
python
TM


```
>>> if h > 50:
...     print("Greater than 50")
... elif h < 20:
...     print("Less than 20")
... else:
...     print("Between 20 and 50")
...
Between 20 and 50
```

Python Release Timeline

2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014

Python 2

2.4 2.5 2.6 2.7

straightforward upgrade paths

Python 3

3.0 3.1 3.2 3.3 3.4

Portable

Platform Specific Installation

macOS


python
TM


Windows 10


python
TM


ubuntu

macOS

Read
Evaluate
Print
Loop

>>> REPL

Significant Indentation in Python

Four spaces per level of indentation

```
"""Class model for aircraft flights."""


class Flight:
    """A flight with a particular aircraft."""

    def __init__(self, number, aircraft):
        if not number[:2].isalpha():
            raise ValueError("No airline code in '{}'".format(number))

        if not number[:2].isupper():
            raise ValueError("Invalid airline code '{}'".format(number))

        if not (number[2:].isdigit() and int(number[2:]) <= 9999):
            raise ValueError("Invalid route number '{}'".format(number))

        self._number = number
        self._aircraft = aircraft

        rows, seats = self._aircraft.seating_plan()
        self._seating = [None] + [ {letter:None for letter in seats} for _ in rows ]


    def passenger_seats(self):
        """An iterable series of passenger seating allocations."""
        row_numbers, seat_letters = self._aircraft.seating_plan()
        for row in row_numbers:
            for letter in seat_letters:
                passenger = self._seating[row][letter]
                if passenger is not None:
                    yield (passenger, "{}{}".format(row, letter))
```

Significant Whitespace

1. Requires **readable** code

2. No **clutter**

3. Human and computer can't get **out of sync**

Significant Whitespace Rules

1. Prefer **four spaces**

2. **Never** mix spaces and tabs

3. Be **consistent** on consecutive lines

4. Only deviate to **improve** readability

Programming as Guido ~~intended~~ it indented

Moment of Zen

Readability Counts

Clarity Matters
So readability makes
For valuable code

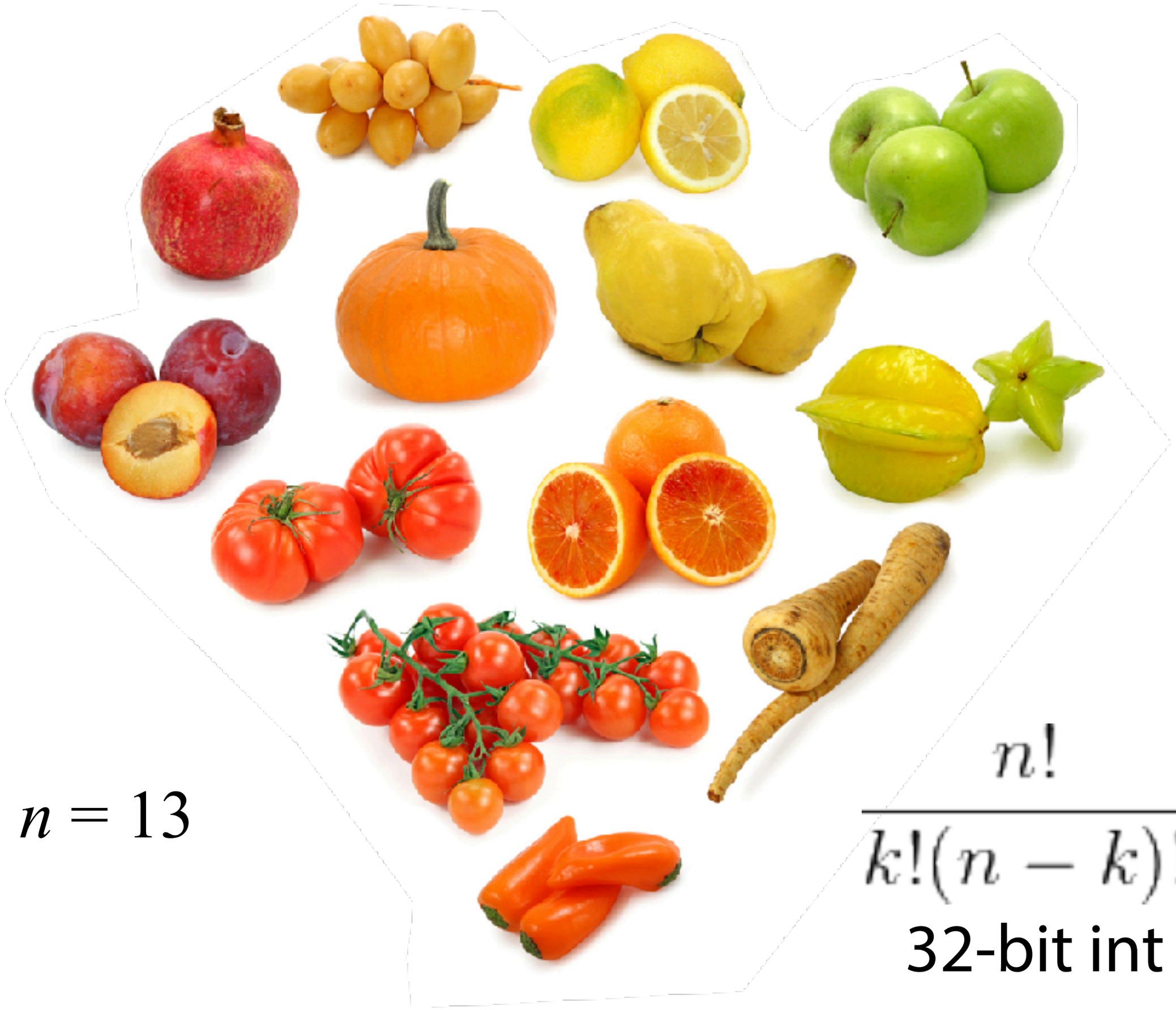
Python Standard Library

`import module_name`

python™

Batteries Included

$$\frac{n!}{k!(n-k)!}$$



$n = 13$

$$\frac{n!}{k!(n-k)!}$$

32-bit int

Scalar types and values

Scalar types and values

`int`
42

arbitrary precision integer

`float`
4.2

64-bit floating point numbers

`NoneType`
None

the null object

`bool`
True

`bool`
False

boolean logical values

python™

int

unlimited precision signed integer

float

IEEE-754 double precision (64-bit)

