Programming Fundamental

A Hitchhiker Guide to Coding with Python

Lesson 1: Introduction

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Lesson Outline

Python Prompt

Verification of Python Installation:

```
>_ python --version
Python 3.10.5
```

Activating Python Prompt:

```
>_ python
Python 3.10.5
Type "help", "copyright", "credits" or "license" for more ...
>>>
```

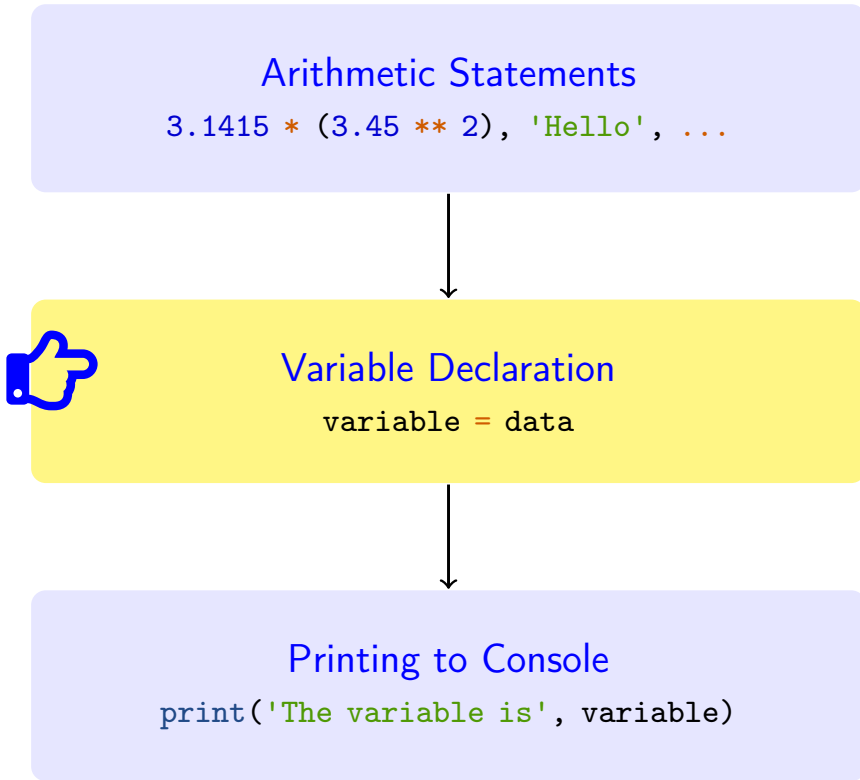
Python Prompt

```
>>> 334 + 3.1415
337.1415
>>> 12345679 * 81
999999999
>>> 22 / 7
3.142857142857143
>>> (4 - 2) ** 10
1024
>>> 87 // 4
21
>>> 87 % 4
3
>>> exit()
```

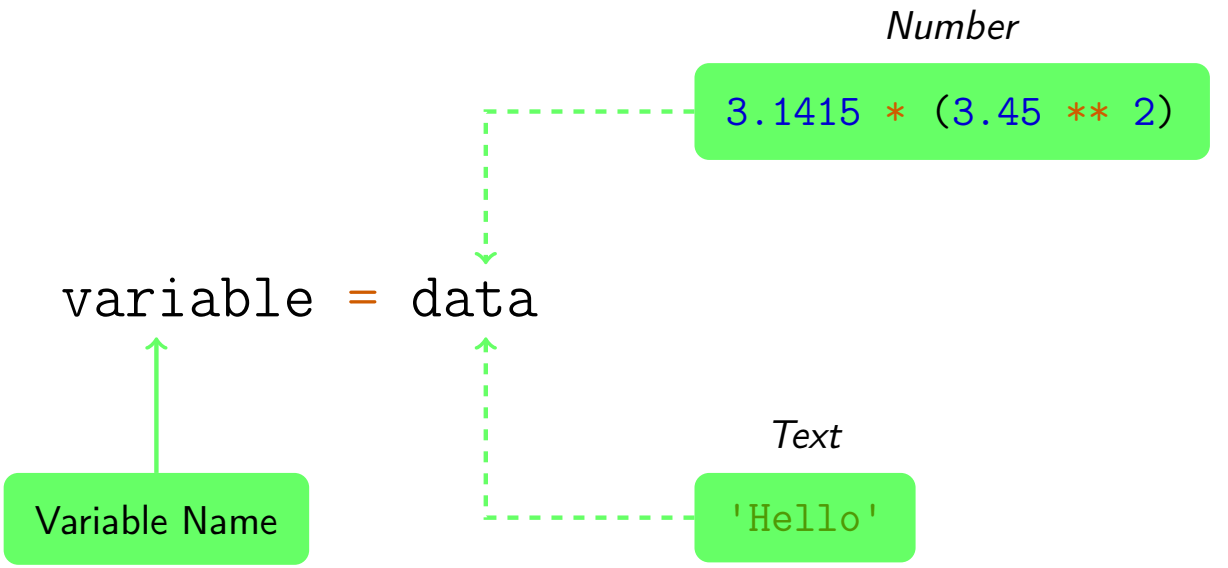
Printing to Console

```
>>> print('Hello, World!')
Hello, World!
>>> print('This year is', 2022)
This year is 2022
>>> print('I am', 20, 'years old')
I am 20 years old
>>> print("Nice to meet you")
Nice to meet you
>>> print('12345', '6789')
12345 6789
```

