Building Blocks

ISYS2001, School of Marketing and Management

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I acknowledge the traditional custodians of the land on which I work and live, and recognise their continuing connection to land, water and community. I pay respect to elders past, present and emerging.

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Previously

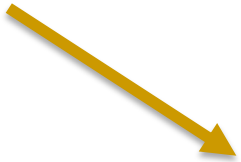
- Data = Value + Type
- Algorithms
- Control Structures
  - Sequence
  - Selection
  - Repetition
- Pseudocode
- Six things a computer can do (fast)

Today

- Calling Functions
- Using Modules
- Creating Functions

```
print(”Hello, world!”)
```

We call or invoke a function by using it name in code



```
print(”Hello, world!”)
```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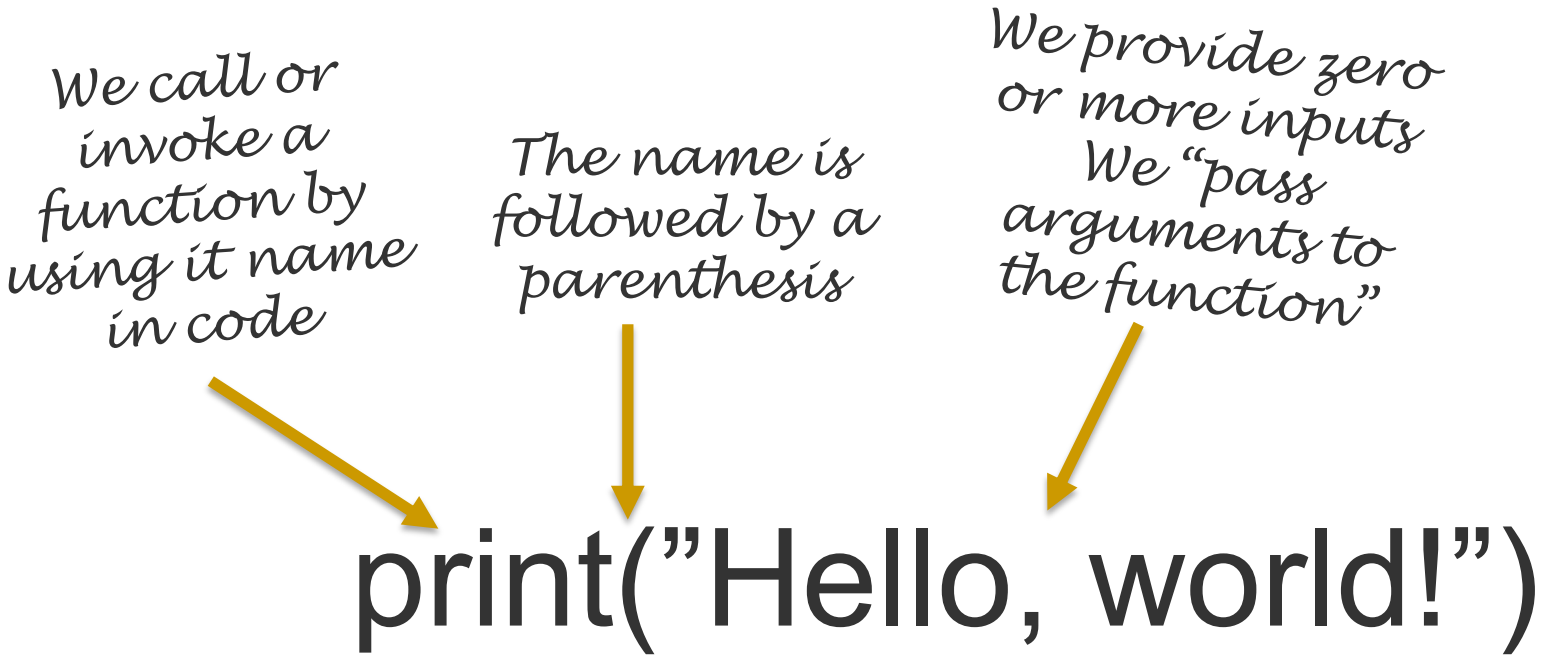
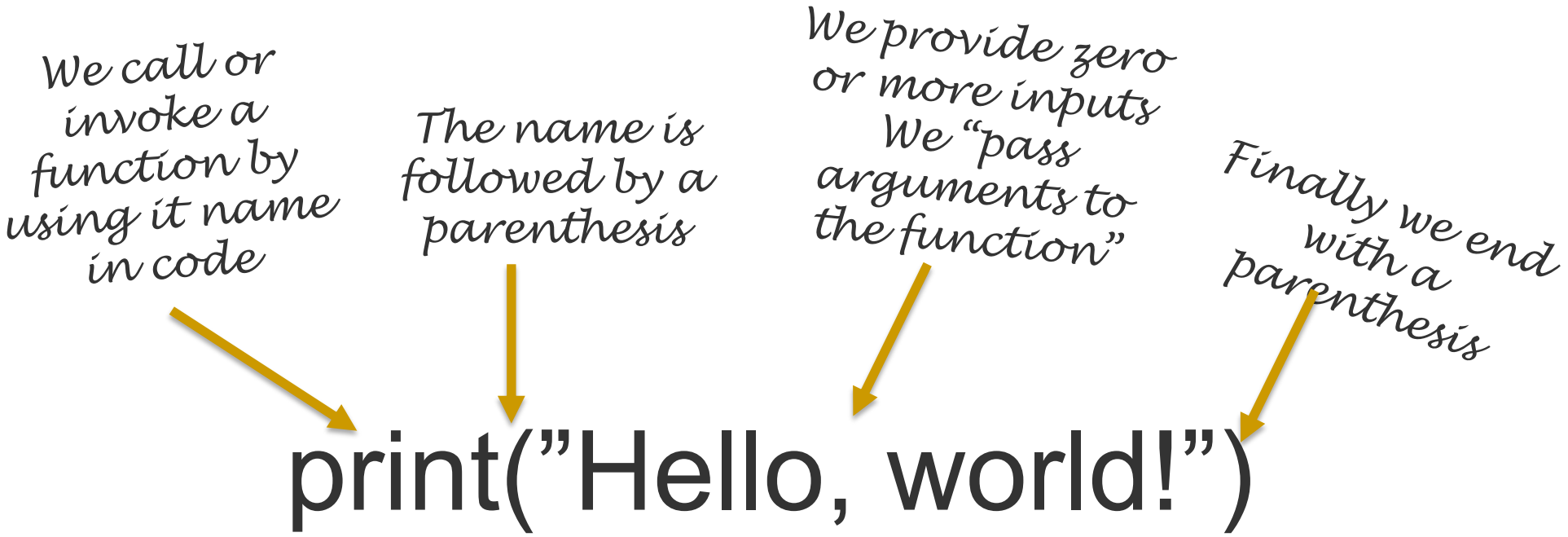
We call or invoke a function by using it name in code

