SCHOOL OF ENGINEERING, KMITL

//WK03

# Advance Computer Programming

For RAI

Topic of
intermediate
Python Programming

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# Conditions

if

Syntax of an **if** statement

```
if some_condition:
    # execute some code
```

```
if 3>2:
    print('ITS TRUE!')
```

# Conditions

if..else

Syntax of an **if/else** statement

```
if some_condition:
    # execute some code
else:
    # do something else
```

```
hungry = True

if hungry==True:
    print('FEED ME!')
else:
    print("Im not hungry")
```

```
FEED ME!
```

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# Conditions

if...elif...else

```
loc = 'Bank'

if loc == 'Auto Shop':
    print("Cars are cool!")
elif loc == 'Bank':
    print("Money is cool!")
elif loc == 'Store':
    print("Welcome to the store!")
else:
    print("I do not know much.")
```

```
Money is cool!
```

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# Generators

using range() with list

# list

using range()

## Purpose

The range() function in Python generates a sequence of numbers, which is often used for iterating over with loops, particularly in for loops, or for creating number sequences in list comprehensions.

## Syntax

```
range(stop)
range(start, stop)
range(start, stop, step)
```

# list

using range()

**Example:** Basic usage

```
for i in range(5):
 print(i)
# Output: 0, 1, 2, 3, 4
```

**Example:** Specifying start and stop

```
for i in range(2, 7):
    print(i)
# Output: 2, 3, 4, 5, 6
```

**Example:** Specifying start, stop and step

```
for i in range(1, 10, 2):
    print(i)
# Output: 1, 3, 5, 7, 9
```

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# Loops

for

Syntax of a for loop

```
my_iterable = [1,2,3]
for item_name in my_iterable:
    print(item_name)
```

```
for i in range(0, 5):
    print(i)
```

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# Loops

while

## Syntax of a while loop

```
while some_boolean_condition:
    #do something
```

```
i = 0
while i < 5:
    print(f"No. is {i}")
    i = i + 1
```

```
No. is 0
No. is 1
No. is 2
No. is 3
No. is 4
```

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# Loops

while

## Syntax of a while loop

```
while some_boolean_condition:
    #do something
```

```
i = 0
while i < 5:
    print(f"No. is {i}")
    i = i + 1
```

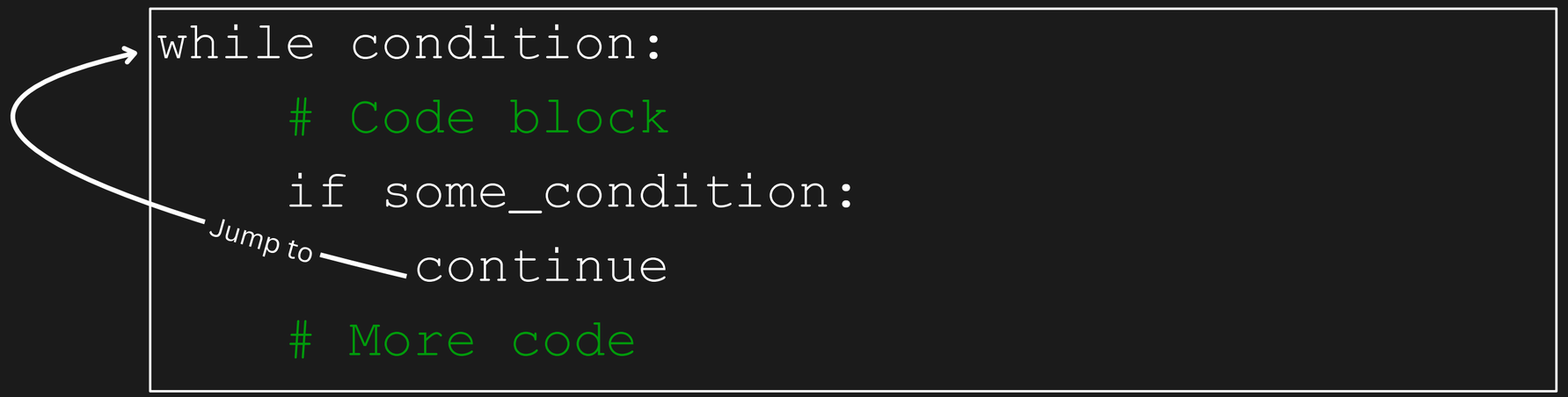
```
No. is 0
No. is 1
No. is 2
No. is 3
No. is 4
```

# Loops continue

The while loop allows repeated execution of a **block of code as long** as a specified condition is true. The **continue** statement is used within loops to **skip** the current iteration and continue with the next iteration of the loop.

