DigitalSkola

Learning Progress Review

OMICRON

Data Science Bootcamp Batch 11

OMICRON

Data Science Bootcamp Batch 11

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Week 4

Basic Programming

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01 ---------- Conditions & Control Flow

02 ---------- IF Statements

03 ---------- Match Case

04 ---------- Iteration

05 ---------- Array and Other Data Types

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01 Conditions & Control Flow

Conditions & Control Flow

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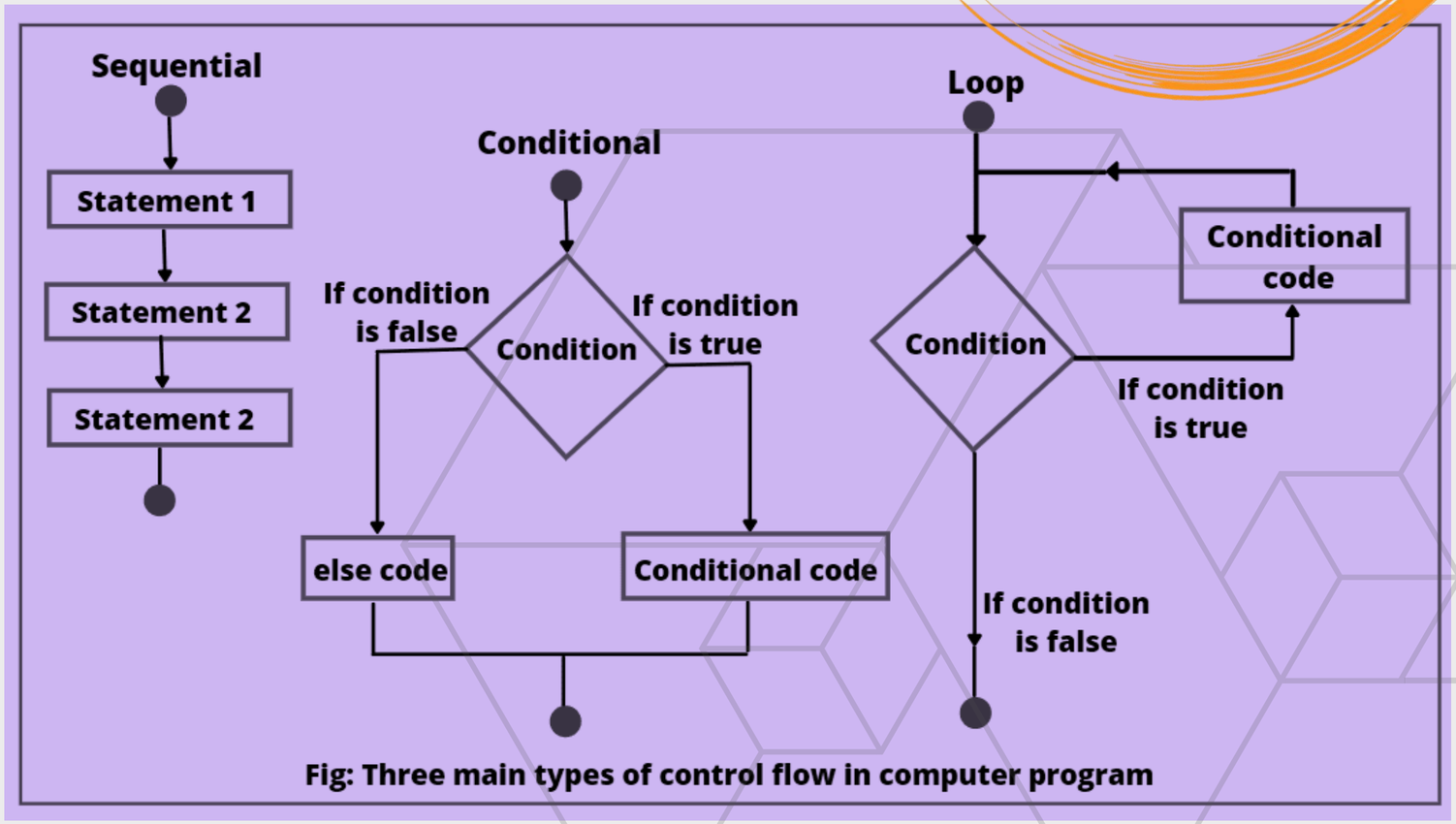
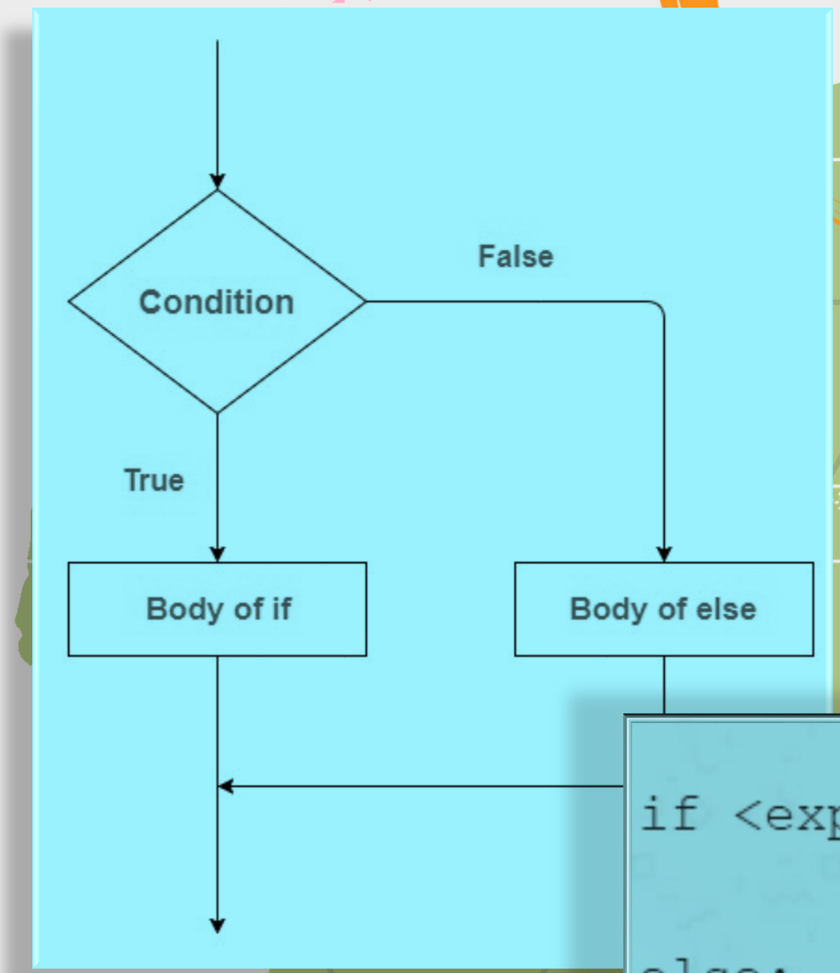
- Control Flow adalah perintah yang dapat mengeksekusi kode kode pemrograman.
- Control Flow pada program Python diatur dengan pernyataan conditional, loop dan function.
- Hanya menjalankan kode tertentu ketika syarat terpenuhi.