The name is followed by a parenthesis

```
print(”Hello, world!”)
```





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Some funtions 'return' a value

```
input("What is your name?")
```


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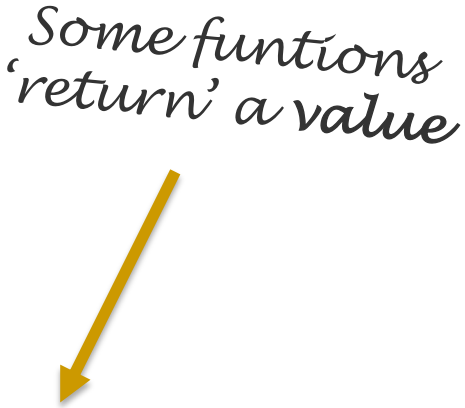


```
name = input("What is your name?")
```

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Calling Functions

- Call/invoke using name
- Provide zero or more arguments (inputs)
- Save the return value to a variable (optional)

Modules

- Builtins
- 3rd Party

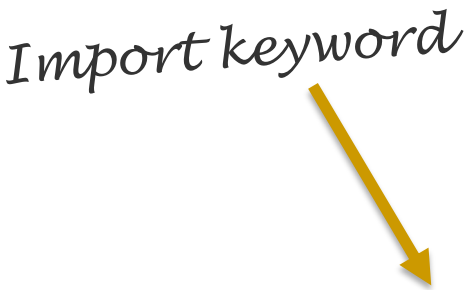
Built-In Functions

input()	Allowing user input
int()	Returns an integer number
len()	Returns the length of an object
print()	Prints to the standard output device
type()	Returns the type of anobject

