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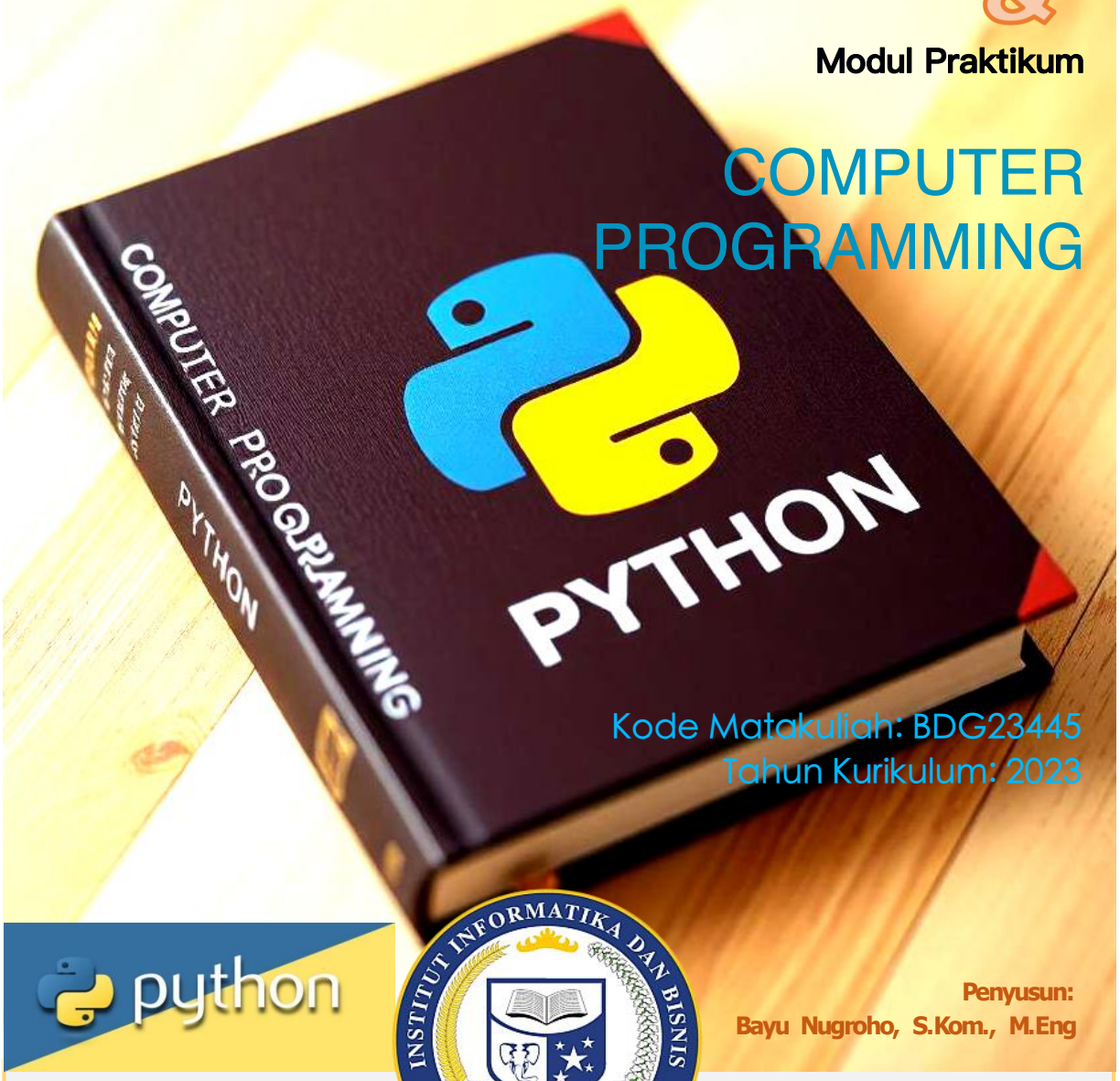
Modul Praktikum

COMPUTER PROGRAMMING



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Penyusun:
Bayu Nugroho, S.Kom., M.Eng

Program Studi

Bisnis Digital
Institut Informatika & Bisnis Darmajaya

FAKULTAS EKONOMI & BISNIS

INSTITUT INFORMATIKA DAN BISNIS DARMAJAYA

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Modul 5

Struktur kontrol percabangan dalam Python

1. Struktur percabangan: if, elif, else & Penerapan dan Contoh dalam alur program

Python Conditions and If statements

Python supports the usual logical conditions from mathematics:

- 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

These conditions can be used in several ways, most commonly in "if statements" and loops.

An "if statement" is written by using the if keyword.

