



Topic 1:

Introduction to Programming and Computer System

CSGE601020 - Dasar-Dasar Pemrograman 1

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Acknowledgement

This slide is an adapted version of 'Introduction to Programming' slides used in DDP1 Course (2020/2021) by **Hafizh Rafizal Adnan, M.Kom.**

Several materials are reused from 'Komputer dan Programming' slides used in Dasar-Dasar Pemrograman 1 dengan Python (CSGE601020/4 SKS) Course (<https://ocw.ui.ac.id/course/view.php?id=142>) by **Fariz Darari, Ph.D.**

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In this session, you will learn ...

Computer: Definition and Architecture

An Overview of Programming

Computational Thinking

How Python works: Syntax and some simple examples



Triggering Question 1

What is a computer?



What is a computer?

Komputer adalah **mesin** yang dapat:

- **Menyimpan data** dalam bentuk angka, teks, gambar, & video
- **Berinteraksi** dengan perangkat seperti layar monitor, speaker, dan printer
- **Mengeksekusi program**, misalnya program ramalan ~~asmara~~-cuaca, game, web browser, serta Integrated Development Environment (IDE)



Two men operating a **mainframe** computer, circa 1960.

Memory

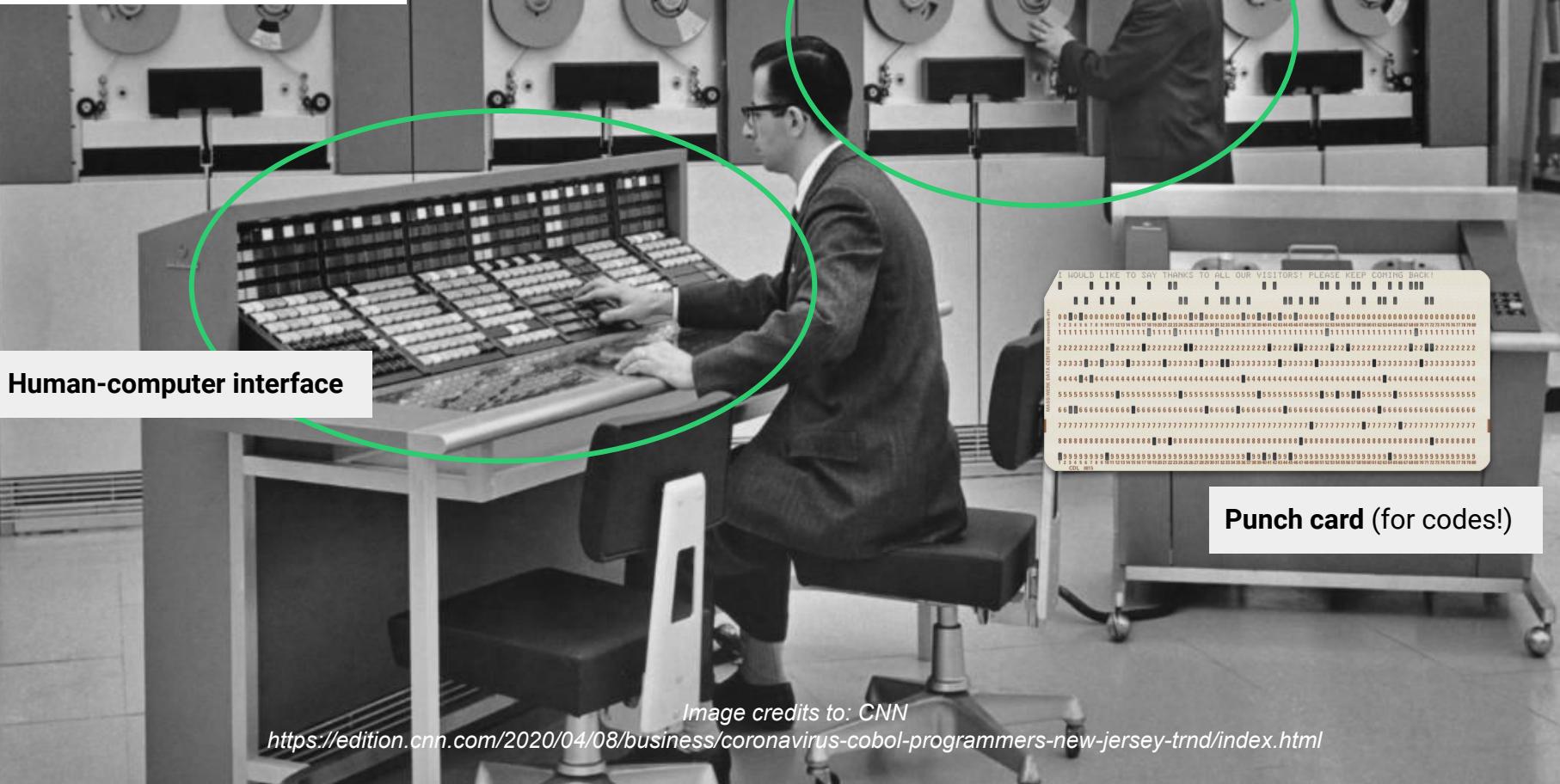


Image credits to: CNN

<https://edition.cnn.com/2020/04/08/business/coronavirus-cobol-programmers-new-jersey-trnd/index.html>

Coding in 1960s

Punched card from a Fortran program:

```
Z(1) = Y + W(1)
```

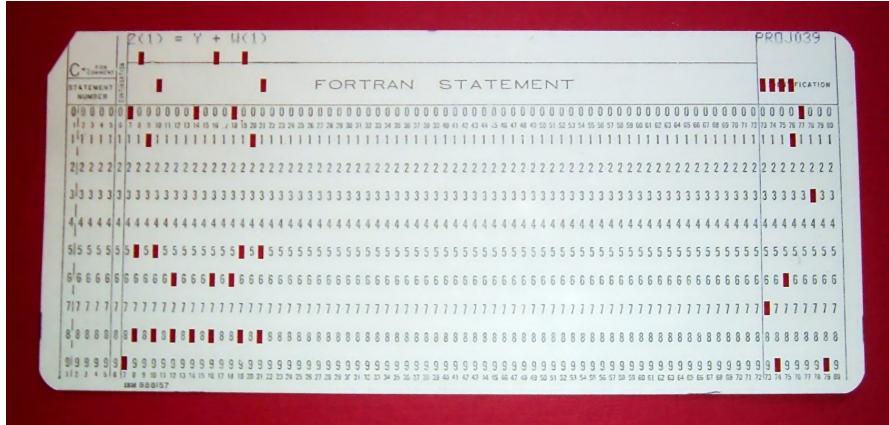
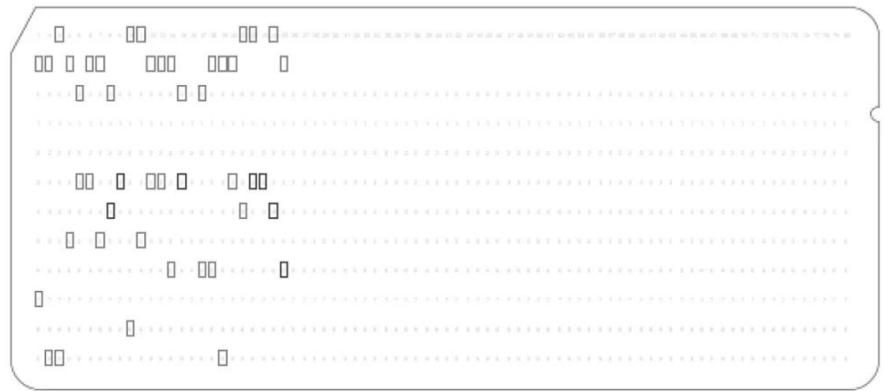


Image credits to: Arnold Reinhold

Punched card from a Fortran program:

```
println("Hello,world.");
```



*Image credits to:
<https://www.jeffreythompson.org/blog/2015/02/20/punch-card-encoding/>*



Kids react to an OLD PC (personal computer) from 1970s
<https://www.youtube.com/watch?v=PF7EpEnglk>

The original Tetris game running on
Диалоговый вычислительный комплекс (DVK-2) personal computer
<https://www.youtube.com/watch?v=O0gAgQOHFcQ>