Many more

https://www.w3schools.com/python/python_ref_functions.asp

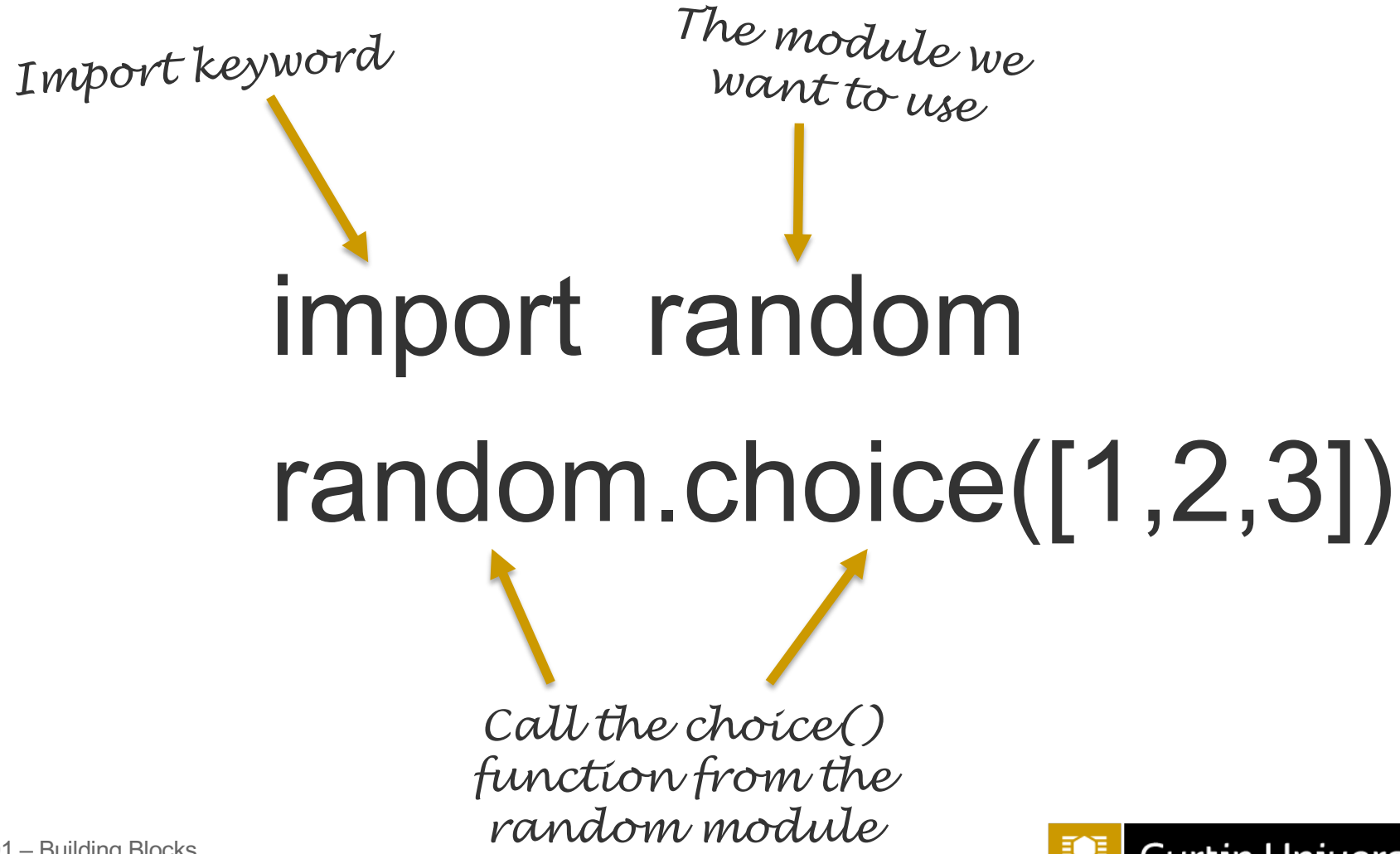
Modules




```
import  random
```

Modules

Modules



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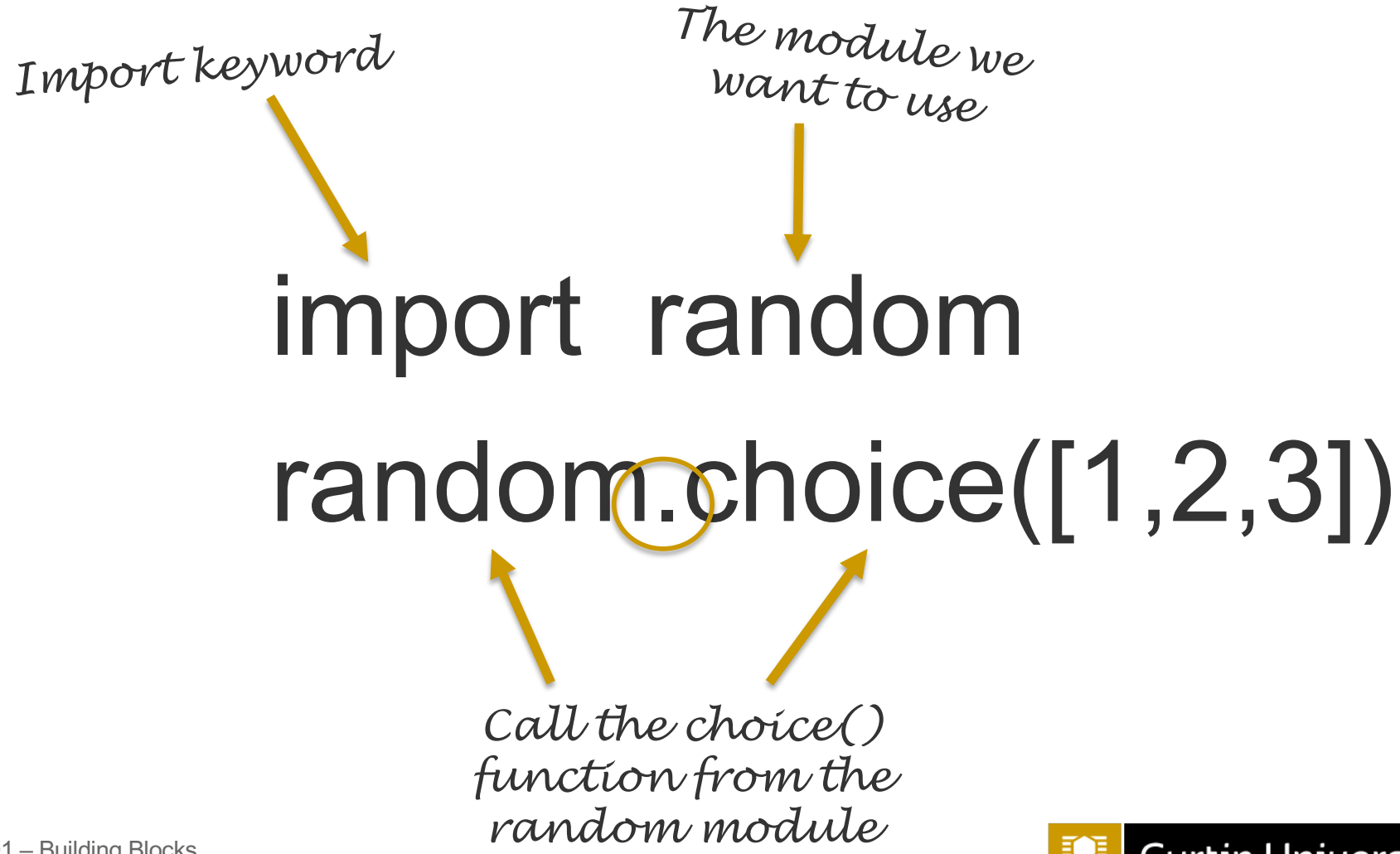
Modules



