

# Python Basic 03

## Control Flow and Iteration

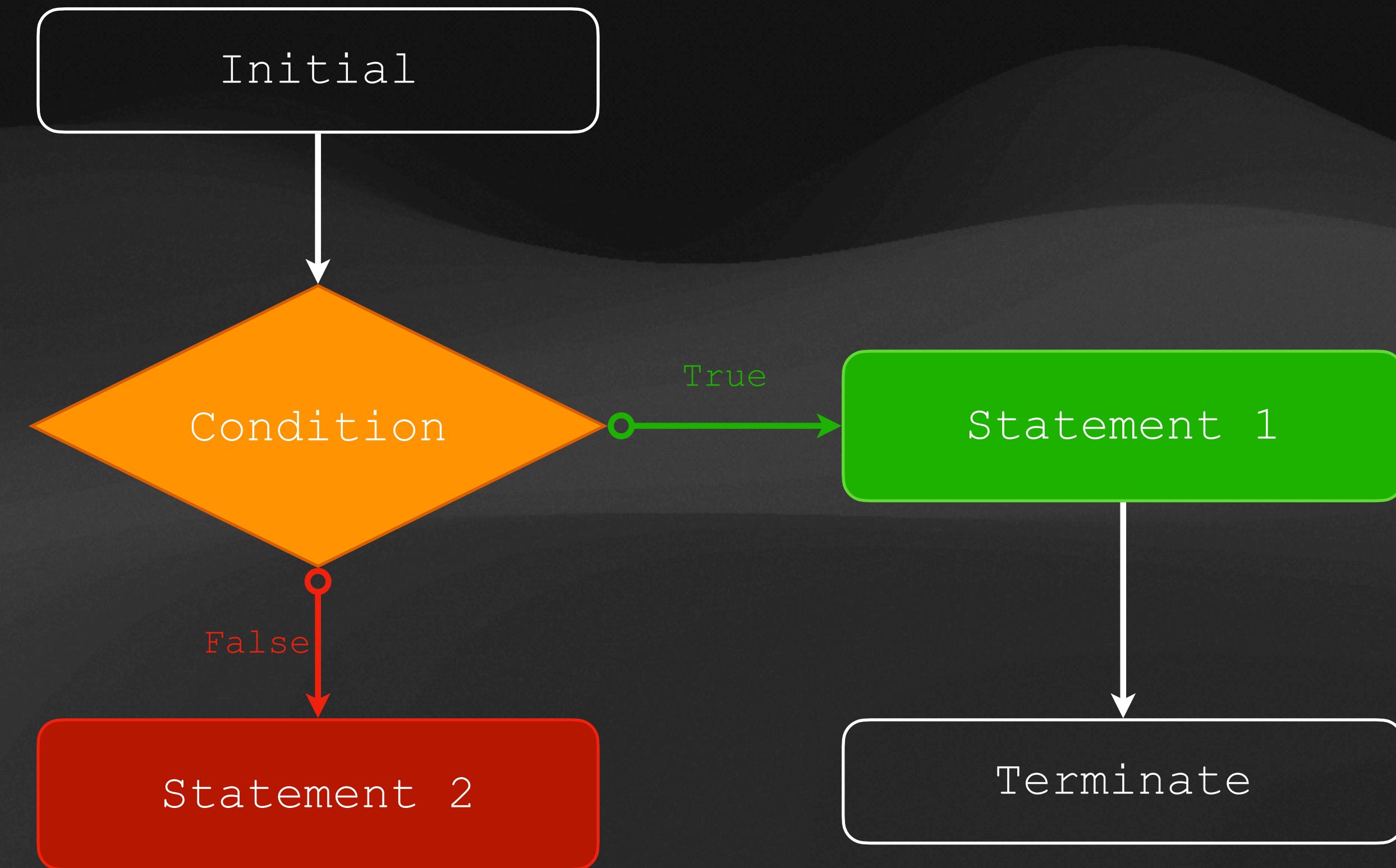
Carlos 2024 Fall

# Control Flow

## If else statement

```
if condition:  
    Statement1  
else:  
    Statement2
```

```
if condition1:  
    Statement1  
elif condition2:  
    Statement2  
else:  
    Statement3
```