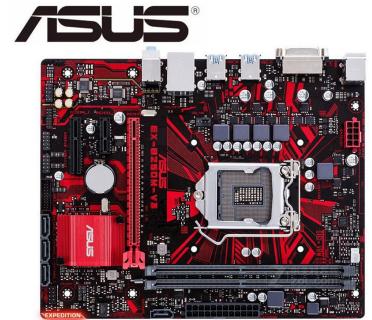
```

J22+2
JPRINT
]
J
JPRINT 2+2
4
JPRINT DISK
0
J

30
?SYNTAX ERROR
]
]
JGOOGLE
?SYNTAX ERROR
]
```

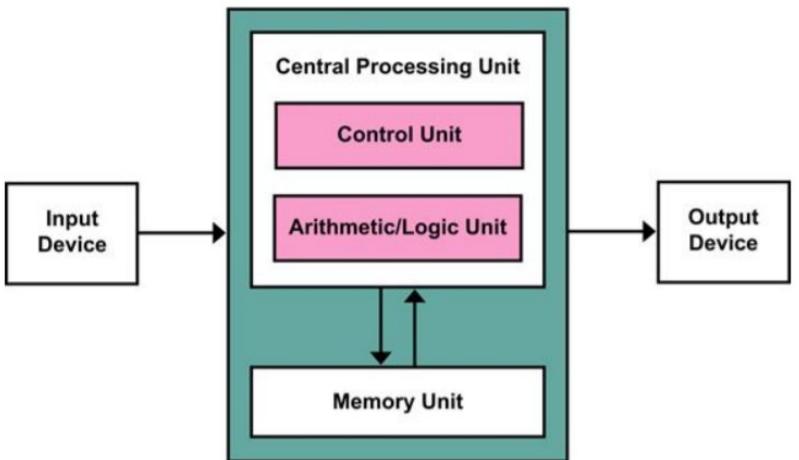


Hardware vs Software



Computer Architecture

(Von Neumann, 1945)



What is computer science?

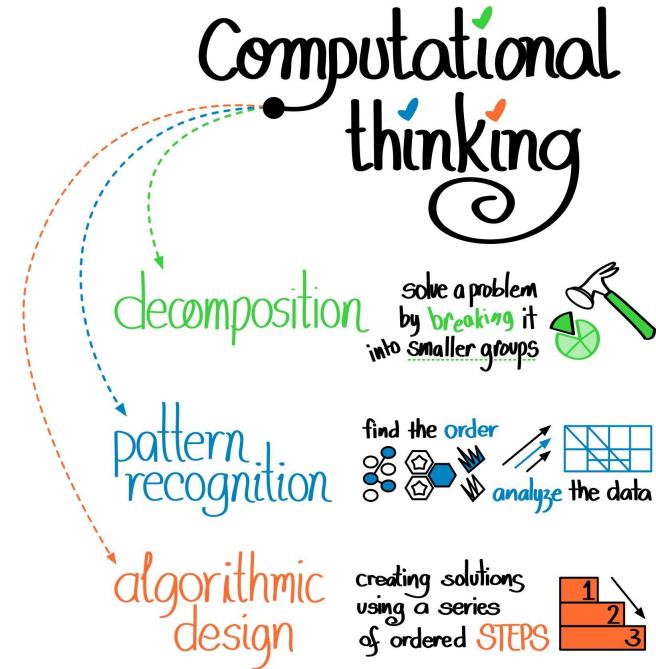
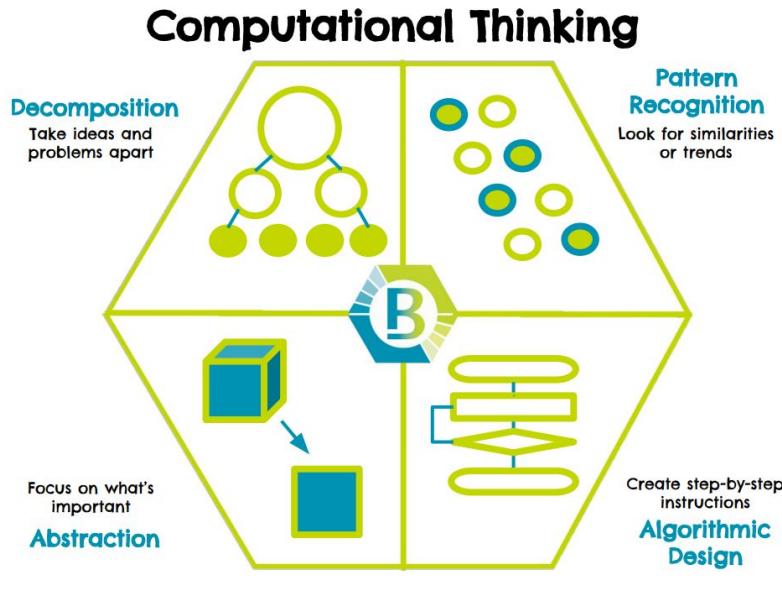
Computer Science is the **study of computers and computational systems**.