Conditions & Control Flow

- Dalam Python, pernyataan if adalah bagaimana anda melakukan pengambilan keputusan semacam ini.
- Ini berisi kode yang berjalan hanya ketika kondisi yang diberikan dalam pernyataan if adalah benar/memenuhi syarat.
- Jika kondisinya salah, maka pernyataan opsional else berjalan, yang berisi beberapa kode untuk kondisi lain.

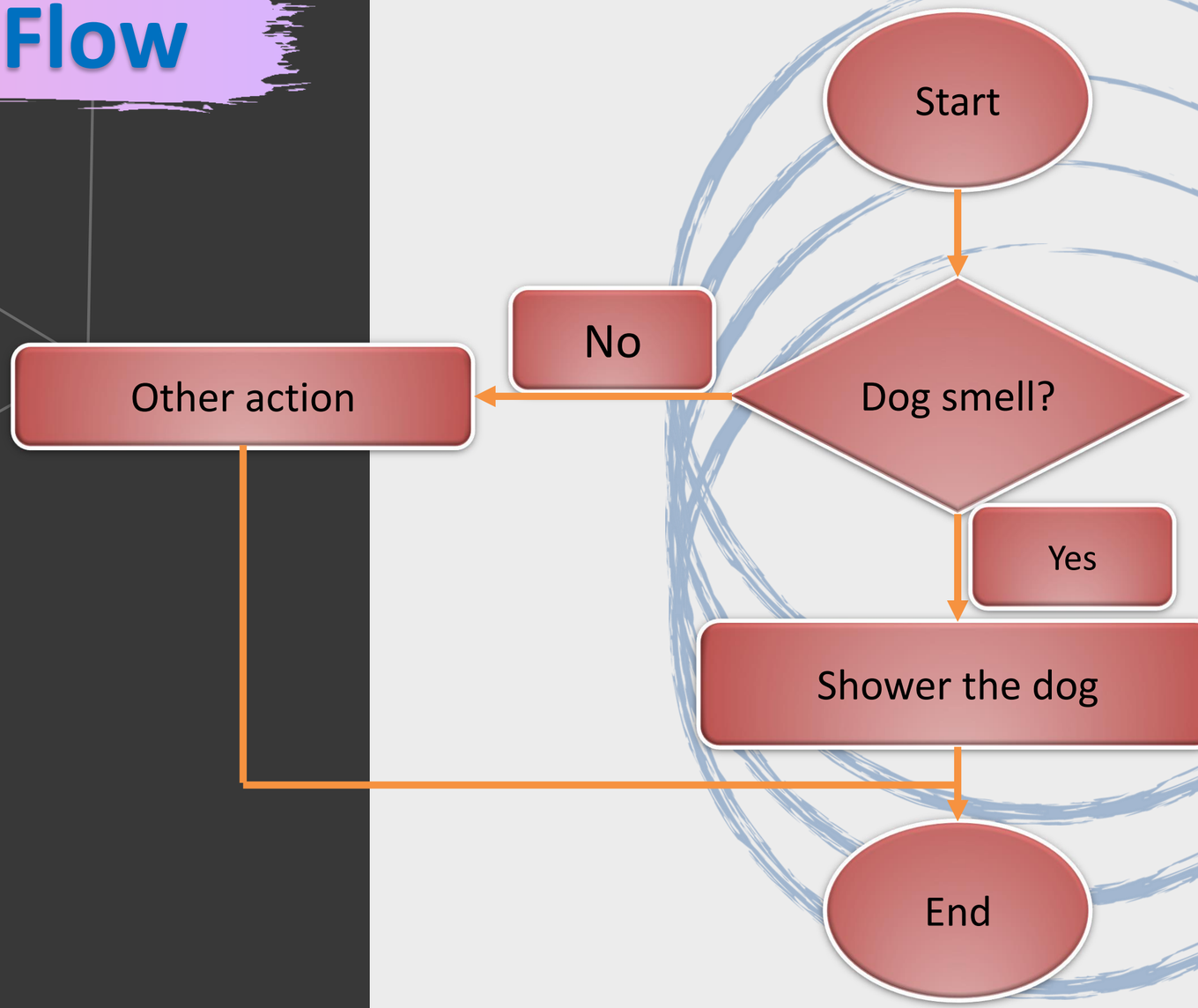



```
if <expression>:
        <statement>
else:
        <statement>
```

