

User input and output

Printing to the screen

```
print('Hello, World!')
```

Printing a variable

```
name = 'Karim'
print('Hello, ' + name + '!')
```

Reading user input

```
country = input('where are you from?' )
age = int(input('what is your age?'))
```

Arithmetic Operations

Basic arithmetic

```
5 + 2 - (4 * 3)
# result is -5
```

Integer division

```
5 // 2
# result is 2
```

Real division

```
5 / 2
# result is 2.5
```

Modulus

```
5 % 2
# result is 1
```

Power

```
5 ** 2
# result is 25
```

Lists

Creating a list

```
L = [1, 2, "abc", True]
```

Append to a list

```
L.append(10)
```

Creating a list of lists

```
L = [[1, 2], ["abc"], [True, 15.2, x, "item"]]
```

Remove from a list

```
L.remove("abc")
```

List contains item

```
L = [1, 2, "abc", True]
2 in L    #True
"xyz" in L #False
```

Get the index of an item

```
L = [1, 2, "abc", True]
idx = L.index("abc")
# idx is 2
```

Reverse a list

```
L.reverse()
```

Sort a list

```
L.sort()
```

Variables

Creating an integer variable

```
age = 25
```

Creating a string variable

```
goal = 'Commit to CS mastery!'
```

Creating a float variable

```
pi = 3.14
```

Strings

Creating strings with single or double quotes

```
greeting = "Hello"
name = ' World'
print(greeting + name)
# prints "Hello Worlds"
```

Concatenation

```
msg = "Hello, " + "World!"
print(msg)
```

String contains another string

```
"ap" in "apple" # True
"z" in "apple"  # False
```

String formatting

```
name = "Alice"
age = 20
msg = f"Hello my name is {name} and my age is {age}"
# only works with Python 3.6+
```

String to uppercase

```
my_string.upper()
```

String to lowercase

```
my_string.lower()
```

Conditional Statements

If statements

```
if x > 5:
    print("x is greater than 5")
```

If else statements

```
if age < 12:
    print("child")
else:
    print("adult")
```

If elif else statements

```
if grade >= 85:
    print ( 'Excellent' )
elif grade >= 75:
    print ( 'very good')
elif grade >= 65:
    print ( 'good')
elif grade >=50:
    print ('pass')
else:
    print ('failed')
```

For Loops

Repeating a block 5 times

```
sum = 0
for i in range (5):
    sum = sum + i
print(sum)
# result = 10
```

Iterating over a list

```
L = ["hello", "my", "name", "is", "Karim"]
for item in L:
    print(item)
```

Iterating over a string

```
str = "afternerd"
for ch in str:
    print(ch)
```

While Loops

Waiting for a condition

```
i = 0
while i < 5:
    print(i)
    i += 1
```

Infinite loop

```
while True:
    print("this loop will never terminate")
```

Break from a loop

```
x = 0
while True:
    if (x == 20):
        break
    # do something
    x += 1
# you can also use break to break from for loops
```

Functions

Function with no parameters

```
def print_msg():
    print("Commit to CS mastery")
```

Function with multiple parameters

```
def print_msg(msg, times):
    for i in range(times):
        print(msg)
```

Function with a return value

```
def power(x, y):
    return x ** y
```

Call a function

```
x = 5
y = 2
z = power(x, y)
# returns 25
```