# Control Flow

## If else statement

```
1 if eval(input('Input your age: ')) >= 20:  
2     print('Is adult!')  
3 else:  
4     print('Is not adult!')
```

ex031\_if\_else\_statement.py

- (.venv) kaiyang@Kais-MacBook-Pro Unit3 % python ex03\_if\_else\_statement.py  
Input your age: 25  
Is adult!

ex031\_if\_else\_statement.py output

# Exercise 3-1

- Write a program that can input a score (range 0 ~ 100) and give a grade according to this table

```
● (.venv) kaiyang@Kais-MacBook-Pro:~/Assignment$ Input a score: 101  
Out of range  
● (.venv) kaiyang@Kais-MacBook-Pro:~/Assignment$ Input a score: 89  
Grade B+
```

Sample output

Grade	Score range
A+	95 ↑
A	90 - 94
B+	85 - 89
B	80 - 84
C	Otherwise

# What is iteration?

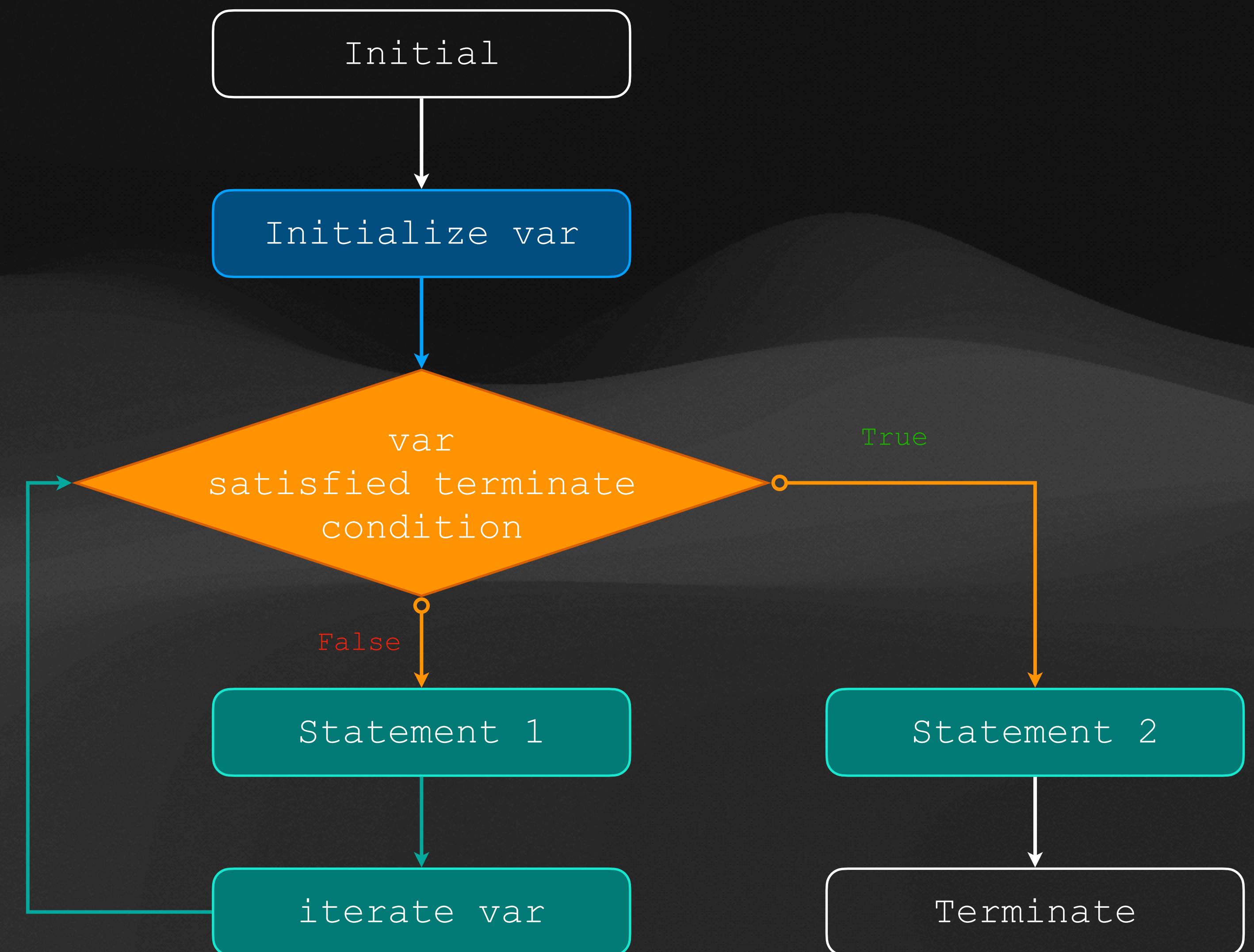
## An example

- (.venv) kaiyang@Kais-MacBook-Pro Class\_Example % python3 test.py  
Hello!  
Hello!  
Hello!  
Hello!  
Hello!

# What is iteration?

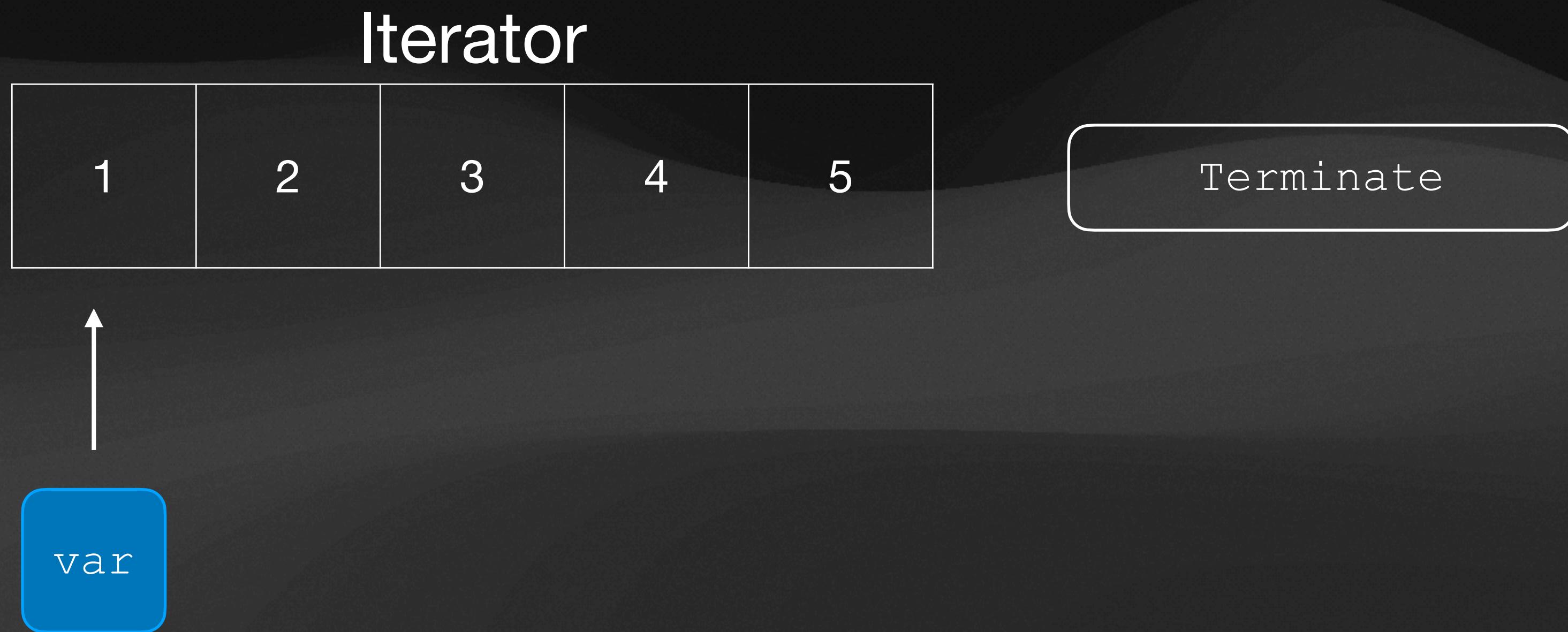
## For Loop

```
For var in iterator:  
    Statement1  
[else:  
    Statement2  
]
```