Conditions & Control Flow

if dog is smell then
    shower the dog
else
    do other things

```
if dog == 'smell':
    shower_the_dog()
else:
    other_action()
```



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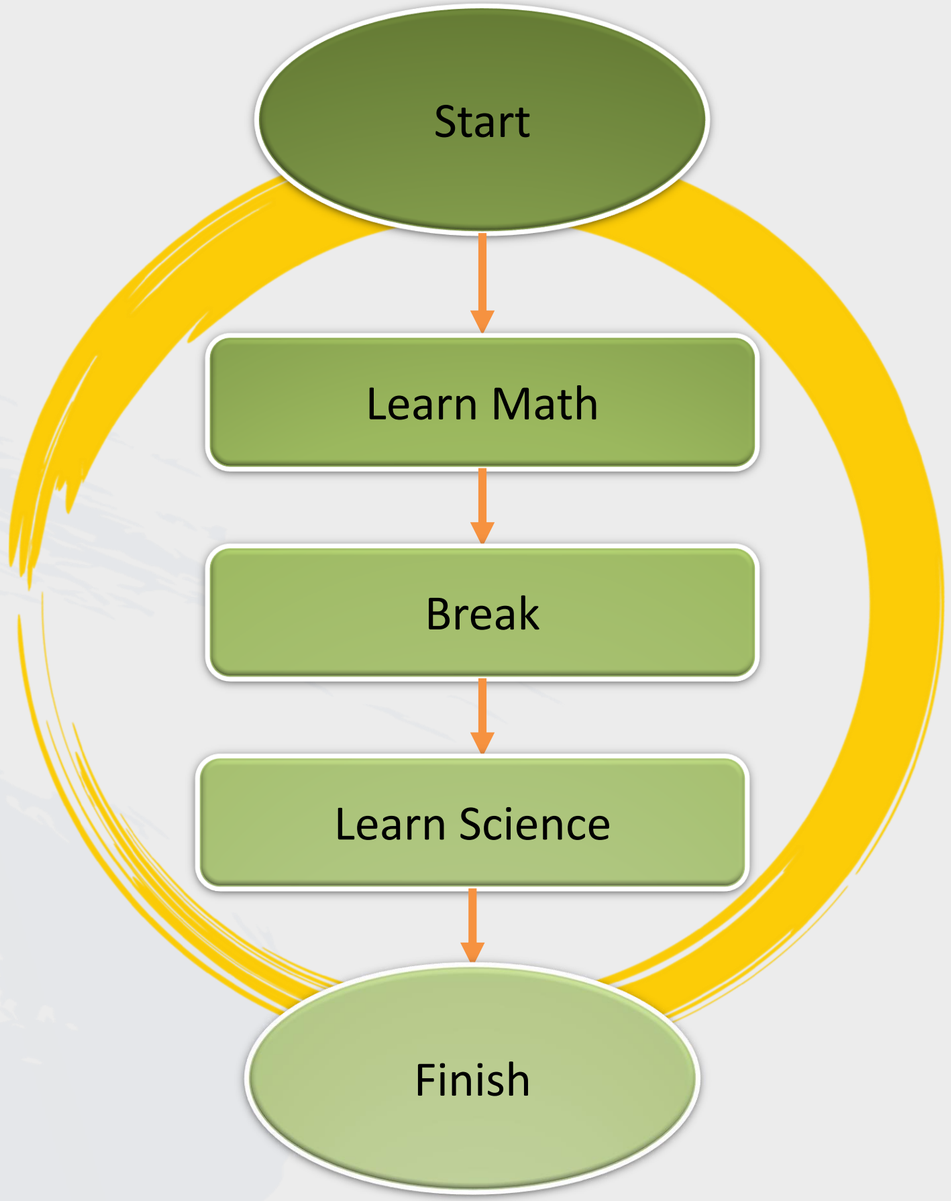
Conditions & Control Flow

Sequential:

- **Learn Math**
- **Break Time**
- **Learn Science**

```
Other Example:
a=30
b=15
c=a-b
print("a-b =",c)
```



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Logical Conditions

Equals	:	a == b
Not Equals	:	a != b
Less Than	:	a < b
Less Than Or Equal To	:	a <= b
Greater Than	:	a > b
Greater Than Or Equal To	:	a >= b

Logical Operators

and	True if both the operands are true
or	True if either of the operands is true
not	True if operand is false (complements the operand)

