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ENGINEERING

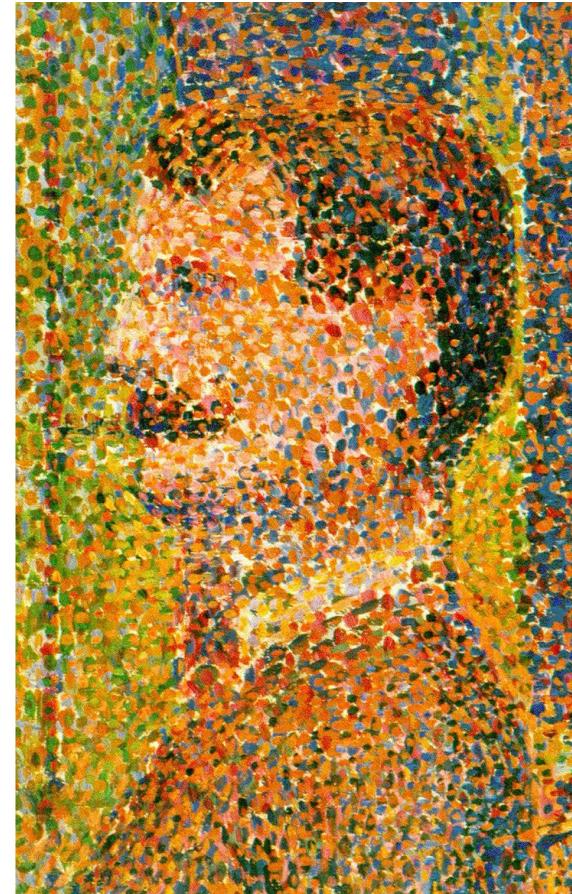
ENGR 1110

Module 2 Lecture

See the forest *and* the trees...