Unlike electrical and computer engineers, computer scientists **deal mostly with software and software systems**; this includes their theory, design, development, and application.



Image credits to: kuliahdimana.id, testingtime.com, Habibie et al. (2016)

Computational Thinking



What is a program?

Program adalah **kumpulan instruksi** yang diberikan pada komputer untuk mengerjakan sesuatu (**problem solving**, eksekusi aksi)

Program terbentuk dari kumpulan instruksi-instruksi sederhana pada komputer:

- Taruh titik biru pada lokasi tertentu di layar monitor
- Kirim huruf B ke printer
- Dapatkan nilai dari suatu lokasi pada RAM
- Tambahkan dua angka
- Jika nilai X kurang dari 0, stop programnya
- Ulangi suatu instruksi satu juta kali

An example:

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

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

What is programming?

Computer programming is a way of giving computers **instructions** about what they should do next.

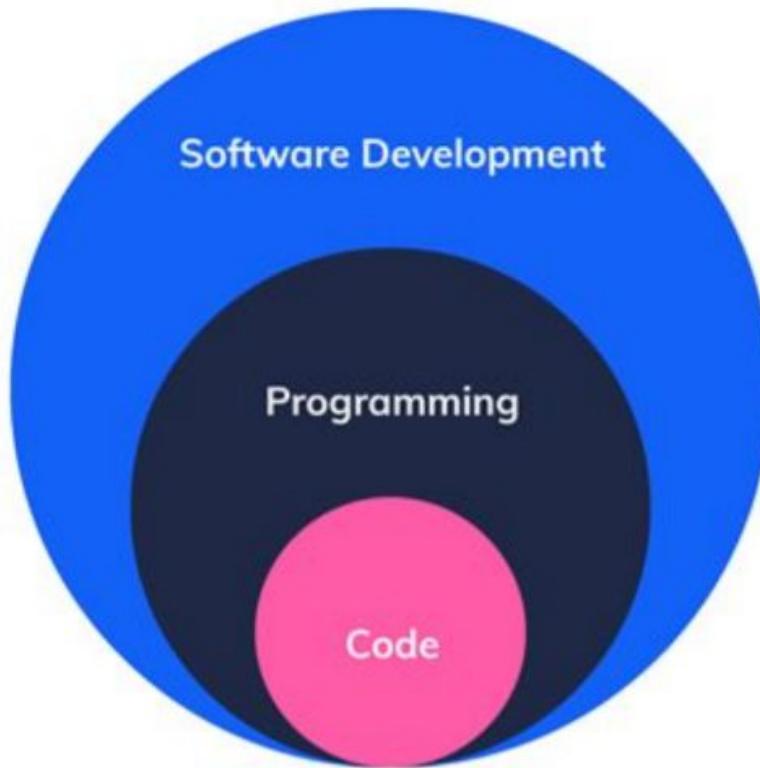
These instructions are known as **code**, and computer programmers write code to solve problems or perform a task.