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02 IF Statements

“IF” Statement

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Conditions

- **Single Condition** (`if`)

Full Cast

```
a = 7
if a == 7:
  print("a is seven")
```

```
a is seven
```

Shorthand Version

```
a = 7
if a == 7: print("a is seven")
```

```
a is seven
```

- **Multiple Conditions** (`if -> elif-> else`)

```
a = 13
b = 7
if a > b:
  print("a is bigger than b")
elif a < b:
  print("a is smaller than b")
else:
  print('a and b is the same')
```

```
a is bigger than b
```

- **Two Conditions** (`if -> else`)

Full Cast

```
a = 13
b = 13
if a != b:
  print("a and b is not the same")
else:
  print("a and b is the same")
```

```
a and b is the same
```

Shorthand Version

```
[25] a = 13
     b = 13
     print("a and b is not the same") if a == b else print("a and b is the same")
```

```
a and b is not the same
```

“IF” Statement

Expressions

- Single Expression

```
a = 13
b = 9
if a > b:
  print("a is bigger than b")
```

```
a is bigger than b
```

- Multiple Expressions

“and” Expression :

```
[19] a = 12
     b = 8
     c = 21
     if a > b and b < c:
       print("a is bigger than b")
```

```
a is bigger than b
```

“or” Expression :

```
[21] a = 5
     b = 11
     c = 25
     if c > b or c < a:
       print("at least one of the expresion is True")
```

```
at least one of the expresion is True
```

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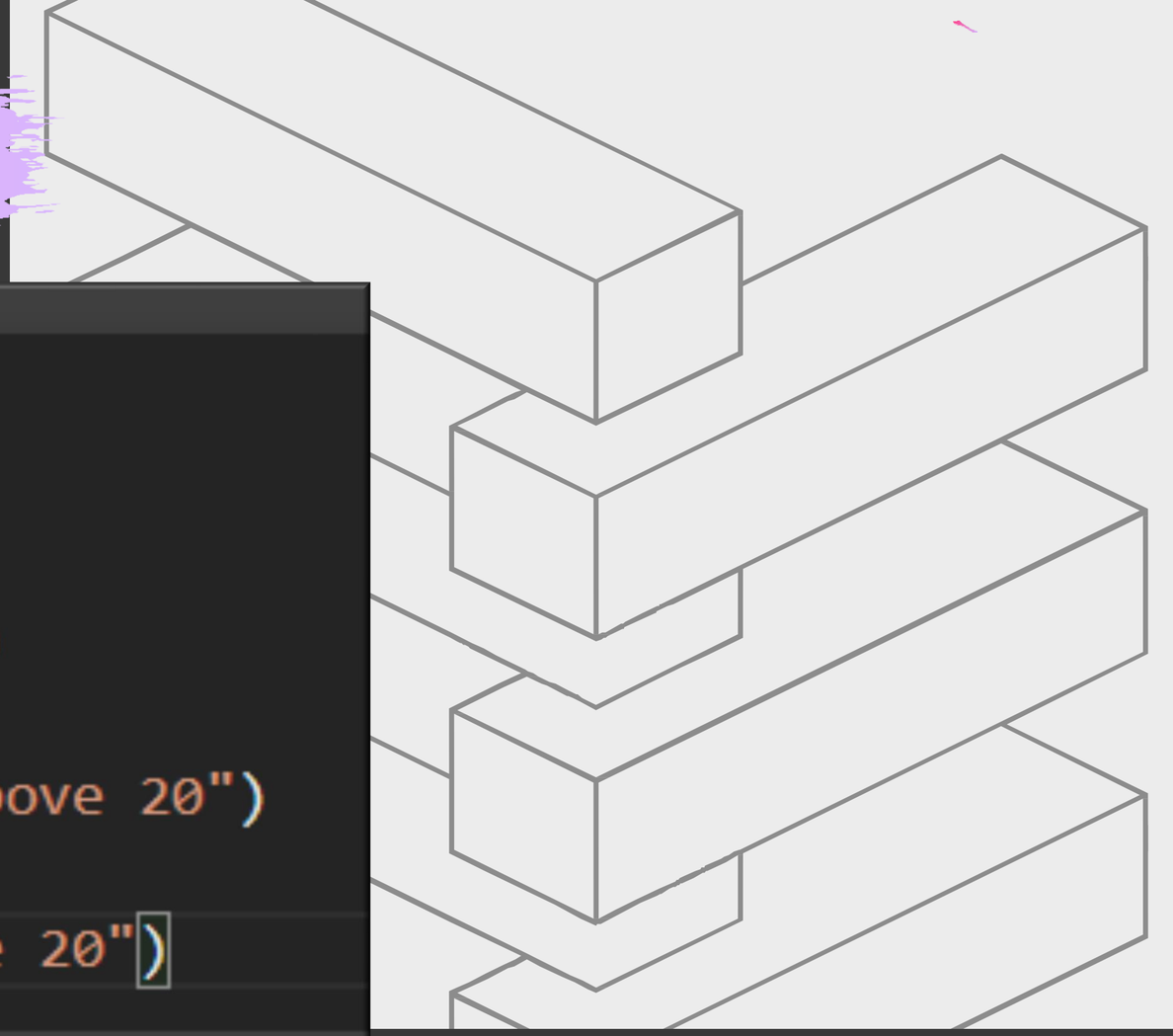
“IF” Statement [nested]



```
x = 30

if x > 10:
  print("Above ten, ")
  if x > 20:
    print("and also above 20")
else:
  print("but not above 20")
```

```
Above ten,
and also above 20
```