53 bits of binary precision

15 to 16 bits of decimal precision

None

The sole value of `NoneType`.
Often used to represent the absence of a value.
Not displayed by the REPL.

python™

bool

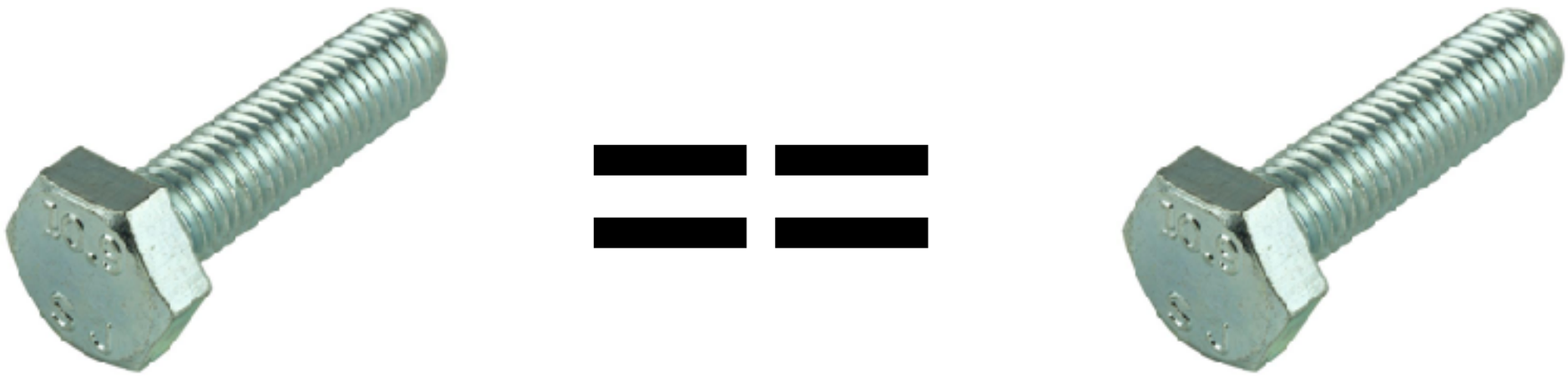
Boolean logical value.

Either `True` or `False`.

python Relational Operators

==	value equality / equivalence
!=	value inequality / inequivalence
<	less-than
>	greater-than
<=	less-than or equal to
>=	greater-than or equal to

Equal objects are interchangable



True

python Conditional Statements

```
if expr:
    print("expr is True")
```

`expr` is converted to `bool` as if by the `bool()` constructor

python Conditional Statements

```
if expr:
    print(”expr is True”)
```

python Conditional Statements

```
if expr:
    print(”expr is True”)
else:
    print(”expr is False”)
```

```
if h > 50:
    print("Greater than 50")
else:
    if h < 20:
        print("Less than 20")
    else:
        print("Between 20 and 50")
```

Python provides the `elif` keyword to eliminate the need for nested `if` … `else` structures in many cases.

Flat is better than nested

```
if h > 50:
    print("Greater than 50")
elif h < 20:
    print("Less than 20")
else:
    print("Between 20 and 50")
```

Python provides the `elif` keyword to eliminate the need for nested `if` ... `else` structures in many cases.

python while loops

```
while expr:
    print("loop while expr is True")
```

`expr` is converted to `bool` as if by the `bool()` constructor

python breaking out

```
while True:
    if expr:
        break
print("Go here on break")
```

The `break` keyword terminates the innermost loop, transferring execution to the first statement after the loop

Getting Started – Summary

- **Obtaining and installing Python 3**
  - Windows
  - Ubuntu Linux
  - Mac OS X
- **Read-Eval-Print-Loop or REPL**
- **Simple arithmetic with + - * / % and //**
- **Assigning objects to named variables with the = operator**
- **`print()`**
- **Exiting the REPL**
  - Ctrl-Z on Windows
  - Ctrl-D on Linux and Mac.
- **Significant indentation - usually four spaces**
- **Python Enhancement Proposals**
  - PEP 8 – Python Style Guide
  - PEP 20 – The Zen of Python

Getting Started – Summary

- **Importing Python Standard Library modules:**
  - `import module`
  - `from module import function`
  - `from module import function as alias`
- **Finding and browsing `help()`**
- **Scalar built-in types**
  - `int` `float` `None` `bool`
  - conversions between types
- **Relational operators `==` `!=` `<` `>` `<=` `>=` for equivalence and ordering**
- **Conditional statements with `if` … `elif` … `else`**
- **`while` loops**
- **Interrupting execution with Ctrl-C to create a `KeyboardInterrupt` exception**
- **Breaking out of loops with `break`**
- **Augmented assignment operators for modifying objects in-place**
- **Requesting text from the user with `input()`**