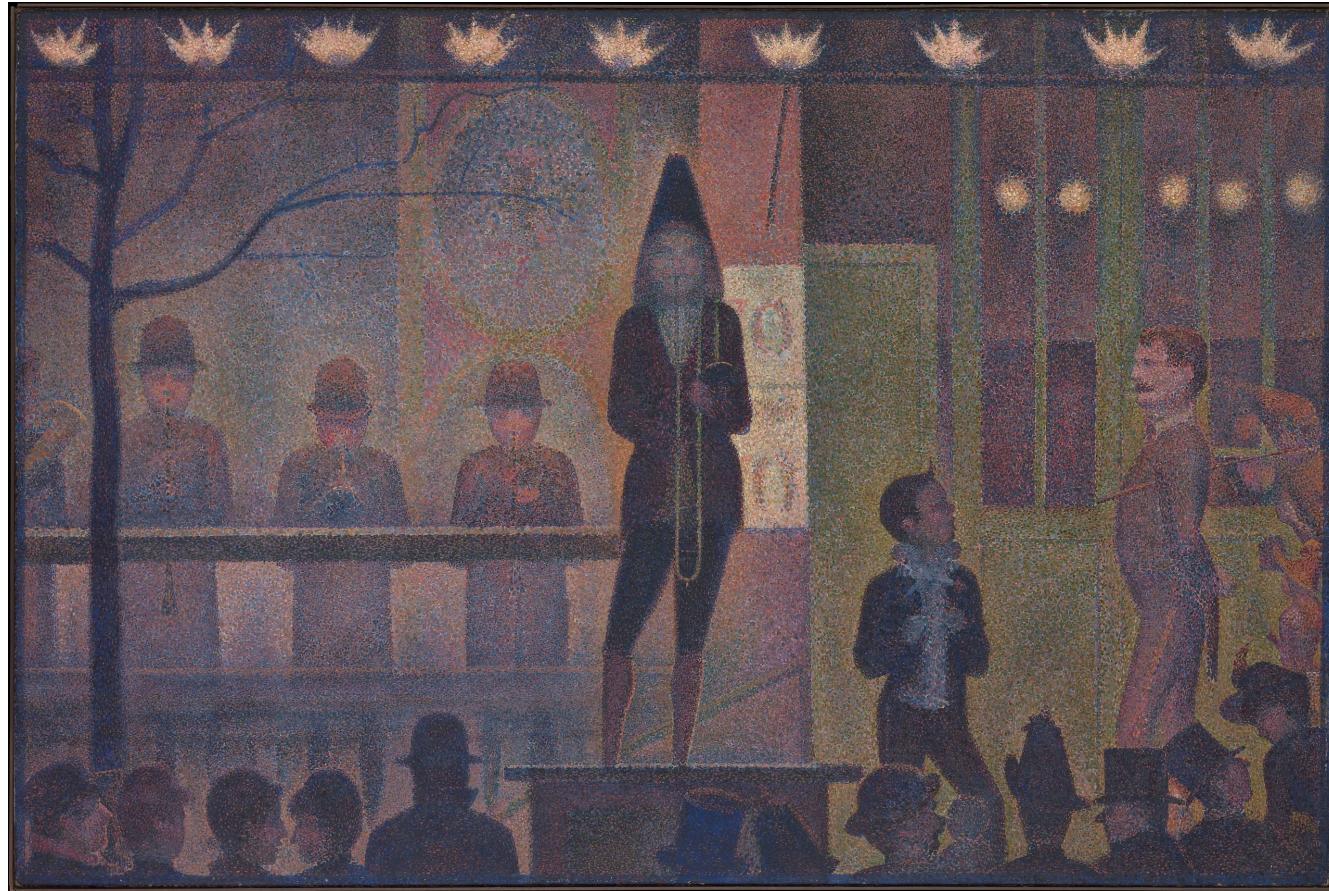


See the forest *and* the trees...



<https://www.principlegallery.com/technique-tuesday-pointillism-take-two/>

See the forest *and* the trees...



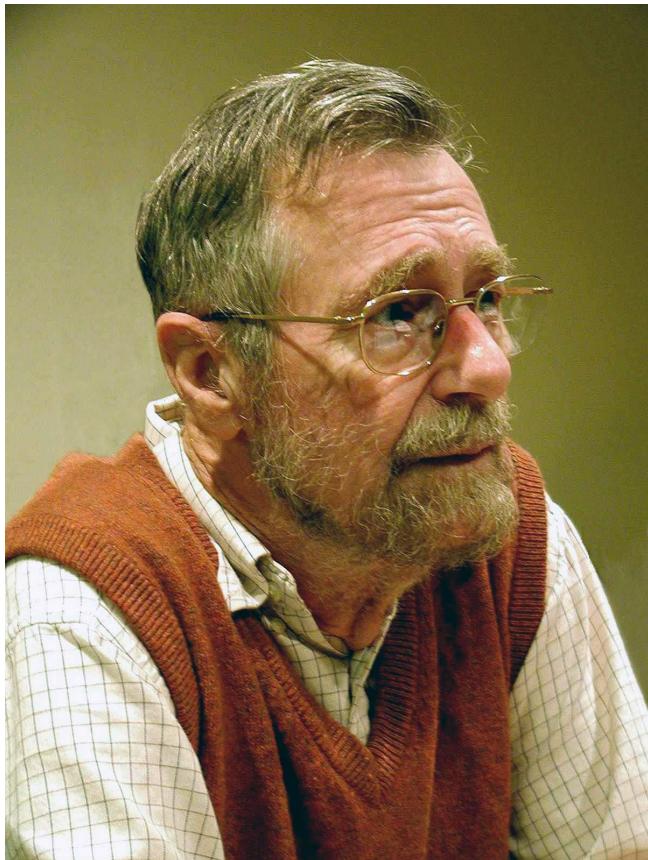
Georges Seurat, *Parade de Cirque*, 1887-88, Public domain, via Wikimedia Commons

See the forest *and* the trees...



