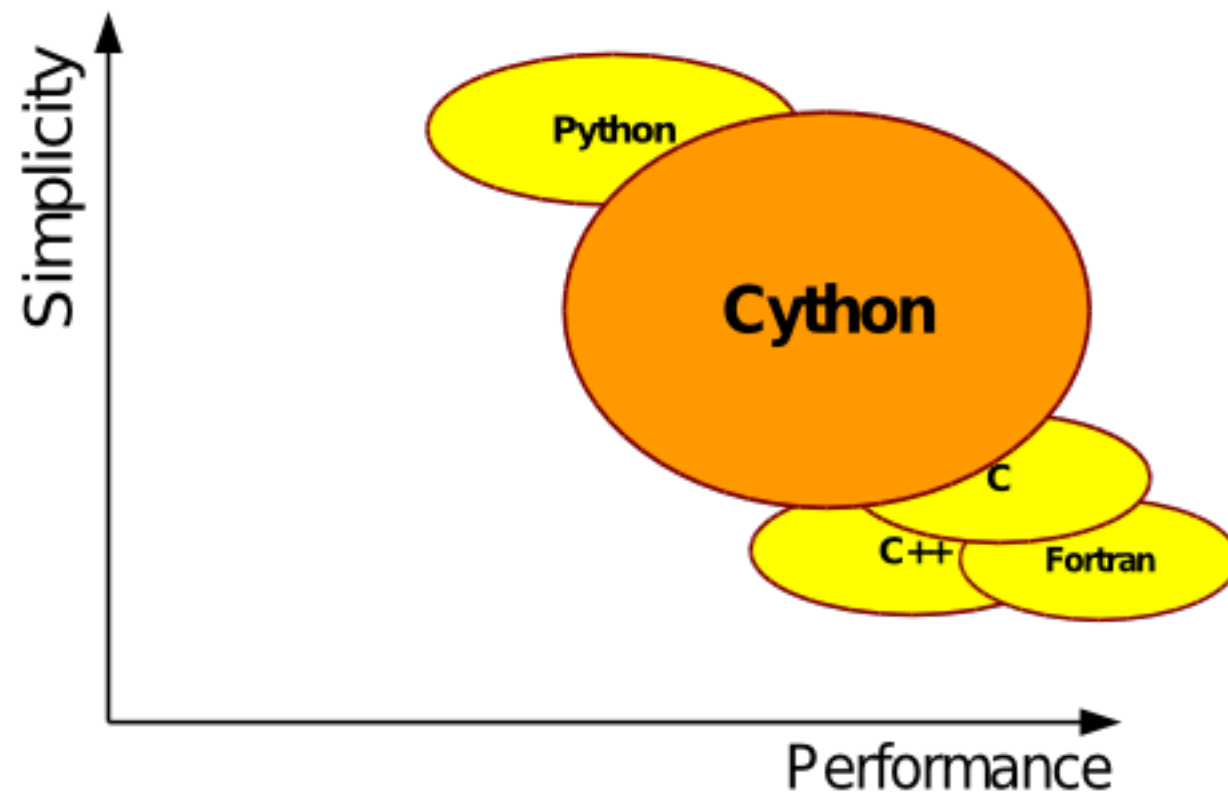
```
push    ebp
mov     ebp,esp
cmp     dword ptr ds:[06FF9A78h],0
je      00000011
call    6D2197F0
nop
mov     ecx,dword ptr ds:[03B35718h]
call    dword ptr ds:[02A0CB3Ch]
nop
nop
pop     ebp
ret
```