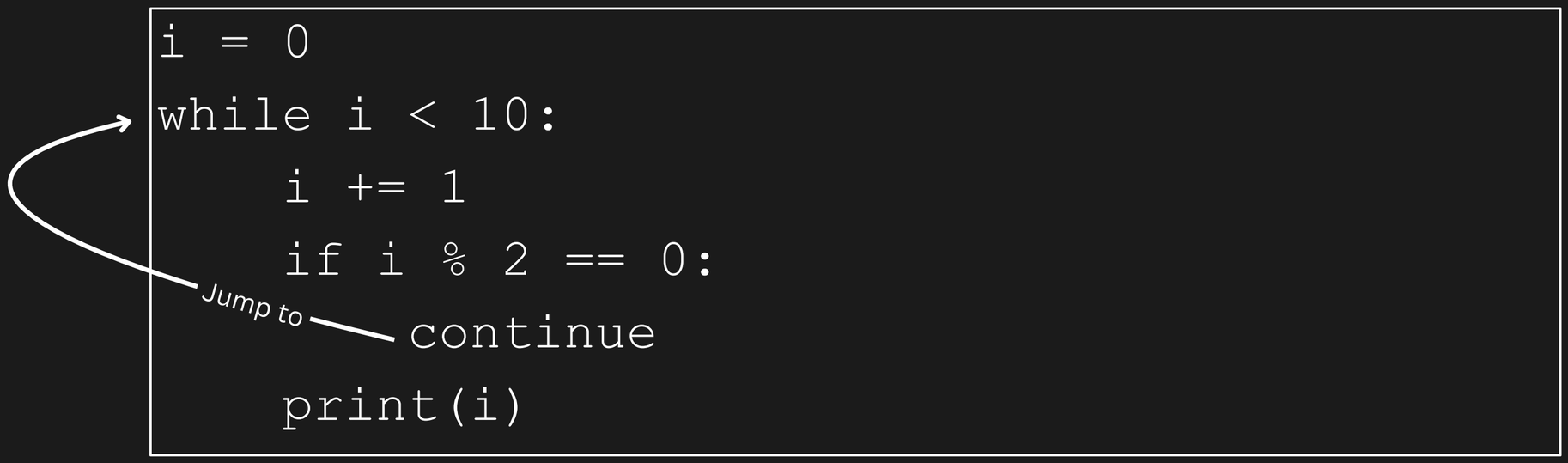
# Loops continue

syntax



# Loops continue

example




```
i = 0
while i < 10:
    i += 1
    if i % 2 == 0:
        continue
    print(i)
```

In this example, the while loop runs until i is less than 10. The continue statement skips the even numbers, so only odd numbers are printed.

# Loops break

The while loop allows repeated execution of a block of code as long as a specified condition is true. The **break** statement is used to exit the loop immediately, regardless of the original loop condition.

# Loops break

syntax

```
while condition:
    # Code block
    if some_condition:
        break
    # More code
# Outside loop
```

# Loops break

example

```
i = 0
while i < 10:
    print(i)
    if i == 5:
        print("Breaking out of the loop")
        break
    i += 1
print("Outside the loop")
```


In this example, the while loop runs until i is less than 10. The break statement exits the loop when i equals 5, and control jumps to the code after the loop, indicated by the print statement "Outside the loop".

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# list comprehensions

List comprehensions in Python provide a concise way to create lists. They consist of brackets containing an expression followed by a for clause, and can include additional for or if clauses for filtering.

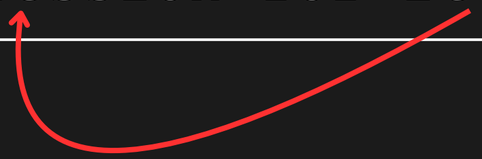
# list

## comprehensions (Element modify)

Syntax

Syntax

```
iterable_out = [expression for item in iterable]
```



expression is the value that will be added into iterable_out. It’s also allow to modify value into add.