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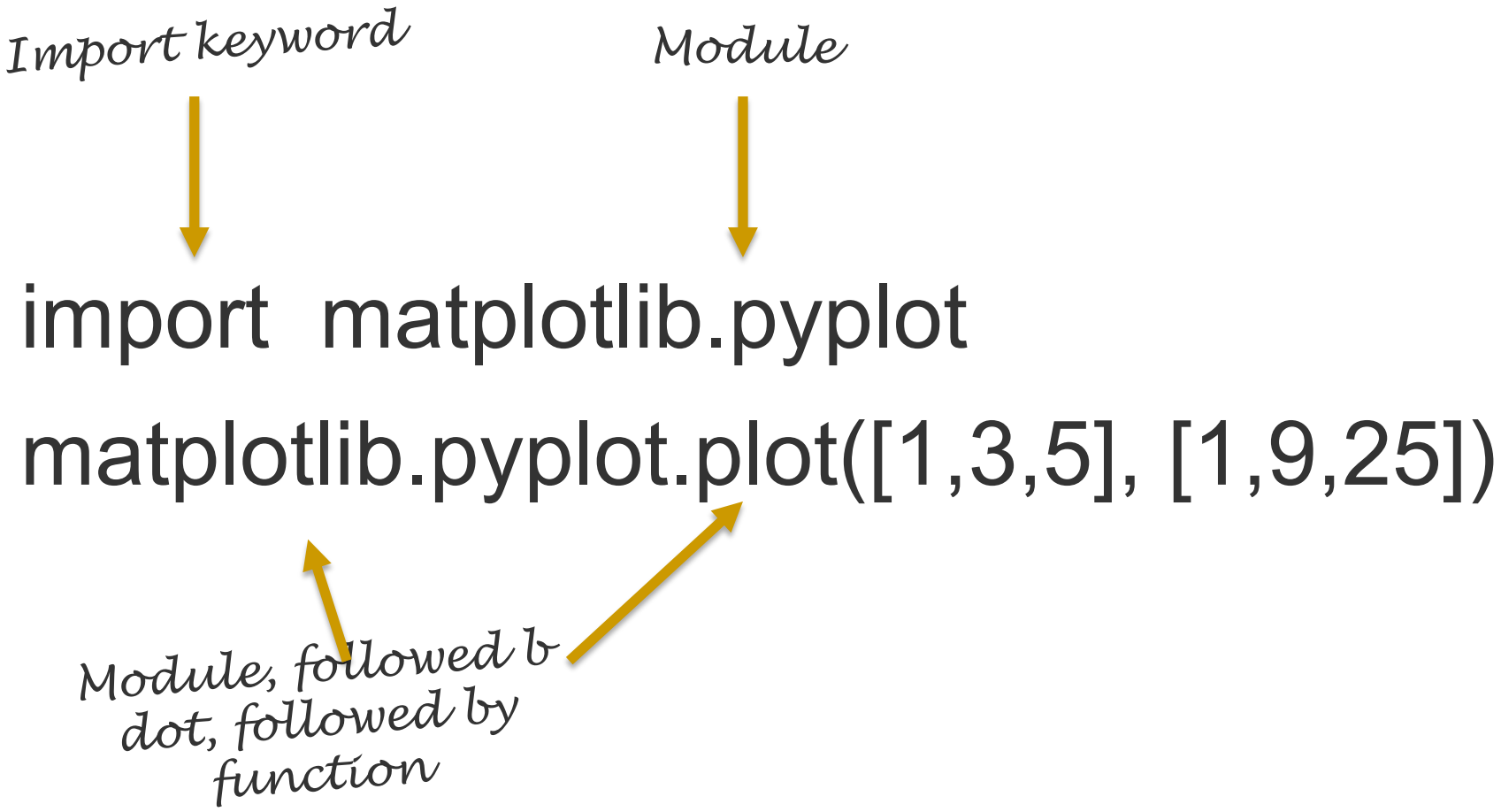
Module Examples

- pillow for **image manipulation**
- openCV for **computer vision**
- scikit-learn for **machine learning**
- pandas for **data analysis**
- keras for **deep learning**
- numpy for **numerical computations**
- matplotlib for **plotting**
- **And many, many others!**

First import the module

Use the module



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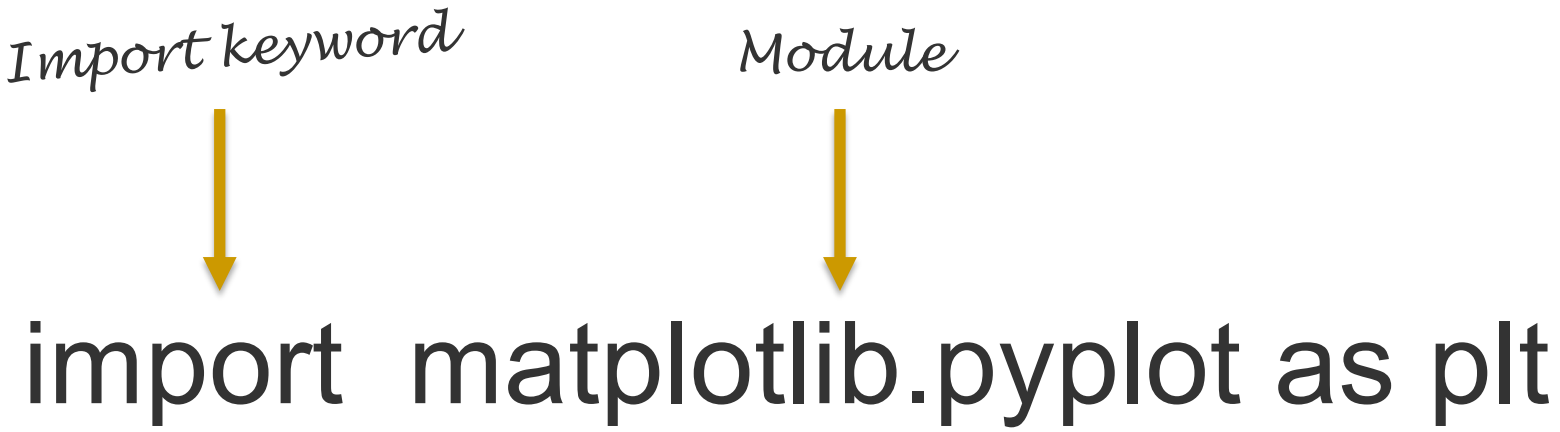
Convenience