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Implementasi IF Statement

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Cek Angka (Positif, Negatif, atau nol)

```
# Check Number (Positif, Negative, or Zero)

number = float(input("Enter number : "))

if number > 0:
  print(number, "is a positif number.")
elif number == 0:
  print(number, "is a zero number.")
else:
  print(number, "is a negative number.")
```

OUTPUT:

```
Enter number : 8
8.0 is a positif number.
```

```
Enter number : 0
0.0 is a zero number.
```

```
Enter number : -4
-4.0 is a negative number.
```

Cek Bilangan Ganjil atau Genap

```
# Check Odd or Even Number

number = int(input("Enter number : "))

if number % 2 != 0:
  print(number, "is an odd number.")
else:
  print(number, "is an even number.")
```

OUTPUT:

```
Enter number : 3
3 is an odd number.
```

```
Enter number : 4
4 is an even number.
```

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03 Match Case

Match Case

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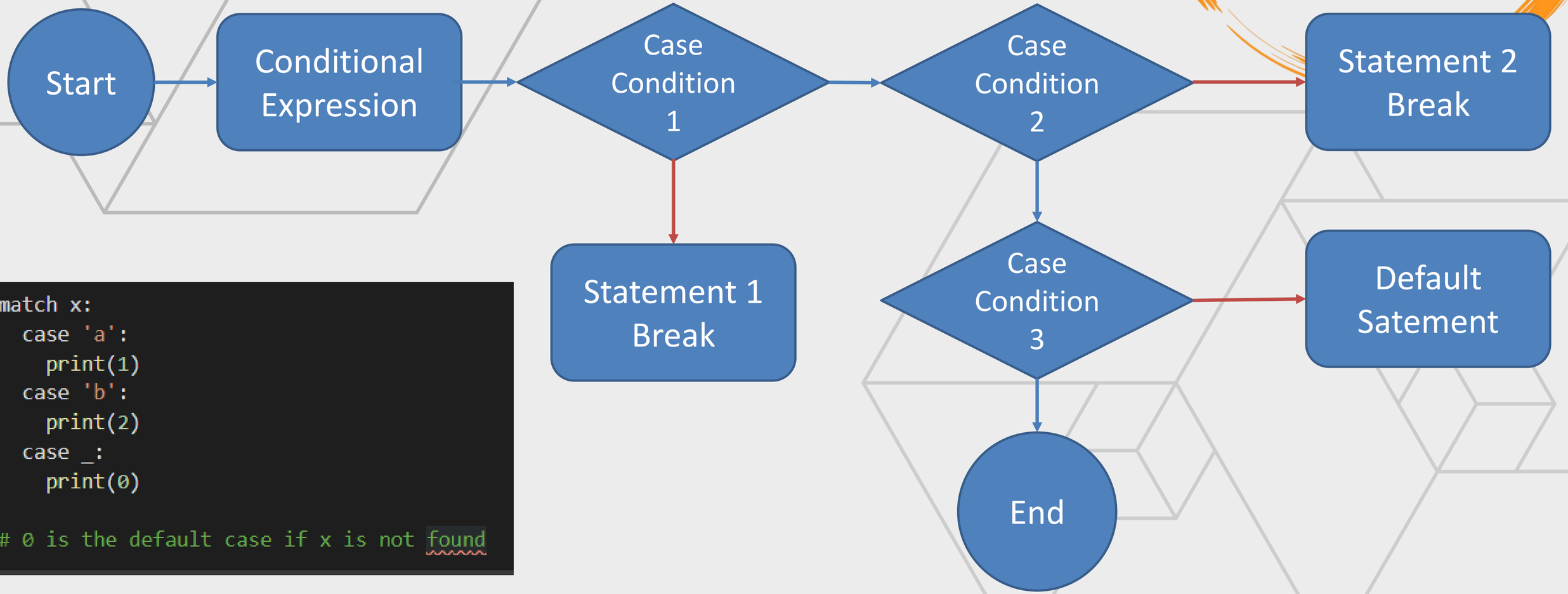


```
match x:
  case 'a':
    print(1)
  case 'b':
    print(2)
  case _:
    print(0)

# 0 is the default case if x is not found
```

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04 Iteration

Iteration

Iteration atau **Loop** pada *programming* adalah instruksi yang dilakukan secara berulang. **Iteration / Loop** akan terus dijalankan sampai kondisi tertentu, yang telah diatur sebelumnya, tercapai.

- Iteration Types
  - Iterasi sampai kondisi tertentu tercapai
  - Iterasi sampai sejumlah perulangan yang ditentukan
  - Iterasi dalam elemen pada list ataupun *array*

Jenis Loop

While Loop

Digunakan untuk menjalankan suatu *block of statements* secara berulang hingga memenuhi kondisi tertentu, dan ketika kondisinya telah terpenuhi, maka iterasi baris berikutnya akan dihentikan.

Termasuk dalam kategori *indefinite iteration*: Jumlah perulangan loop tidak didefinisikan secara eksplisit di awal.