An example:

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

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

Code, Programming, and Software Development

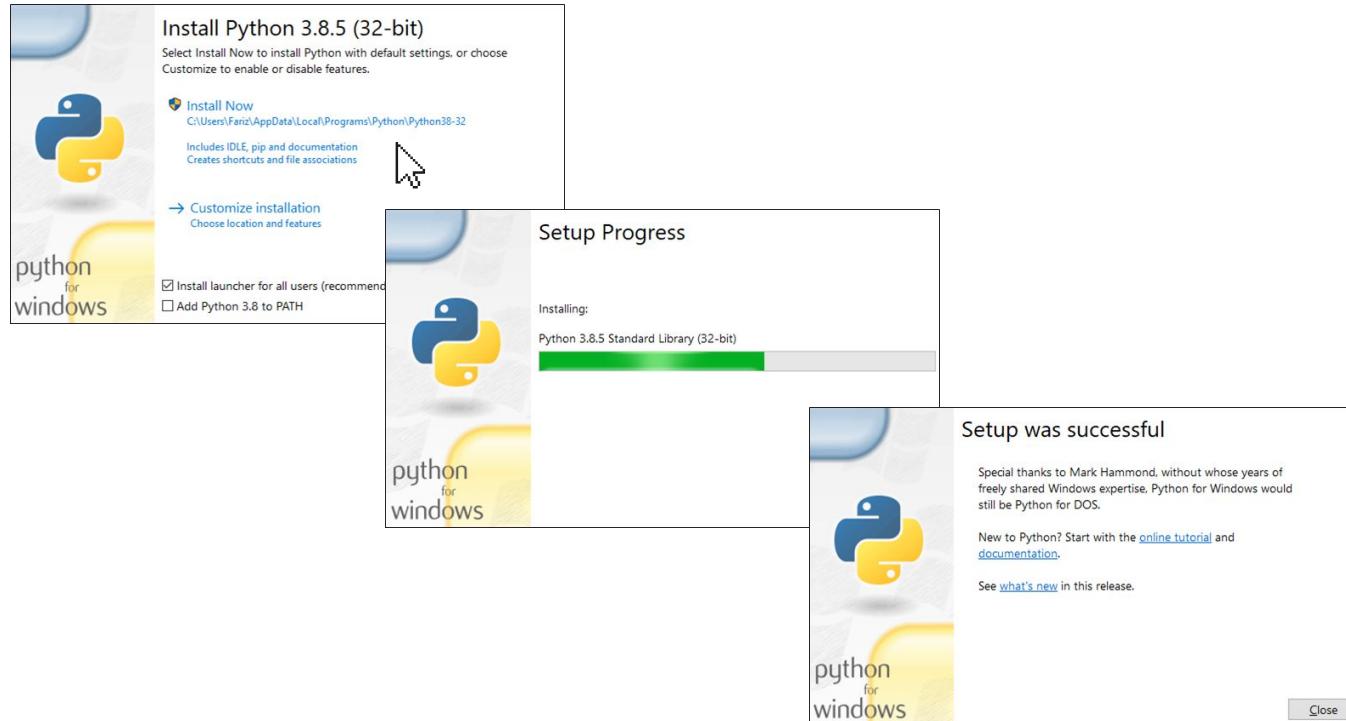


My First Code (1): Installing Python



<https://www.python.org/downloads/>

My First Code (2): Installing Python



My First Code (3): Halo Dunia



My First Code (4): Halo Dunia



Triggering Question 2

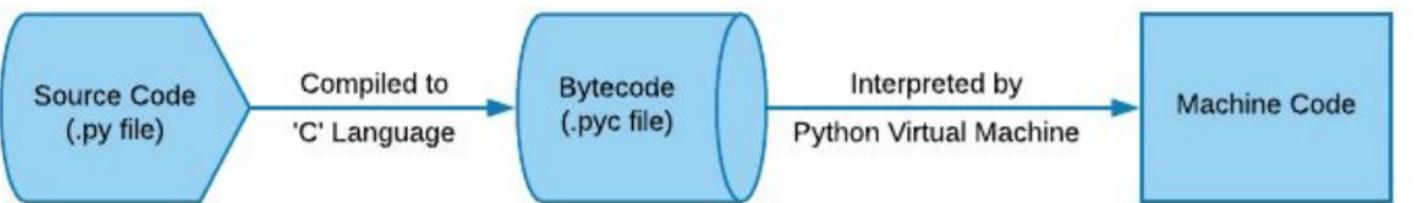
**Write a Python program that prints
“Kuy kita ngoding” and a random sentence of
your choice, each in two separate lines**