# What is iteration?

## For Loop



# Iteration

## Iterator: Range(start, end, [step])

```
range(start, end, [step=1])
```

→  $start, start + 1 \cdot step, \dots, \text{until } start + i \cdot step > end$

```
range(0, 5)
```

→ 0, 1, 2, 3, 4

# Iteration

Iterator: Range(start, end, [step])

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

ex032\_forLoop.py

```
● (.venv) kaiyang@Kais-MacBook-Pro Unit3  
0  
1  
2  
3  
4
```

ex032\_forLoop.py output

```
1  for i in range(0, 5, 2):  
2      print(i)
```

ex033\_forLoop2.py

```
● (.venv) kaiyang@Kais-MacBook-Pro Unit3  
0  
2  
4
```

ex033\_forLoop2.py output

# Iteration

## Iterator: List

```
1 index = [0, 2, 4, 5, 7]
2
3 for i in index:
4     print(i)
```

ex034\_forLoop3.py

```
● (.venv) kaiyang@Kais-MacBook-Pro Unit3
0
2
4
5
7
```

ex034\_forLoop3.py output

# Exercise 3-2

- Using Exercise 3-1's table
- Ask user how many student's score need to be mark
- Iteratively input a score and output the grade

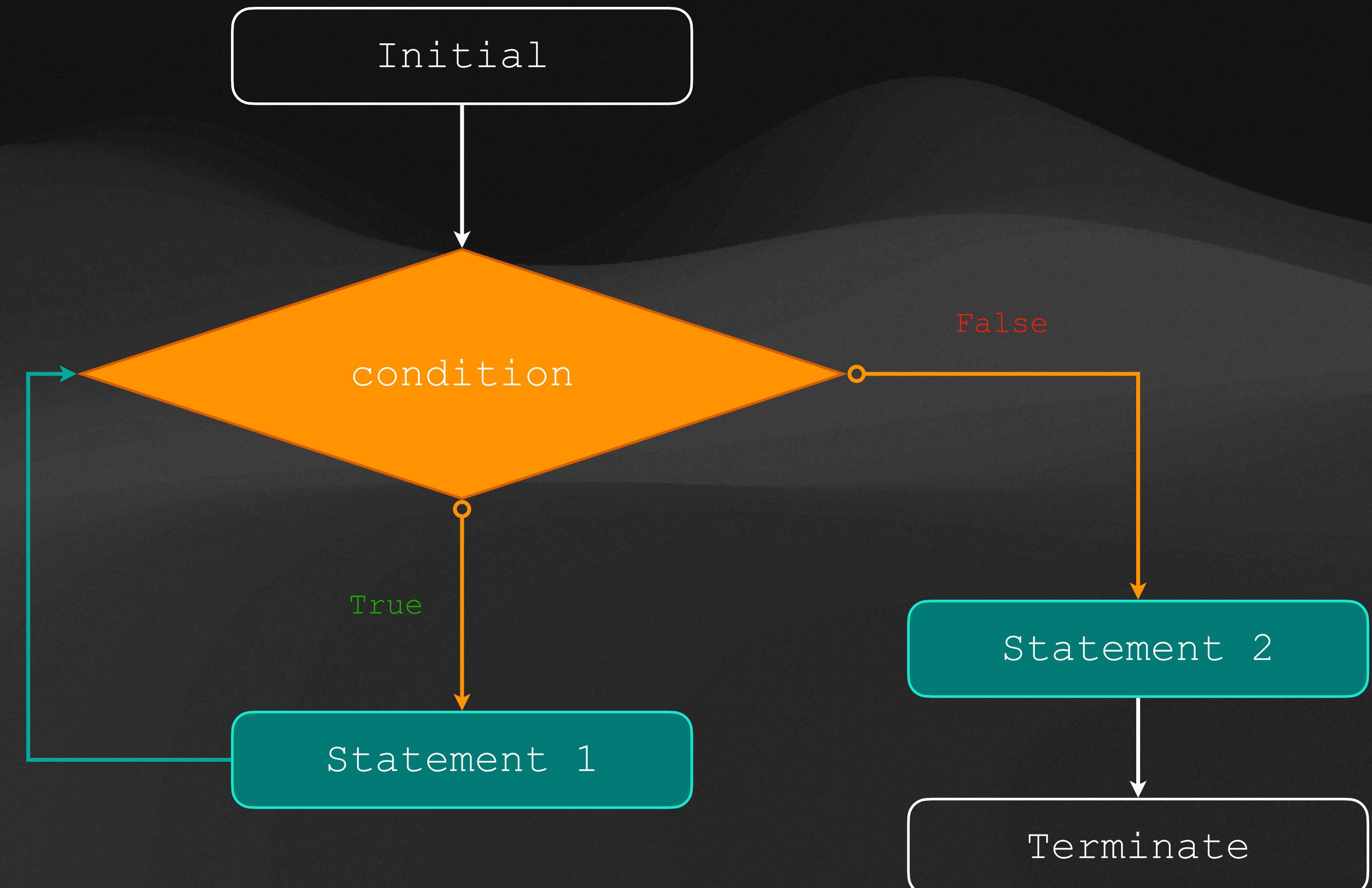
```
● (.venv) kaiyang@Kais-MacBook-Pro Assignment  
How many student's score need to be mark? 3  
Input a score: 55  
Grade C  
Input a score: 99  
Grade A+  
Input a score: 10  
Grade C
```