Syntax while loop:

```
while <expression>:
    <statement>
```

Implementasi while Loop

N – Urutan Awal Bilangan **Fibonacci** Menggunakan Loop **WHILE**

```
# Program to display the Fibonacci sequence up to n-th term in list

nterms = int(input("How many terms? "))
fibonacci_sequence = []

# first two terms
n1, n2 = 0, 1
count = 0

# check if the number of terms is valid
if nterms <= 0:
  print("Please enter a positive integer")
# if there is only one term, return n1
elif nterms == 1:
  print("Fibonacci sequence upto",nterms,":")
  print(n1)
# generate fibonacci sequence using WHILE
else:
  print("Fibonacci sequence:")
  while count < nterms:
    fibonacci_sequence.append(n1)
    nth = n1 + n2
    # update values
    n1 = n2
    n2 = nth
    count += 1

print(fibonacci_sequence)
```

OUTPUT:

```
How many terms? 10
Fibonacci sequence:
[0, 1, 1, 2, 3, 5, 8, 13, 21, 34]
```

10 urutan awal bilangan Fibonacci dengan pengulangan WHILE

Implementasi while Loop

N – Urutan Awal Bilangan **Fibonacci Ganjil** dan **Genap** Menggunakan Loop **WHILE**

```
# Program to display the Fibonacci sequence up to n-th term
# Divided by ODD & EVEN number list

nterms = int(input("How many terms? "))
odd_list = []
even_list = []

# first two terms
n1, n2 = 0, 1
count = 0

# check if the number of terms is valid
if nterms <= 0:
  print("Please enter a positive integer")
# if there is only one term, return n1
elif nterms == 1:
  print("Fibonacci sequence upto",nterms,":")
  print(n1)
# generate fibonacci sequence using WHILE
else:
  while count < nterms:
    if n1 % 2 != 0:
      odd_list.append(n1)
    else:
      even_list.append(n1)

    nth = n1 + n2
    # update values
    n1 = n2
    n2 = nth
    count += 1

print("Odd Fibonacci Number :" ,odd_list)
print("Even Fibonacci Number :" ,even_list)
```

OUTPUT:

```
How many terms? 10
Odd Fibonacci Number : [1, 1, 3, 5, 13, 21]
Even Fibonacci Number : [0, 2, 8, 34]
```

Pada 10 urutan pertama bilangan Fibonacci terdapat:

- Ganjil: 6 angka
- Genap: 4 angka

Implementasi while Loop

N – Urutan Awal Bilangan **Fibonacci** yang **< Angka Limit** Menggunakan Loop **WHILE**

```
# Program to display the Fibonacci sequence less than limit number in list

nlimit = int(input("Enter limit number :"))
fibonacci_sequence = []

# first two terms
n1, n2 = 0, 1
count = 0

# check if the limit number is valid
if nlimit <= 0:
  print("Please enter a positive integer")
# generate fibonacci sequence using WHILE
else:
  print("Fibonacci sequence <", nlimit, ":")
  while n1 < nlimit:
    fibonacci_sequence.append(n1)
    nth = n1 + n2
    # update values
    n1 = n2
    n2 = nth
    count += 1

print(fibonacci_sequence)
```

OUTPUT:

```
Enter limit number :20
Fibonacci sequence < 20 :
[0, 1, 1, 2, 3, 5, 8, 13]
```

Terdapat 8 angka Fibonacci yang lebih kecil dari 20

Jenis Loop

For Loop

Secara umum digunakan untuk menjalankan perintah yang berurutan (*sequential*).

Termasuk dalam kategori *definite iteration*: Jumlah perulangan loop sudah didefinisikan secara eksplisit di awal.

Syntax for loop:

```
for i in interable:
    <statement>
```

Implementasi for Loop

N – Urutan Awal Bilangan **Fibonacci** Menggunakan Loop **FOR**

```
# Program to display the Fibonacci sequence up to n-th term in list

nterms = int(input("How many terms? "))
fibonacci_sequence = []

# first two terms
n1, n2 = 0, 1
count = 0

# check if the number of terms is valid
if nterms <= 0:
  print("Please enter a positive integer")
# if there is only one term, return n1
elif nterms == 1:
  print("Fibonacci sequence upto",nterms,":")
  print(n1)
# generate fibonacci sequence using FOR
else:
  print("Fibonacci sequence:")
  fibonacci_sequence.extend((n1, n2))
  for i in range(2,nterms):
    nth = n1 + n2
    n1 = n2
    n2 = nth
    fibonacci_sequence.append(nth)

print(fibonacci_sequence)
```

OUTPUT:

```
How many terms? 10
Fibonacci sequence:
[0, 1, 1, 2, 3, 5, 8, 13, 21, 34]
```

10 urutan awal bilangan Fibonacci dengan pengulangan FOR

Implementasi for Loop

N – Urutan Awal Bilangan **Fibonacci Ganjil** dan **Genap** Menggunakan Loop **FOR**

```
# Program to display the Fibonacci sequence up to n-th term
# Divided by ODD & EVEN number list

nterms = int(input("How many terms? "))
odd_list = []
even_list = []

# first two terms
n1, n2 = 0, 1
count = 0

# check if the number of terms is valid
if nterms <= 0:
  print("Please enter a positive integer")
# if there is only one term, return n1
elif nterms == 1:
  print("Fibonacci sequence upto",nterms,":")
  print(n1)
# generate fibonacci sequence using FOR
else:
  even_list.append(n1)
  odd_list.append(n2)
  for i in range(2,nterms):
    nth = n1 + n2
    n1 = n2
    n2 = nth
    if nth % 2 != 0:
      odd_list.append(nth)
    else:
      even_list.append(nth)

print("Odd Fibonacci Number :" ,odd_list)
print("Even Fibonacci Number :" ,even_list)
```