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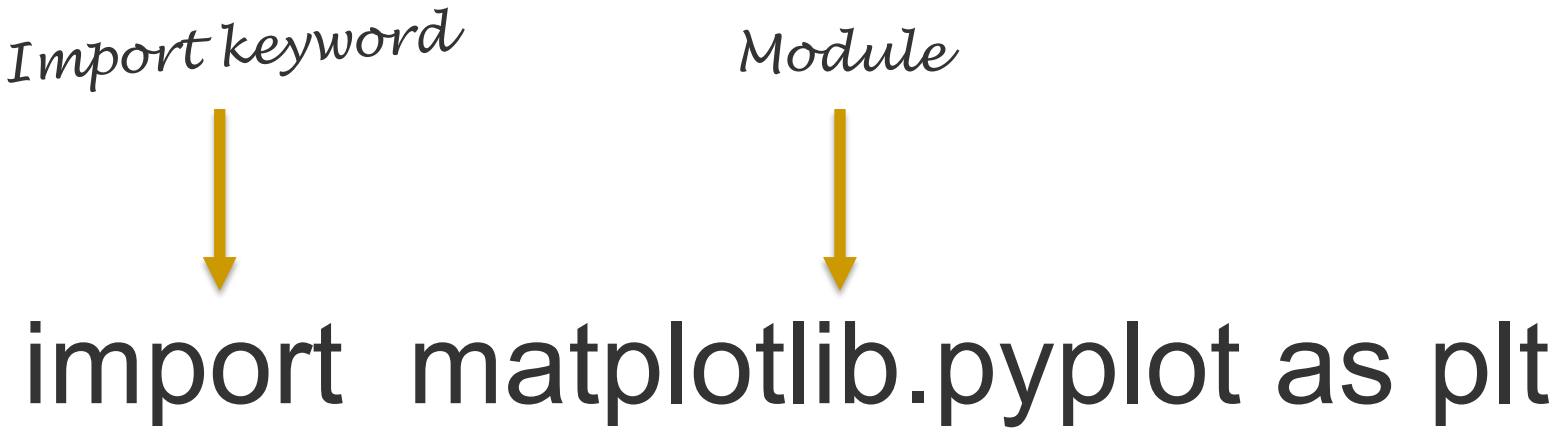

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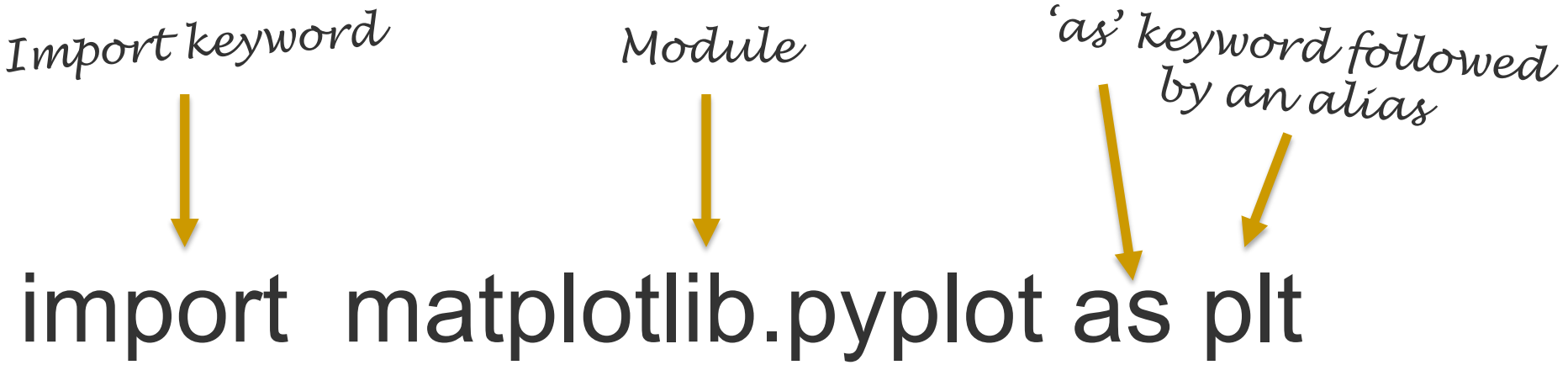