Example

If statement:

```
a = 33
b = 200
if b > a:
  print("b is greater than a")
```

In this example we use two variables, a and b, which are used as part of the if statement to test whether b is greater than a. As a is 33, and b is 200, we know that 200 is greater than 33, and so we print to screen that "b is greater than a".

Indentation

Python relies on indentation (whitespace at the beginning of a line) to define scope in the code. Other programming languages often use curly-brackets for this purpose.

Example

If statement, without indentation (will raise an error):

```
a = 33
b = 200
if b > a:
print("b is greater than a") # you will get an error
```

Elif

The elif keyword is Python's way of saying "if the previous conditions were not true, then try this condition".

Example

```
a = 33
b = 33
if b > a:
  print("b is greater than a")
elif a == b:
  print("a and b are equal")
```

In this example a is equal to b, so the first condition is not true, but the elif condition is true, so we print to screen that "a and b are equal".

Else

The else keyword catches anything which isn't caught by the preceding conditions.

Example

```
a = 200
b = 33
if b > a:
  print("b is greater than a")
elif a == b:
  print("a and b are equal")
else:
  print("a is greater than b")
```

In this example a is greater than b, so the first condition is not true, also the elif condition is not true, so we go to the else condition and print to screen that "a is greater than b".
You can also have an else without the elif:

Example

```
a = 200
b = 33
if b > a:
  print("b is greater than a")
else:
  print("b is not greater than a")
```

Short Hand If

If you have only one statement to execute, you can put it on the same line as the if statement.

Example

One line if statement:

```
if a > b: print("a is greater than b")
```

Short Hand If ... Else

If you have only one statement to execute, one for if, and one for else, you can put it all on the same line:

Example

One line if else statement:

```
a = 2
b = 330
print("A") if a > b else print("B")
```

This technique is known as Ternary Operators, or Conditional Expressions.

You can also have multiple else statements on the same line:

Example

One line if else statement, with 3 conditions:

```
a = 330
b = 330
print("A") if a > b else print("=") if a == b else print("B")
```

And

The and keyword is a logical operator, and is used to combine conditional statements:

Example

Test if a is greater than b, AND if c is greater than a:

```
a = 200
b = 33
c = 500
if a > b and c > a:
  print("Both conditions are True")
```

Or

The or keyword is a logical operator, and is used to combine conditional statements:

Example

Test if a is greater than b, OR if a is greater than c:

```
a = 200
b = 33
c = 500
if a > b or a > c:
  print("At least one of the conditions is True")
```

Not

The not keyword is a logical operator, and is used to reverse the result of the conditional statement:

Example

Test if a is NOT greater than b:

```
a = 33
b = 200
```

```
if not a > b:
  print("a is NOT greater than b")
```

Nested If

You can have if statements inside if statements, this is called nested if statements.

Example

```
x = 41

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

The pass Statement

if statements cannot be empty, but if you for some reason have an if statement with no content, put in the pass statement to avoid getting an error.

Example

```
a = 33
b = 200

if b > a:
  pass
```

2. The Python Match Statement

Instead of writing many if..else statements, you can use the match statement.

The match statement selects one of many code blocks to be executed.

Syntax

```
match expression:
  case x:
    code block
```

```
  case y:
    code block
  case z:
    code block
```

This is how it works:

- The match expression is evaluated once.
- The value of the expression is compared with the values of each case.
- If there is a match, the associated block of code is executed.

The example below uses the weekday number to print the weekday name:

Example

```
day = 4
match day:
  case 1:
    print("Monday")
  case 2:
    print("Tuesday")
  case 3:
    print("Wednesday")
  case 4:
    print("Thursday")
  case 5:
    print("Friday")
  case 6:
    print("Saturday")
  case 7:
    print("Sunday")
```

Default Value

Use the underscore character _ as the last case value if you want a code block to execute when there are not other matches:

Example

```
day = 4
match day:
  case 6:
    print("Today is Saturday")
  case 7:
    print("Today is Sunday")
  case _:
    print("Looking forward to the Weekend")
```

The value _ will always match, so it is important to place it as the last case to make it beahave as a default case.

Combine Values

Use the pipe character | as an or operator in the case evaluation to check for more than one value match in one case:

Example

```
day = 4
match day:
  case 1 | 2 | 3 | 4 | 5:
    print("Today is a weekday")
  case 6 | 7:
    print("I love weekends!")
```

If Statements as Guards

You can add if statements in the case evaluation as an extra condition-check:

Example

```
month = 5
day = 4
match day:
  case 1 | 2 | 3 | 4 | 5 if month == 4:
```

```
    print("A weekday in April")
  case 1 | 2 | 3 | 4 | 5 if month == 5:
    print("A weekday in May")
  case _:
    print("No match")
```