OUTPUT:

```
How many terms? 10
Odd Fibonacci Number : [1, 1, 3, 5, 13, 21]
Even Fibonacci Number : [0, 2, 8, 34]
```

Pada 10 urutan pertama bilangan Fibonacci terdapat:

- Ganjil: 6 angka
- Genap: 4 angka

Control Loop

Break	Menghentikan loop yang sedang berjalan dan melanjutkannya ke baris selanjutnya setelah loop.
Continue	Menolak sisa *statement* pada loop yang sedang dijalankan dan melanjutkannya ke iterasi selanjutnya.
Pass	Digunakan ketika suatu *statement* memerlukan *syntactically* namun tidak menginginkan kode apapun untuk dijalankan.

Implementasi control Loop

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Cek Bilangan Prima

```
# Check Prime Number

number = int(input("Enter any number : "))
if number>1:
  for i in range(2,number):
    if (number%i)==0:
      print(number, "is not prime number.")
      break
  else:
    print(number, "is prime number.")
else:
  print(number, "is not prime number.")
```

OUTPUT:

```
Enter any number : 7
7 is prime number.
```

```
Enter any number : 8
8 is not prime number.
```

Nested Loop

Nested Loop adalah loop didalam Loop.

Syntax nested while loop:

```
while <expression>:
    <statement>
    while <expression>:
    <statement>
```

Syntax nested for loop:

```
for i in iterable:
    <statement>
    for j in iterable_2:
        <statement>
```

Implementasi nested Loop

N – Urutan Awal Bilangan **Prima** yang **< Angka Limit**
Menggunakan Loop **FOR**

```
# Program to display the Prime numbers less than limit number in list

nlimit = int(input("Enter limit number: "))
prime_number = []
# Using FOR loop
for num in range(1, nlimit + 1):
  if(num > 1):
    for i in range(2,num):
      if(num % i)==0:
        break
    else:
      prime_number.append(num)

print("Prime number <", nlimit, ":")
print(prime_number)
```

OUTPUT:

```
Enter limit number: 20
Prime number < 20 :
[2, 3, 5, 7, 11, 13, 17, 19]
```

Terdapat 8 angka prima yang kurang dari 20

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Implementasi nested Loop

N – Urutan Awal Bilangan **Prima** yang **< Angka Limit**
Menggunakan Loop **WHILE**

```
# Program to display the Prime numbers less than limit number in list

nlimit = int(input("Enter limit number: "))
prime_number = []
num = 1
# Using WHILE loop
while(num <= nlimit):
  count = 0
  i = 2
  while(i <= num//2):
    if(num % i == 0):
      count += 1
      break
    i += 1
  if (count == 0 and num!= 1):
    prime_number.append(num)
  num += 1

print("Prime number <", nlimit, ":")
print(prime_number)
```

OUTPUT:

```
Enter limit number: 20
Prime number < 20 :
[2, 3, 5, 7, 11, 13, 17, 19]
```

Terdapat 8 angka prima yang kurang dari 20

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Implementasi nested Loop

N – Urutan Awal Bilangan **Prima** Menggunakan Loop **WHILE**

```
# Program to display the Prime numbers up to n-th term

nterms = int(input("How many terms? "))
prime_number = []
num = 1
count_prime = 1
# Using WHILE loop
while(count_prime <= nterms):
    count = 0
    i = 2
    while(i <= num//2):
        if(num % i == 0):
            count += 1
            break
        i += 1
    if (count == 0 and num!= 1):
        prime_number.append(num)
        count_prime += 1
    num += 1

print("Prime number :")
print(prime_number)
```

OUTPUT:

```
How many terms? 10
Prime number :
[2, 3, 5, 7, 11, 13, 17, 19, 23, 29]
```

10 urutan awal bilangan Prima
dengan pengulangan While

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Implementasi nested Loop

N – Urutan Awal Bilangan **Prima** Menggunakan Loop **WHILE**

```
# Program to display the Prime & Fibonacci numbers up to n-th term

nterms = int(input("How many terms? "))
fibonacci_prime = []
n1, n2 = 0, 1
# Using WHILE loop
while(n1 <= nterms):
    count = 0
    i = 2
    while(i <= n1//2):
        if(n1 % i == 0):
            count += 1
            break
        i += 1
    if (count == 0 and n1!= 1 and n1!=0):
        fibonacci_prime.append(n1)
    fibonacci = n1 + n2
    n1 = n2
    n2 = fibonacci

print("Fibonacci Prime Number :", len(fibonacci_prime))
print(fibonacci_prime)
```

OUTPUT:

```
How many terms? 500
Fibonacci Prime Number : 6
[2, 3, 5, 13, 89, 233]
```

Dari 500 urutan awal bilangan Fibonacci, terdapat 6 angka Prima

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05 Array and Other Data-types

Array

Termasuk dalam non-primitive data- type, merupakan variable yang di-*assigned* by user.