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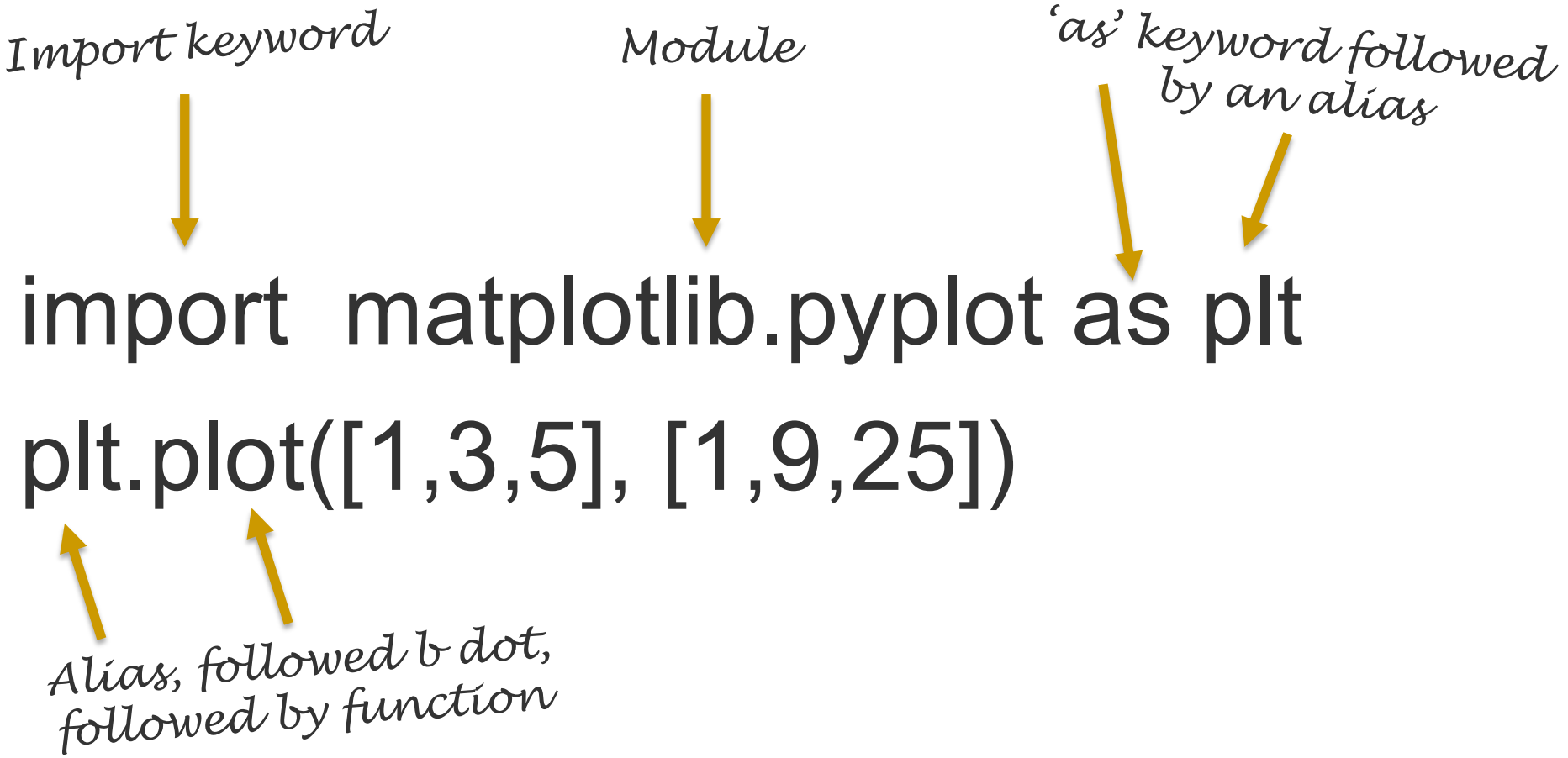

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Modules

- Builtins not enough
- Designed & tested by someone else
- Contain lots of functions
- Use *import* keyword
- Use module name as prefix to function name
- Can alias module name

Define functions

- Header
- Body

```
def calculate_price(price, discount):
    amount_saved = price *  (discount/100)
    sale_price = price – amount_saved
    gst = sale_price * 0.1
    total_price = sale_price + gst
    return total_price
```


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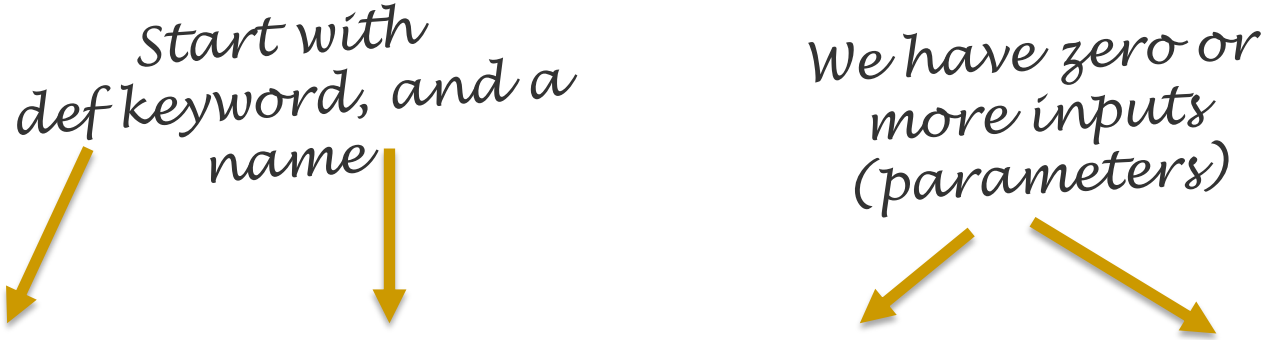