Georges Seurat, *A Sunday Afternoon on the Island of La Grande Jatte*, 1884-86, Public domain, via Wikimedia Commons

Tools are important, but...



Hamilton Richards, CC BY-SA 3.0 <<http://creativecommons.org/licenses/by-sa/3.0/>>,
via Wikimedia Commons

... the topic became [...] prematurely known as “computer science” — which, actually is like referring to surgery as “knife science” [...]

Edsger Dijkstra, “On a cultural gap”, *The Mathematical Intelligencer* 8 (1986), 1: 48–52.

Computer science is no more about computers than astronomy is about telescopes, biology is about microscopes or chemistry is about beakers and test tubes. Science is not about tools, it is about how we use them and what we find out when we do.

Attributed to **Edsger Dijkstra** by Michael R. Fellows, Ian Parberry (1993) "SIGACT trying to get children excited about CS", *Computing Research News*, January 1993.

Software Engineering tools



Programming languages

A **programming language** is a system of notation for writing computer programs. Most programming languages are **text-based** formal languages, but they may also be **graphical**.

The description of a programming language is usually split into the two components of **syntax** (form) and **semantics** (meaning), which are usually defined by a formal language.

Programming languages usually contain abstractions for defining and manipulating **data structures** or controlling the **flow of execution**.

In broad strokes, programming languages are classified by **programming paradigm** and **intended domain of use**, with **general-purpose** programming languages distinguished from **domain-specific** programming languages. Traditionally, programming languages have been regarded as describing computation in terms of **imperative** sentences, i.e. issuing commands. These are generally called imperative programming languages. A great deal of research in programming languages has been aimed at blurring the distinction between a program as a set of instructions and a program as an assertion about the desired answer, which is the main feature of **declarative** programming.[73] More refined paradigms include **procedural programming**, **object-oriented programming**, **functional programming**, and **logic programming**; some languages are hybrids of paradigms or multi-paradigmatic.

https://en.wikipedia.org/wiki/Programming_language

Python



<https://gvanrossum.github.io/>

Python is a **high-level, general-purpose programming language**. Its design philosophy emphasizes code readability with the use of significant indentation.

Python is **dynamically typed** and **garbage-collected**. It supports multiple programming paradigms, including structured (particularly **procedural**), **object-oriented** and **functional** programming. It is often described as a "batteries included" language due to its **comprehensive standard library**.

Guido van Rossum began working on Python in the late 1980s as a successor to the ABC programming language and first released it in 1991 as Python 0.9.0. Python 2.0 was released in 2000 and introduced new features such as list comprehensions, cycle-detecting garbage collection, reference counting, and Unicode support. Python 3.0, released in 2008, was a major revision not completely backward-compatible with earlier versions. Python 2.7.18, released in 2020, was the last release of Python 2.

Python consistently ranks as one of the most popular programming languages.

[https://en.wikipedia.org/wiki/Python_\(programming_language\)](https://en.wikipedia.org/wiki/Python_(programming_language))

Python resources

The screenshot shows the Python.org homepage. At the top, there's a navigation bar with links for Python, PSF, Docs, PyPI, Jobs, and Community. Below the navigation is the Python logo and a search bar with a 'GO' button. A main content area features a code snippet in a terminal window:

```
# For loop on a list
>>> numbers = [2, 4, 6, 8]
>>> product = 1
>>> for number in numbers:
...     product = product * number
...
>>> print('The product is:', product)
The product is: 384
```

To the right of the code, a yellow button labeled 'All the Flow You'd Expect' leads to an article about Python's control flow statements. The article text is:

Python knows the usual control flow statements that other languages speak — `if`, `for`, `while` and `range` — with some of its own twists, of course. [More control flow tools in Python 3](#)

Below the article are five numbered buttons (1, 2, 3, 4, 5). At the bottom of the page, a blue banner states: "Python is a programming language that lets you work quickly and integrate systems more effectively. [» Learn More](#)".

