

1. 9. PYTHON : DASAR PEMROGRAMAN

1.1 Dasar Python

1) Interactive shell

```
>>> 2 + 2
4
```

2) Operator matematika

Table 1-1: Math Operators from Highest to Lowest Precedence

| Operator | Operation | Example | Evaluates to... |
|----------|-----------------------------------|---------|-----------------|
| ** | Exponent | 2 ** 3 | 8 |
| % | Modulus/remainder | 22 % 8 | 6 |
| // | Integer division/floored quotient | 22 // 8 | 2 |
| / | Division | 22 / 8 | 2.75 |
| * | Multiplication | 3 * 5 | 15 |
| - | Subtraction | 5 - 2 | 3 |
| + | Addition | 2 + 2 | 4 |

3) Data types

Table 1-2: Common Data Types

| Data type | Examples |
|------------------------|---|
| Integers | -2, -1, 0, 1, 2, 3, 4, 5 |
| Floating-point numbers | -1.25, -1.0, --0.5, 0.0, 0.5, 1.0, 1.25 |
| Strings | 'a', 'aa', 'aaa', 'Hello!', '11 cats' |

4) Penggabungan dan manipulasi string

```
>>> 'Alice' + 'Bob'
'AliceBob'

>>> 'Alice' * 5
'AliceAliceAliceAliceAlice'
```

5) Menyimpan nilai kedalam variabel

```
❶ >>> spam = 40
    >>> spam
    40
    >>> eggs = 2
❷ >>> spam + eggs
    42
    >>> spam + eggs + spam
    82
❸ >>> spam = spam + 2
    >>> spam
    42

    >>> spam = 'Hello'
    >>> spam
    'Hello'
    >>> spam = 'Goodbye'
    >>> spam
    'Goodbye'
```

6) Program ke-1

```
❶ # This program says hello and asks for my name.

❷ print('Hello world!')
  print('What is your name?')    # ask for their name
❸ myName = input()
❹ print('It is good to meet you, ' + myName)
❺ print('The length of your name is:')
  print(len(myName))

❻ print('What is your age?')    # ask for their age
  myAge = input()
  print('You will be ' + str(int(myAge) + 1) + ' in a year.')
```

```
>>> str(0)
'0'
>>> str(-3.14)
'-3.14'
>>> int('42')
42
>>> int('-99')
-99
>>> int(1.25)
1
>>> int(1.99)
1
>>> float('3.14')
3.14
>>> float(10)
10.0
```

Contoh logic

```
>>> 42 == '42'
False
>>> 42 == 42.0
True
>>> 42.0 == 0042.000
True
```

1.2 Flow Control

1) Operator pembandingan

| Operator | Meaning |
|----------|--------------------------|
| == | Equal to |
| != | Not equal to |
| < | Less than |
| > | Greater than |
| <= | Less than or equal to |
| >= | Greater than or equal to |

```
>>> 42 == 42
True
>>> 42 == 99
False
>>> 2 != 3
True
>>> 2 != 2
False
```

```
>>> 'hello' == 'hello'
True
>>> 'hello' == 'Hello'
False
>>> 'dog' != 'cat'
True
>>> True == True
True
>>> True != False
True
>>> 42 == 42.0
True
>>> 42 == '42'
False
```

```
>>> 42 < 100
True
>>> 42 > 100
False
>>> 42 < 42
False
>>> eggCount = 42
>>> eggCount <= 42
True
>>> myAge = 29
>>> myAge >= 10
True
```

2) Operator Boolean

| Expression | Evaluates to... | | Expression | Evaluates to |
|-----------------|-----------------|-----------------------------|------------|--------------|
| True and True | True | >>> False or True True | not True | False |
| True and False | False | >>> False or False False | not False | True |
| False and True | False | >>> True and True True | | |
| False and False | False | >>> True and False False | | |


```

>>> (4 < 5) and (5 < 6)
True
>>> (4 < 5) and (9 < 6)
False
>>> (1 == 2) or (2 == 2)
True
  
```



```

>>> 2 + 2 == 4 and not 2 + 2 == 5 and 2 * 2 == 2 + 2
True
  
```

3) If, elif, else flow control

```

if name == 'Mary':
    print('Hello Mary')
if password == 'swordfish':
    print('Access granted.')
else:
    print('Wrong password.')
  