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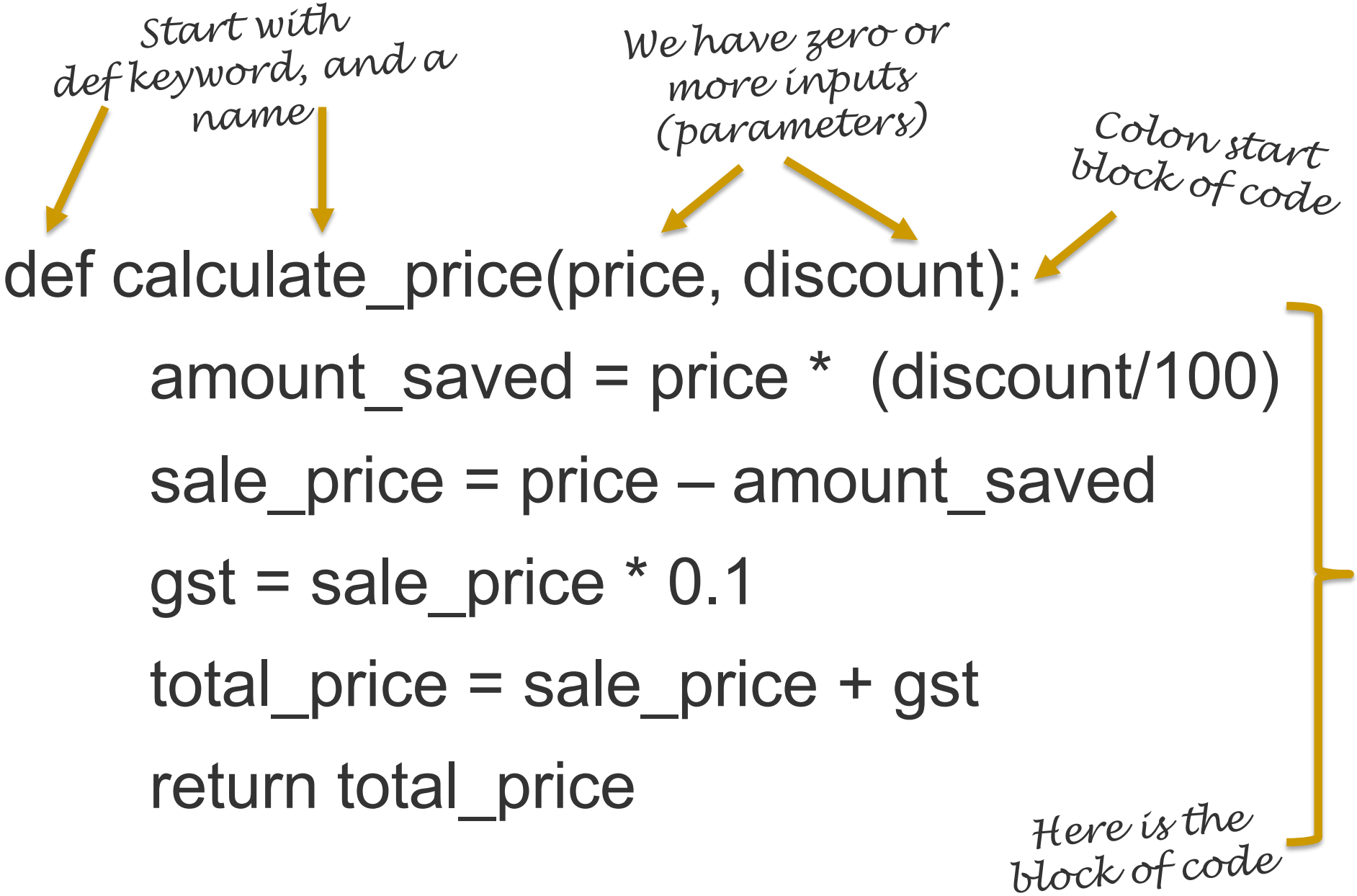

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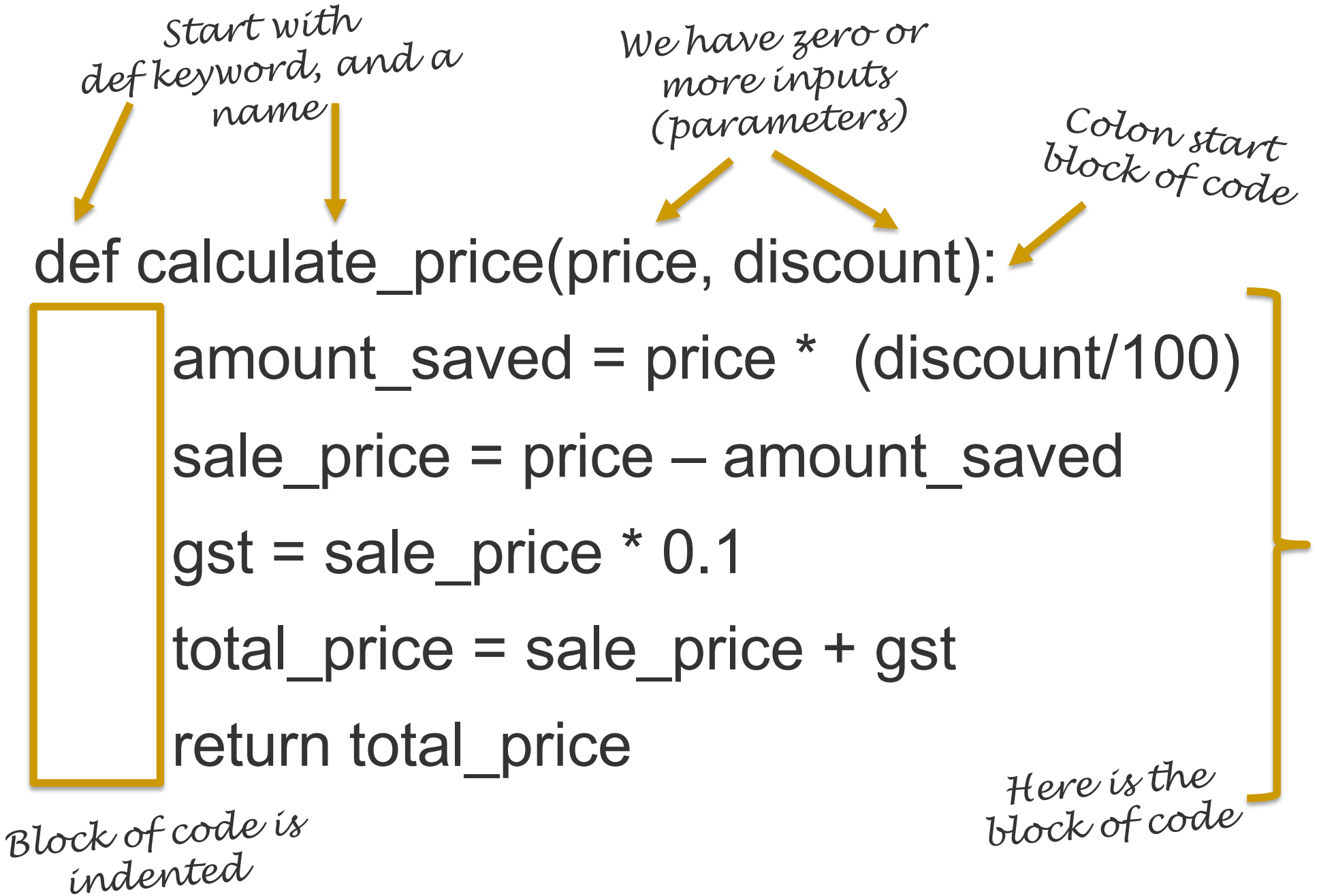