Variables


Arithmetic Statements
3.1415 * (3.45 ** 2), 'Hello', ...
Variable Declaration
variable = data
Printing to Console
print('The variable is', variable)

Variable Declaration



Using Variables

```
>>> width = 3
>>> height = 4
>>> area = width * height
>>> print('Area is', area)
Area is 12
```

Using Variables

```
>>> width = 30
>>> height = 40
>>> area = width * height
>>> print('Area is', area)
Area is 1200
```

Python Scripts

area_rectangle.py

```
1 width = 30
2 height = 40
3 area = width * height
4 print('Area is', area)
```

Python Scripts

hello_world.py

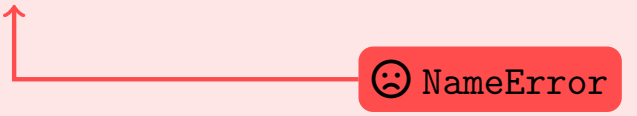
```python
print('Hello, World!')
print('This is printed with Python')
year = 2022
print('This year is', year)
print('It is awesome')
```

```
>_ python hello_world.py
Hello, World!
This is printed with Python
This year is 2022
It is awesome
```

Python Scripts

hello_world.py

```
1 print('Hello, World!')
2 print('This is printed with Python')
3 print('This year is', year)
4 year = 2022
5 print('It is awesome')
```




```
>_ python hello_world.py
Hello, World!
This is printed with Python
Traceback (most recent call last):
  File ".../hello_world.py", line 3, in <module>
    print('This year is', year)
NameError: name 'year' is not defined
```

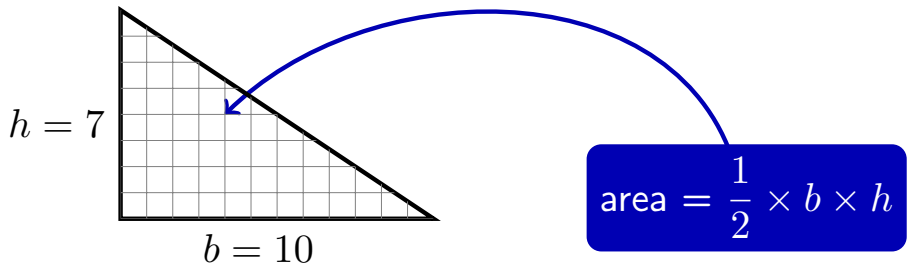
Commenting Python Code

hello_world.py

```
1 print('Hello, World!')
2 # print('This is printed with Python')
3 year = 2022
4 print('This year is', year)
5 # print('It is awesome')
```


```
>_ python hello_world.py
Hello, World!
This year is 2022
```

Example



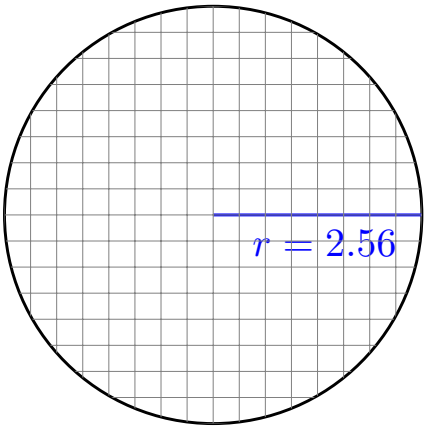
area_triangle.py

```
1  # Calculate area of a right triangle
2  base = 10
3  height = 7
4  area = 0.5 * base * height
5  print('Area of this triangle is', area)
```

```
>_ python area_triangle.py
Area of this triangle is 35
```

Exercise

Calculate the *perimeter* and *area* of the given circle.

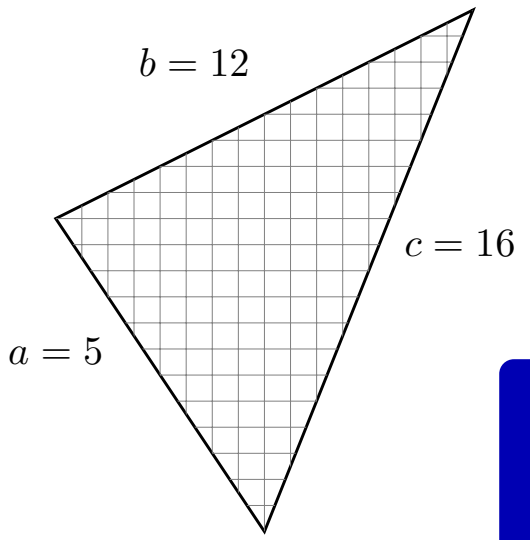


Perimeter $= 2 \cdot \pi \cdot r$

Area $= \pi \cdot r^2$

Exercise

Calculate the *area* of the given triangle with Heron's formula.



Area $= \sqrt{s(s-a)(s-b)(s-c)}$,
where $s = \dfrac{a+b+c}{2}$