perl, matlab, **python**

Easy to write, read and understand

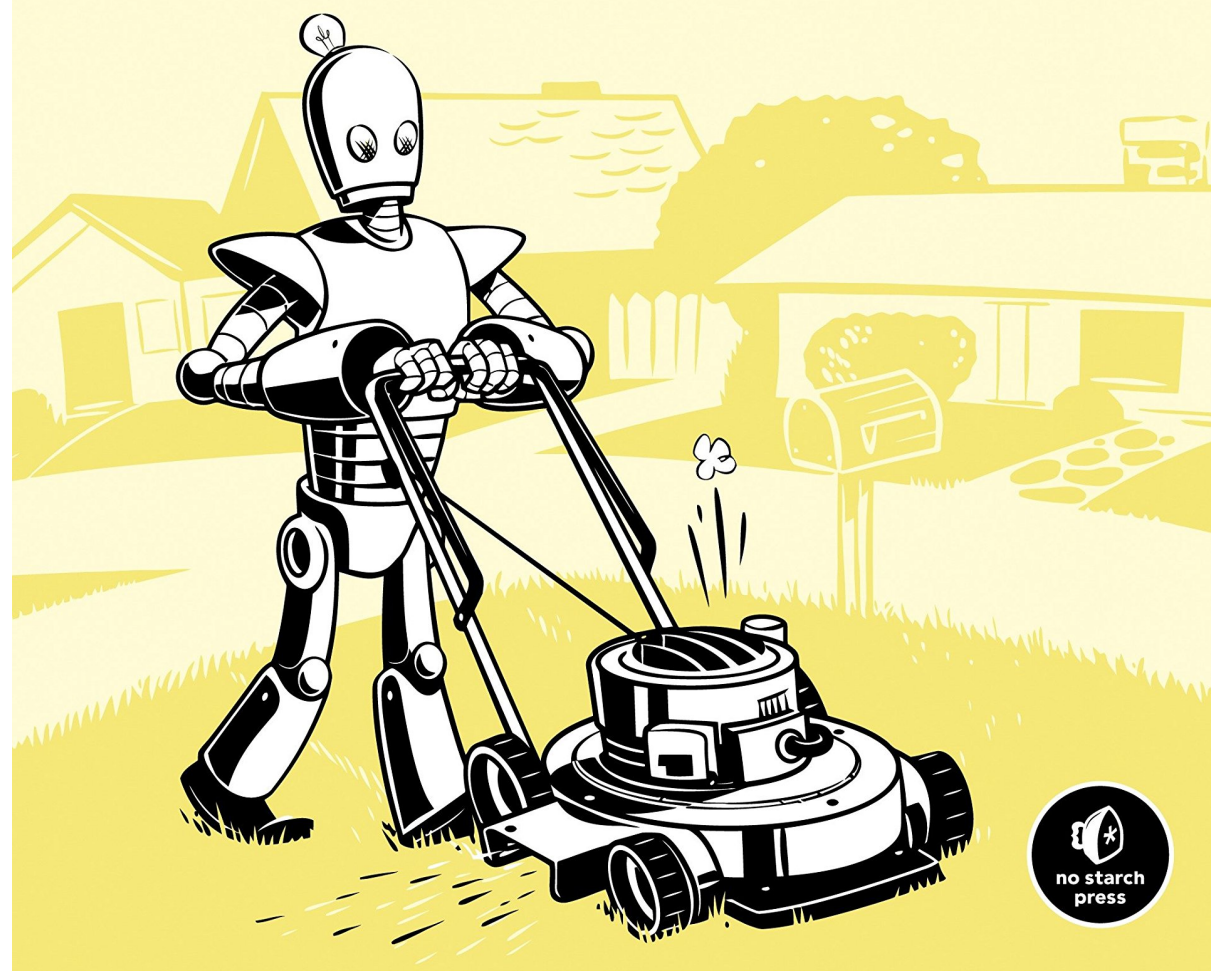
Slow



AUTOMATE THE BORING STUFF WITH PYTHON

**PRACTICAL PROGRAMMING
FOR TOTAL BEGINNERS**

AL SWEIGART



<https://automatetheboringstuff.com>

Variables

strings, float and integer

Case sensitive

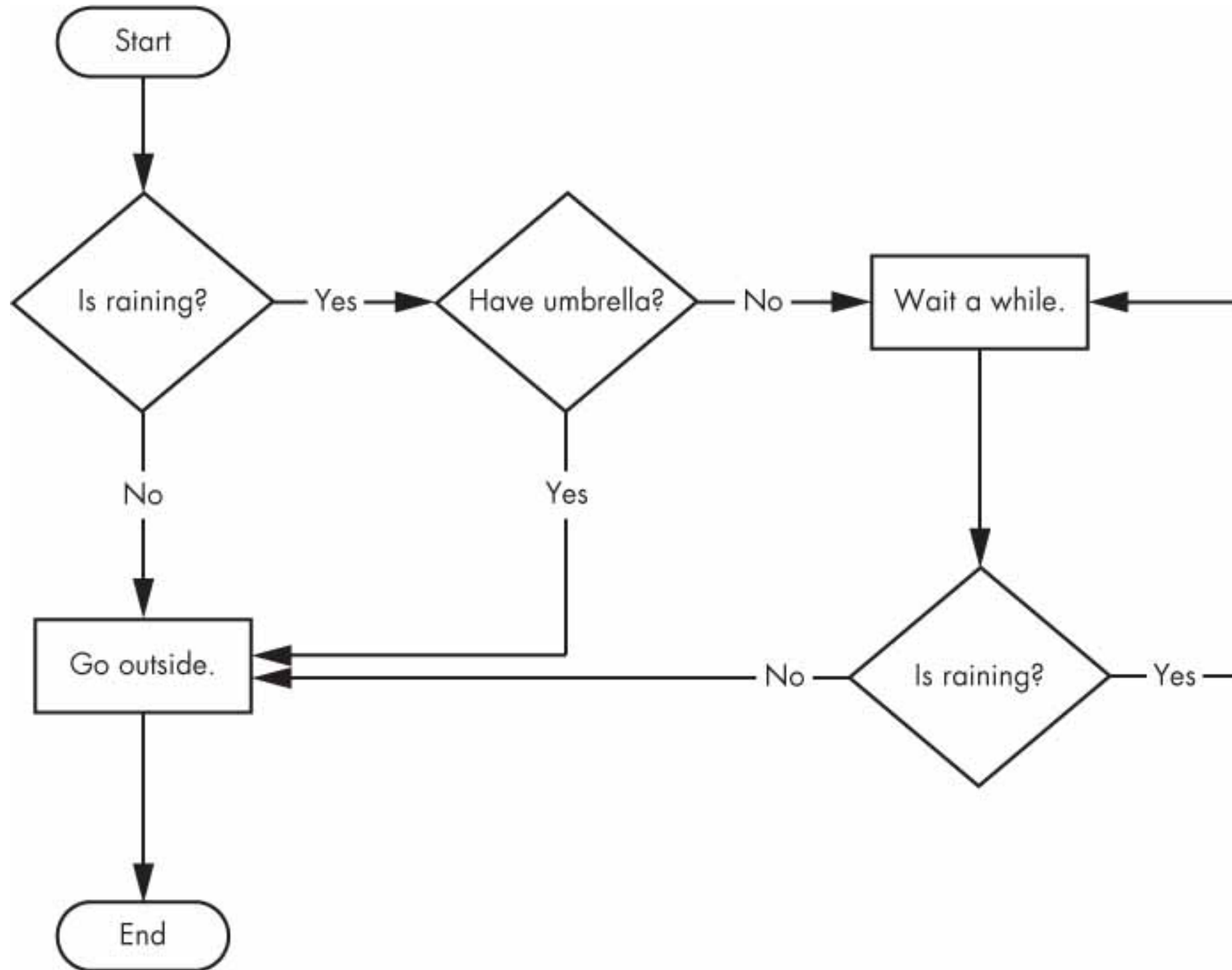
requires correct indentation

Which of the following is a variable , and which is a string

(a)spam

(b)'spam'

Flow control



- Boolean values
 - Comparison operators
 - Boolean operators
- YES: True, False
 - NO: TRUE,false,'true'

Comparison operators

Operator	Meaning
==	Equal to
!=	Not equal to
<	Less than
>	Greater than
<=	Less than or equal to
>=	Greater than or equal to

Boolean Operators

and, or, not

The _{and} Operator's Truth Table

Expression	Evaluates to ...
True and True	True
True and False	False
False and True	False
False and False	False