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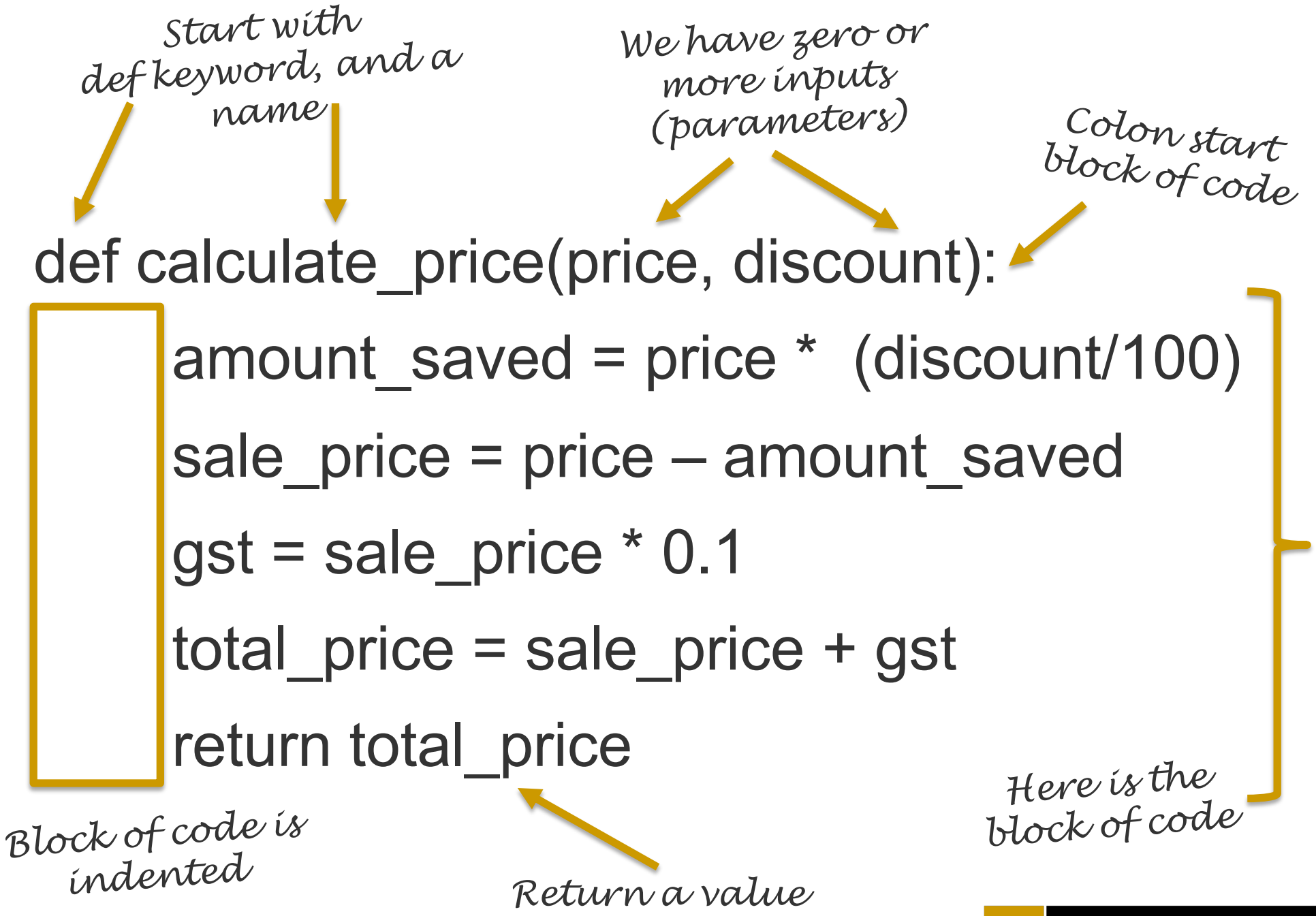

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Function header

```
def calculate_price(price, discount):
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    return total_price
```

Function header

```
def calculate_price(price, discount):
```

Function body

```
    amount_saved = price *  (discount/100)
    sale_price = price – amount_saved
    gst = sale_price * 0.1
    total_price = sale_price + gst
    return total_price
```

Define functions

- Header
  - Use def keyword
  - List parameters (input)
  - Colon define a code block
- Body
  - Set of statement
  - Code block indented
  - Optionally returns a value

Today

- Calling Functions
- Using Modules
- Creating Functions

Next time

- Getting Help
- Handling Exceptions
- Validating Input
- File Input/Output