```



```

if name == 'Alice':
    print('Hi, Alice.')
elif age < 12:
    print('You are not Alice, kiddo.')
  
```



```

if name == 'Alice':
    print('Hi, Alice.')
elif age < 12:
    print('You are not Alice, kiddo.')
elif age > 2000:
    print('Unlike you, Alice is not an undead, immortal vampire.')
elif age > 100:
    print('You are not Alice, grannie.')
  
```

4) While loop control

```

spam = 0
while spam < 5:
    print('Hello, world.')
    spam = spam + 1
  
```

Break statement pada loop

```

while True:
    print('Please type your name.')
    name = input()
    if name == 'your name':
        break
print('Thank you!')
  
```

Nilai Truthy dan Falsey (false = '', 0, 0.0)

```

name = ''
while not name:❶
    print('Enter your name:')
    name = input()
print('How many guests will you have?')
numOfGuests = int(input())
if numOfGuests:❷
    print('Be sure to have enough room for all your guests.')❸
print('Done')
  
```

```

name = ''
while name != 'your name':
    print('Please type your name.')
    name = input()
print('Thank you!')
  
```

Continue statement pada loop

```

while True:
    print('Who are you?')
    name = input()
    if name != 'Joe':
        continue
    print('Hello, Joe. What is the password? (It is a fish.)')
    password = input()
    if password == 'swordfish':
        break
print('Access granted.')
  
```

5) For loop control dan fungsi range()

| | | | |
|--|---|--|--|
| <pre>print('My name is') for i in range(5): print('Jimmy Five Times (' + str(i) + ')')</pre> | | | <pre>total = 0 for num in range(101): total = total + num print(total)</pre> |
| <pre>for i in range(12, 16): print(i)</pre> | <pre>for i in range(0, 10, 2): print(i)</pre> | <pre>for i in range(5, -1, -1): print(i)</pre> | |

6) Import modul

```
import random
for i in range(5):
    print(random.randint(1, 10))
```

7) Mengakhiri program lebih awal dengan sys.exit()

```
import sys

while True:
    print('Type exit to exit.')
    response = input()
    if response == 'exit':
        sys.exit()
    print('You typed ' + response + '.')
```

1.3 List

1) Membuat list

| | |
|--|---|
| <pre>>>> spam = ['cat', 'bat', 'rat', 'elephant'] >>> spam ['cat', 'bat', 'rat', 'elephant']</pre> | <pre>>>> 'Hello ' + spam[0] 'Hello cat'</pre> |
| <pre>>>> spam = [['cat', 'bat'], [10, 20, 30, 40, 50]] >>> spam[0] ['cat', 'bat'] >>> spam[0][1] 'bat' >>> spam[1][4] 50</pre> | <pre>>>> spam = ['cat', 'bat', 'rat', 'elephant'] >>> spam[-1] 'elephant' >>> spam[-3] 'bat' >>> 'The ' + spam[-1] + ' is afraid of the ' + spam[-3] + '.' 'The elephant is afraid of the bat.'</pre> |

2) Mendapatkan sublist dengan slice

| | | |
|---|--|---|
| <pre>>>> spam = ['cat', 'bat', 'rat', 'elephant'] >>> spam[0:4] ['cat', 'bat', 'rat', 'elephant'] >>> spam[1:3] ['bat', 'rat'] >>> spam[0:-1] ['cat', 'bat', 'rat']</pre> | <pre>>>> spam[:2] ['cat', 'bat'] >>> spam[1:] ['bat', 'rat', 'elephant']</pre> | <pre>>>> spam[:] ['cat', 'bat', 'rat', 'elephant']</pre> |
|---|--|---|