Sample output

# Another Loop

## While Loop

```
while condition:  
    Statement1  
[else:  
    Statement2  
]
```



# Another Loop

## While Loop

```
1 counter = 0
2 while counter < 10:
3     print('counter = ', counter)
4     counter += 1
```

ex035\_whileLoop.py

- (.venv) kaiyang@Kais-MacBook-Pro Unit3:  
counter = 0  
counter = 1  
counter = 2  
counter = 3  
counter = 4  
counter = 5  
counter = 6  
counter = 7  
counter = 8  
counter = 9

ex035\_whileLoop.py output

# Another Loop

## Infinite Loop

Never terminate

```
1 counter = 0
2 while True:
3     print('counter = ', counter)
4     counter += 1
```

ex036\_infiniteLoop.py

# Escape the Loop

## break statement

```
1 while True:  
2     num = eval(input("Input a even number: "))  
3     if num % 2 == 0:  
4         print('Is even, break')  
5         break  
6     else:  
7         print('Not even, input again\n')
```

ex037\_break.py

```
1 while True:  
2     while True:  
3         num = eval(input("Input a even number: "))  
4         if num % 2 == 0:  
5             print('Is even, break')  
6             break  
7         else:  
8             print('Not even, input again\n')
```

ex038\_break02.py

\* break statement only escape from the current loop block

# Exercise 3-3

- Write a program that generate a random integer between 1 ~ 100
- Let user guess the number
- If user guess higher than target, print “Guess too High!”
- If user guess less than target, print “Guess too small”

```
● (.venv) kaiyang@Kais-MacBook-Pro Assignment
Guess number: 50
Guess too small!
Guess number: 75
Guess too small!
Guess number: 87
Guess too small!
Guess number: 95
Guess too small!
Guess number: 97
Guess too small!
Guess number: 99
Guess too high!
Guess number: 98
Successfully Guess! The target is 98
```

Sample output