Built-in array dalam Python:

- [list]
- (tuple)
- {Dictionary}

Characteristic:

- Dapat berisi multiple data-types.
- Kumpulan data dinomorkan / *indexed* mulai dari 0.
- Index tertinggi adalah total elements dikurangi 1.
  (Total Element = (n(max)-1))

Data Type

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Primitives	Non-Primitives
Integer	Array
Float	List
String	Tuples
Boolean	Dictionary

Non-Primitives Data-types

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List

Represented by []

- ✓ Ordered : menjaga urutan sesuai dengan saat input data
- ✓ Mutable : dapat diubah dan dimodifikasi itemnya
- ✓ Heterogenous : data dapat mengandung segala jenis data-types
- ✓ Contain Duplicate : mengizinkan data serupa/duplikat

```
[ ]  List = [11, 27.02, 'Omicron', ['Anugrah', 'Edo', 'Fajar', 'Fikri'] ]
```

List[0] List[1] List[2] List[3]

Non-Primitives Data-types

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Dictionary

Represented by {}

- ✓ Unordered : items yg disimpan dalam dictionary tidak memiliki nilai index
- ✓ Mutable : dapat diubah dan dimodifikasi key/itemnya
- ✓ Unique : Key harus unique tidak boleh serupa/duplikat

```
Dict = {1: 'Anugrah',
        2: 'Edo',
        3: 'Fajar',
        4: 'Fikri'}
```

Dict{1}

Dict{2}

Dict{3}

Dict{4}

Implementasi Dictionary

Kebiasaan/History Transaksi Pelanggan menggunakan **Dictionary**

```
behaviour_user_transaction = [{
    'name': 'Anugrah',
    'platfrom': 'Web',
    'transaction': [{
        'product_name': 'Laptop',
        'product_price': 10000000,
        'product_qty': 2,
        'product_category': 'Electronics'
      },
      {
        'product_name': 'Handphone',
        'product_price': 2000000,
        'product_qty': 4,
        'product_category': 'Electronics'
      }]
},
{
    'name': 'Omicron',
    'platfrom': 'Mobile',
    'transaction': [{
        'product_name': 'PC',
        'product_price': 30000000,
        'product_qty': 1,
        'product_category': 'Electronics'
      },
      {
        'product_name': 'Tablet',
        'product_price': 5000000,
        'product_qty': 3,
        'product_category': 'Electronics'
      }]
}]
```

```
behaviour_user_transaction[0]['transaction']
```

OUTPUT:

```
[{'product_category': 'Electronics',
  'product_name': 'Laptop',
  'product_price': 10000000,
  'product_qty': 2},
 {'product_category': 'Electronics',
  'product_name': 'Handphone',
  'product_price': 2000000,
  'product_qty': 4}]
```

Output transaksi dari indeks list ke-0 (dengan nama user Anugrah)

Non-Primitives Data-types

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Tuple

Represented by ()

- ✓ Ordered : menjaga urutan sesuai dengan saat input data
- ✓ Unchangeable : tidak dapat diubah dan dimodifikasi itemnya
- ✓ Heterogenous : data dapat mengandung segala jenis data-types
- ✓ Contain Duplicate : mengizinkan data serupa/duplikat

```
Tup = (11, 27.02, 'Omicron')
```

Tup(0) Tup(1) Tup(2)

Non-Primitives Data-types

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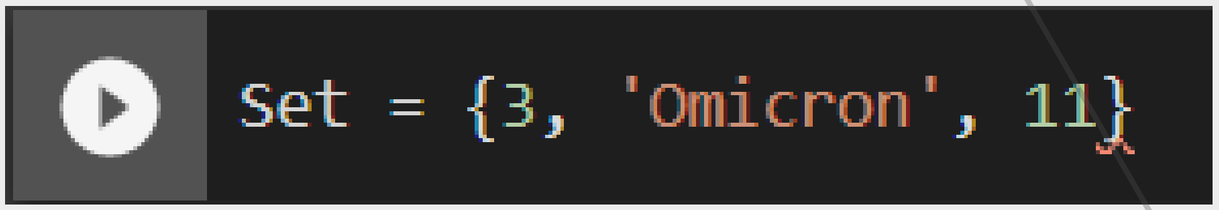
Set

Represented by ()

- ✓ Unordered : tidak menjaga urutan sesuai dengan saat input data
- ✓ Unchangeable : tidak dapat diubah dan dimodifikasi itemnya
- ✓ Heterogenous : data dapat mengandung segala jenis data-types
- ✓ Unique : tidak mengizinkan data serupa/duplikat



Penggunaan Pandas

Penggunaan **Pandas** dalam pembuatan Tabel Data Transaksi

```
import pandas as pd

data = [
        ['Laptop', 2, 10000000],
        ['Handphone', 4, 2000000],
        ['PC', 1, 30000000],
        ['Tablet', 3, 5000000]
       ]
df = pd.DataFrame(data)
df.columns = ['Product Name', 'Quantity', 'Price']
print(df)
```

OUTPUT:

```
  Product Name  Quantity     Price
0       Laptop         2  10000000
1    Handphone         4   2000000
2           PC         1  30000000
3       Tablet         3   5000000
```

TERIMA KASIH !

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