3) Mendapatkan panjang list

```
>>> spam = ['cat', 'dog', 'moose']
>>> len(spam)
3
```

4) Merubah isi list menggunakan index

```
>>> spam = ['cat', 'bat', 'rat', 'elephant']
>>> spam[1] = 'aardvark'
>>> spam
['cat', 'aardvark', 'rat', 'elephant']
>>> spam[2] = spam[1]
>>> spam
['cat', 'aardvark', 'aardvark', 'elephant']
>>> spam[-1] = 12345
>>> spam
['cat', 'aardvark', 'aardvark', 12345]
```

5) Menggabungkan dan menambah isi list

```
>>> [1, 2, 3] + ['A', 'B', 'C']
[1, 2, 3, 'A', 'B', 'C']
>>> ['X', 'Y', 'Z'] * 3
['X', 'Y', 'Z', 'X', 'Y', 'Z', 'X', 'Y', 'Z']
>>> spam = [1, 2, 3]
>>> spam = spam + ['A', 'B', 'C']
>>> spam
[1, 2, 3, 'A', 'B', 'C']
```

```
>>> eggs = [1, 2, 3]
>>> del eggs[2]
>>> del eggs[1]
>>> del eggs[0]
>>> eggs.append(4)
>>> eggs.append(5)
>>> eggs.append(6)
>>> eggs
[4, 5, 6]
```

6) Menghapus isi list

```
>>> spam = ['cat', 'bat', 'rat', 'elephant']
>>> del spam[2]
>>> spam
['cat', 'bat', 'elephant']
>>> del spam[2]
>>> spam
['cat', 'bat']
```

7) Multiple assignment

```
>>> cat = ['fat', 'black', 'loud']
>>> size, color, disposition = cat
```

1.4 Tuple

1) Tuple bersifat immutable (isi array tidak dapat diganti)

```
>>> eggs = ('hello', 42, 0.5)
>>> eggs[0]
'hello'
>>> eggs[1:3]
(42, 0.5)
>>> len(eggs)
3
>>> type(('hello',))
<class 'tuple'>
>>> type('hello')
<class 'str'>
```

2) Konversi list ke tuple dan sebaliknya

```
>>> tuple(['cat', 'dog', 5])
('cat', 'dog', 5)
>>> list(('cat', 'dog', 5))
['cat', 'dog', 5]
>>> list('hello')
['h', 'e', 'l', 'l', 'o']
```


1.5 Dictionary

1) Membuat dictionary (key, value)

```
>>> spam = {12345: 'Luggage Combination', 42: 'The Answer'}

>>> eggs = {'name': 'Zophie', 'species': 'cat', 'age': '8'}
>>> ham = {'species': 'cat', 'age': '8', 'name': 'Zophie'}
>>> eggs == ham
True
```

```
birthdays = {'Alice': 'Apr 1', 'Bob': 'Dec 12', 'Carol': 'Mar 4'}

while True:
    print('Enter a name: (blank to quit)')
    name = input()
    if name == '':
        break

    if name in birthdays:
        print(birthdays[name] + ' is the birthday of ' + name)
    else:
        print('I do not have birthday information for ' + name)
        print('What is their birthday?')
        bday = input()
        birthdays[name] = bday
        print('Birthday database updated.')
```

2) Metode keys(), items() dan values() pada dictionary

| | | |
|---|---|--|
| <pre>>>> spam = {'color': 'red', 'age': 42} >>> for v in spam.values(): >>> print(v)</pre> | <pre>>>> for k in spam.keys(): >>> print(k)</pre> | <pre>>>> for i in spam.items(): >>> print(i)</pre> |
| <pre>red 42</pre> | <pre>color age</pre> | <pre>('color', 'red') ('age', 42)</pre> |

3) Multiple assignment dari directory

```
>>> spam = {'color': 'red', 'age': 42}
>>> for k, v in spam.items():
>>>     print('Key: ' + k + ' Value: ' + str(v))
```