Try it using IDLE and share your experience to your friends



How Python Works (1)

```
#include <stdio.h>
int main() {
    printf("Hello, World!");
    return 0;
}
```



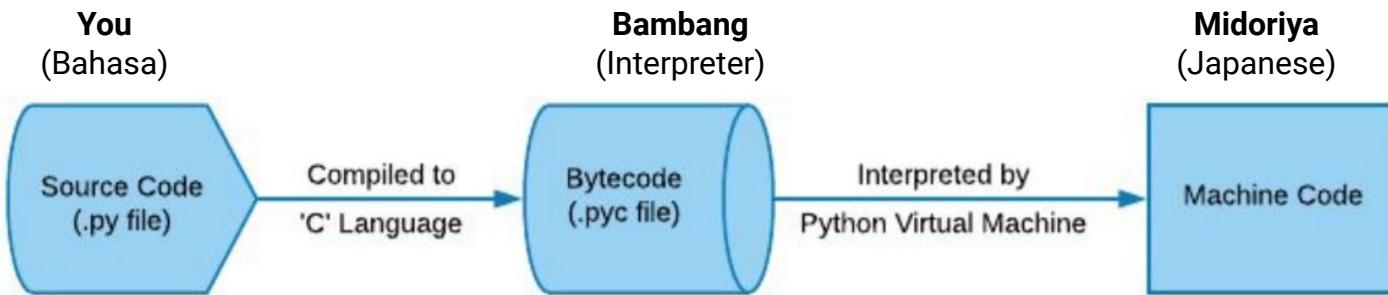
```
# This program says hello
print('Hello, world!')
```



```
1100 0011 1110 1111
0000 0101 0110 0111
...
...
```

Note: This is only an illustration

How Python Works (2)



A Very Basic Python Syntax

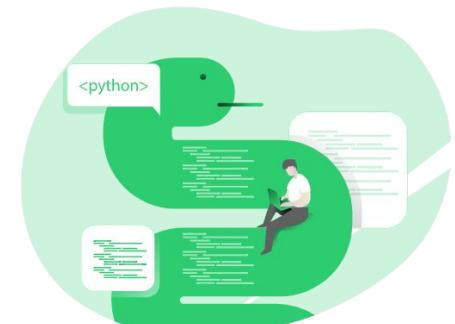
Sintaks/Syntax = format, tata cara, dan struktur untuk menulis program

```
# This is a syntax to make comment  
  
input() # to ask user input in the console  
  
print() # to show something in the console  
  
variable_name = "Value" #to assign a variable we will learn it further
```



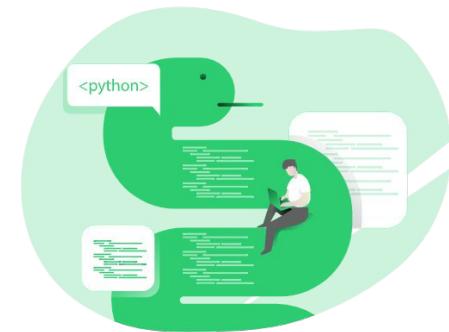
Arithmetic Operator

```
# This is a syntax to make comment  
  
a + b # Penjumlahan  
  
a - b # Pengurangan  
  
a / b # Pembagian  
  
a // b # Pembagian (Pembulatan ke bawah)  
  
a * b # Perkalian  
  
a ** b # Perpangkatan (A pangkat B)  
  
a % b # Modulo
```



Comparison Operator

```
# This is a syntax to make comment  
  
== # Sama dengan, return true/false  
  
!= # Tidak sama dengan, return true/false  
  
<> # Tidak sama dengan, return true/false  
  
> # Lebih dari, return true/false  
  
< # Kurang dari, return true/false  
  
>= # Lebih dari sama dengan, return true/false  
  
<= # Kurang dari sama dengan
```