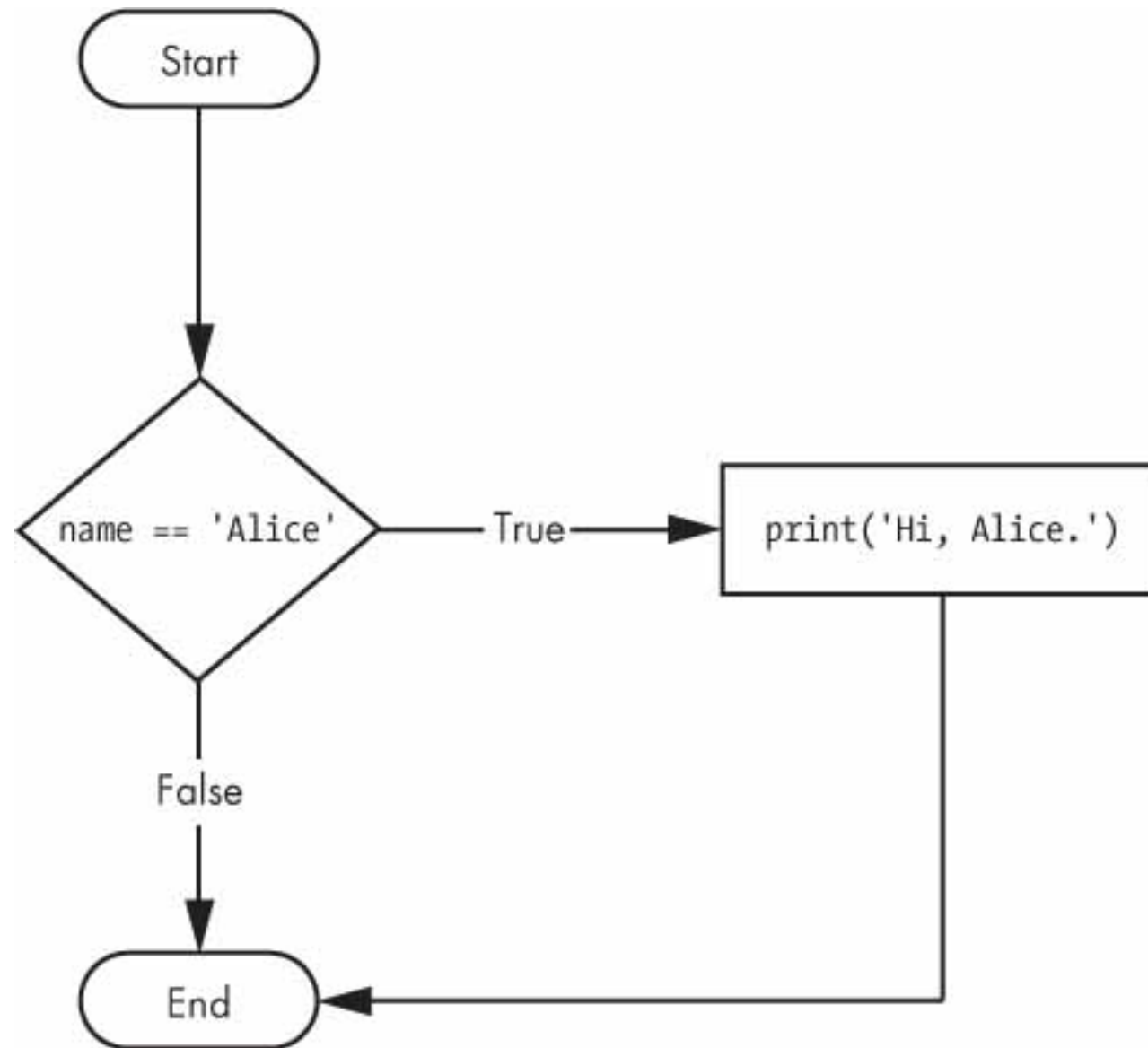
The _{or} Operator's Truth Table

Expression	Evaluates to ...
True or True	True
True or False	True
False or True	True
False or False	False

The _{not} Operator's Truth Table

Expression	Evaluates to ...
not True	False
not False	True

if, Else and Elif Statements



<http://pythontutor.com>

Write a code if the entered password is
“swordfish”
print **“access granted”**
other wise print **“access denied”**