Python

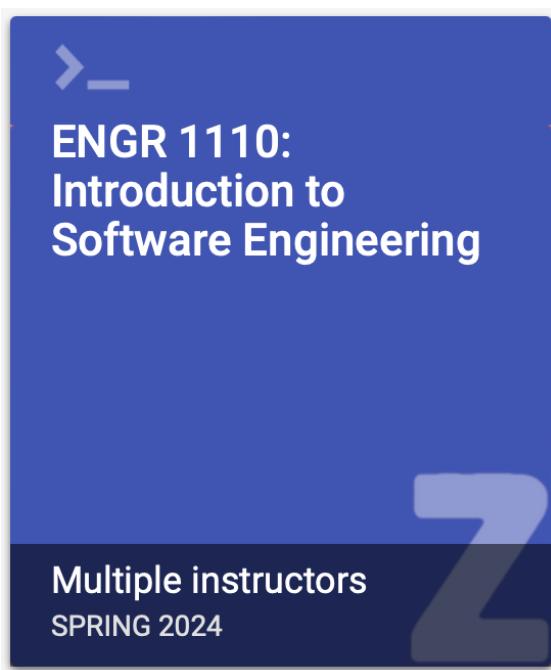
Python code is executed by an **interpreter**, not a **compiler**.

```
Python 3.10.5 (main, Jul 22 2022, 17:09:35) [GCC 9.4.0] on linux
Type "help", "copyright", "credits" or "license" for more information.
>>>
>>> print("War Eagle!")
War Eagle!
>>> 3 + 4
7
>>> x = 5 + 3
>>> x
8
>>> print(x)
8
>>> print("x = ", x)
x = 8
>>> █
```

<https://www.pythonanywhere.com/>



A Wiley Brand



The image shows a screenshot of a course interface. At the top, there's a blue header bar with a white right-pointing arrow icon. Below it, the course title "ENGR 1110: Introduction to Software Engineering" is displayed in large white text. In the bottom left corner of the main content area, the text "Multiple instructors SPRING 2024" is visible next to a large, semi-transparent "Z" logo.

Write a statement that assigns total_coins with the sum of nickel_count and dime_count. Sample output for 100 nickels and 200 dimes is:

300

See [How to Use zyBooks](#) for info on how our automated program grader works.

462352 503456.qx3zqy7

```
1 total_coins = 0
2
3 nickel_count = int(input())
4 dime_count = int(input())
5
6 """ Your solution goes here """
7
8 print(total_coins)
```

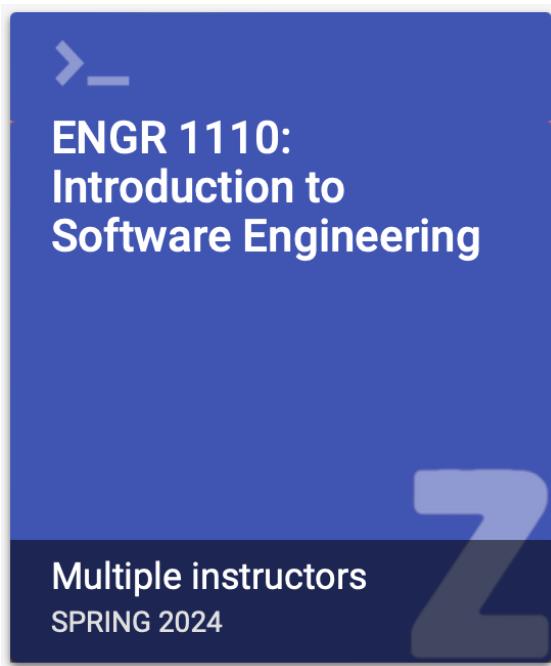
A built-in interpreter for Python

Run

← Executes the Python code



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Chapter 3. Variables and Expressions

Chapter 4. Types