



Curtin University

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.

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 its name
in code



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print("Hello, world!")
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We call or
invoke a
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in code

The name is
followed by a
parenthesis

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print("Hello, world!")
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We call or invoke a function by using its name in code

The name is followed by a parenthesis

We provide zero or more inputs
We “pass arguments to the function”

```
print("Hello, world!")
```

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

The name is followed by a parenthesis

We provide zero or more inputs
We “pass arguments to the function”

Finally we end with a parenthesis

```
print("Hello, world!")
```

*'Some functions
'return' a value*



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

*'Some functions
'return' a value*



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

*Save the return
value in a
variable*

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 an object

Many more

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

Modules

Import keyword



```
import random
```

Modules

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```
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*The module we
want to use*

Modules

Import keyword

The module we want to use

```
import random
```

```
random.choice([1,2,3])
```

Call the choice()
function from the
random module

Modules

Import keyword

The module we want to use

```
import random
```

```
random.choice([1,2,3])
```

Call the choice()
function from the
random module

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

Import keyword



Module



```
import matplotlib.pyplot
```

Use the module

Import keyword



Module



```
import matplotlib.pyplot  
matplotlib.pyplot.plot([1,3,5], [1,9,25])
```

Module, followed by dot, followed by function



Convenience

Import keyword



Module



```
import matplotlib.pyplot as plt
```

Convenience

Import keyword



Module



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import matplotlib.pyplot as plt
```

Convenience

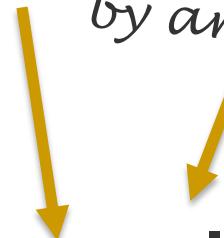
Import keyword



Module



'as' keyword followed
by an alias



```
import matplotlib.pyplot as plt
```

Convenience

Import keyword

Module

'as' keyword followed
by an alias

```
import matplotlib.pyplot as plt  
plt.plot([1,3,5], [1,9,25])
```

Alias, followed by dot,
followed by function

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
```

*Start with
def keyword, and a
name*

```
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
```

*Start with
def keyword, and a
name*

*We have zero or
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(parameters)*

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def calculate_price(price, discount):
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    amount_saved = price * (discount/100)
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    total_price = sale_price + gst
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    return total_price
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Start with def keyword, and a name

We have zero or more inputs (parameters)

Colon start block of code

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```

Start with def keyword, and a name

We have zero or more inputs (parameters)

Colon start block of code

Here is the block of code

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

```
    return total_price
```

*Block of code is
indented*

*Here is the
block of code*

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We have zero or more inputs (parameters)

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Here is the block of code

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

Block of code is indented

Return a value



*Function
header*

```
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
```

*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