# list
## comprehensions (Element modify)

Example

**Example 1: modify value to square the number into new list**

```
numbers = [1, 2, 3, 4, 5]
squares = [n**2 for n in numbers]
# squares = [1, 4, 9, 16, 25]
```

# list

## comprehensions (Element modify with if-else)

Syntax

**Syntax**

```
iterable_out = [expression for item in iterable]
```

```
iterable_out = [exp_true if cond else exp_false for item in iterable]
```

** This technique combines the shorthand if-else and list comprehensions.

# list

## comprehensions (Element modify with if-else)

Example

```
numbers = [1, 2, 3, 4, 5]
parity = ["even" if n % 2 == 0 else "odd" for n in numbers]

# output
# parity = ["odd", "even", "odd", "even", "odd"]
```

# list

## comprehensions (Filter element)

Syntax

Syntax

```
iterable_out = [expression for item in iterable if condition]
```

If the condition is correct, the item will be pass to expression.

expression is the value that will be added into iterable_out. It’s also allow to modify value into add.

# list

## comprehensions (Filter element)

Example

**Example 1: filter the even numbers**

```
numbers = [1, 2, 3, 4, 5]
even_numbers = [n for n in numbers if n % 2 == 0]


# even_numbers = [2, 4]
```

# list

## comprehensions (Search in element)

Syntax/Example

**Example**

```
fruits = ["apple", "banana", "cherry"]
is_contains_apple = "apple" in fruits
print (is_contains_apple)

# Output is True
```

** The variable is_contains_apple will be True if "apple" is in the list, otherwise False

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# Function

# def

;

## Purpose

The def keyword is used to define a function in Python. Functions allow you to encapsulate reusable blocks of code, making your programs modular and easier to manage.

## Syntax

```
def function_name(parameters):
    # Code block
    return value (optional)
```

# def

;

## Example

```
def greet(name):
    message = f"Hello, {name}!"
    return message

# Usage
print(greet("Alice")) # Output: Hello, Alice!
```

In this example, the greet function takes a name parameter, constructs a greeting message, and returns it. The function is then called with the argument "Alice".

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# Anonymous Functions

lambda functions, also known as anonymous functions, allow the creation of small, unnamed functions for short-term use.

# lambda

;

## Syntax

```
lambda arguments: expression
```

## Regular function VS Lambda function

```
# Regular function
def add(x, y):
    return x + y
```

```
# Lambda function
add = lambda x, y: x + y
```

** x, y are defined as input argument for function add.

```
# Regular function
def square(x):
    return x*x
```

```
# Lambda function
square = lambda x: x*x
```

** x is defined as input argument for function square.

# lambda

Use cases

## Using lambda with map()

To modify element in list with specific algorithm

## Example

```
numbers = [1, 2, 3, 4, 5]
squared = list(map(lambda x: x**2, numbers))
# squared = [1, 4, 9, 16, 25]
```

# lambda

Use cases

## Using lambda with filter()

To filter element in list with specific algorithm

## Example

```
numbers = [1, 2, 3, 4, 5]
evens = list(filter(lambda x: x % 2 == 0, numbers))
# evens = [2, 4]
```

# lambda

Use cases

## Using lambda with sort

To sort element in list with specific algorithm

## Example

```
# List of dictionaries
students = [
    {"name": "Alice", "grade": 85},
    {"name": "Bob", "grade": 92},
    {"name": "Charlie", "grade": 78}
]
```

Sort the nesteset list of dictionary

```
# Output:
# [
# {'name': 'Charlie', 'grade': 78},
# {'name': 'Alice', 'grade': 85},
# {'name': 'Bob', 'grade': 92}
# ]
```

# lambda

Use cases

## Example

```
# List of dictionaries
students = [
    {"name": "Alice", "grade": 85},
    {"name": "Bob", "grade": 92},
    {"name": "Charlie", "grade": 78}
]

# Sorting the list of dictionaries by the 'grade' key
sorted_students = sorted(students, key=lambda student: student["grade"])

# Output the sorted list
print(sorted_students)

# Output:
# [{'name': 'Charlie', 'grade': 78}, {'name': 'Alice', 'grade': 85},
{'name': 'Bob', 'grade': 92}]
```

In this example, the lambda function lambda student: student["grade"] is used to extract the grade value from each dictionary in the list. The sorted() function then sorts the list of dictionaries based on these grade values in ascending order.

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# Done!


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**Q/A**