Assignment Operator

Operator	Description	Example
=	Assigns values from right side operands to left side operand	$c = a + b$ assigns value of $a + b$ into c
+= Add AND	It adds right operand to the left operand and assign the result to left operand	$c += a$ is equivalent to $c = c + a$
-= Subtract AND	It subtracts right operand from the left operand and assign the result to left operand	$c -= a$ is equivalent to $c = c - a$
*= Multiply AND	It multiplies right operand with the left operand and assign the result to left operand	$c *= a$ is equivalent to $c = c * a$
/= Divide AND	It divides left operand with the right operand and assign the result to left operand	$c /= a$ is equivalent to $c = c / a$
%= Modulus AND	It takes modulus using two operands and assign the result to left operand	$c %= a$ is equivalent to $c = c \% a$
**= Exponent AND	Performs exponential (power) calculation on operators and assign value to the left operand	$c **= a$ is equivalent to $c = c ** a$
//= Floor Division	It performs floor division on operators and assign value to the left operand	$c //= a$ is equivalent to $c = c // a$



More Syntax

https://www.tutorialspoint.com/python/python_basic_syntax.htm

- This page provides **IMPORTANT INFO** regarding Python Identifiers, Reserved Words, Multi-Line Statements, Quotation in Python, Comments in Python, Using Blank Lines, etc. (**Obligatory reading material!**)

https://www.tutorialspoint.com/python/python_basic_operators.htm

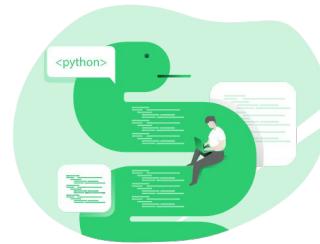
- This page provides **IMPORTANT INFO** regarding Python arithmetic, comparison, assignment, logical, etc. (**Also an obligatory reading material!**)

General Steps in Programming



Desain solusi masalah

Pikirkan alur terlebih dahulu sebelum menulis kode, misalnya dengan flowchart atau pseudocode



Menulis kode program

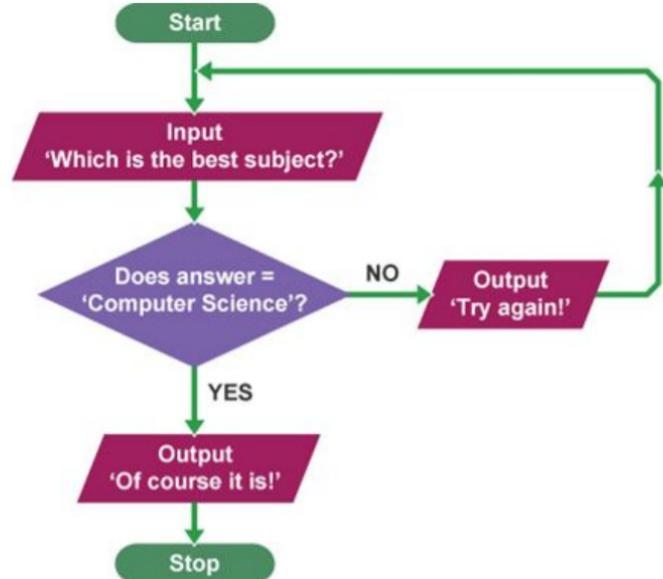
Menulis solusi yang dirancang dengan sintaks bahasa pemrograman tertentu



Debugging

Memeriksa dan memperbaiki error yang muncul

Designing Solution: Flowchart



Designing Solution: Pseudocode (1)



Yaki Udon Ayam Saus Gochujang

Takumi-kun
@cook_28485572
© Yokohama



Bahan-bahan

2 - 3 porsi

2 bungkus mie udon

2-3 sendok makan minyak wijen

1 sendok makan minyak goreng

2 siung Bawang putih

Bumbu

3 sendok makan saus gochujang

2 sendok makan mirin (bisa pakai merk Kikkoman)

3 sendok makan Soba Shoyu (bisa pakai merk Kikkoman)

2 sendok makan kecap manis

Isian

Sesuai selera ayam suwir (rebus dan air fry terlebih dahulu)

Sesuai selera wortel (bersihkan, potong memanjang)

Sesuai selera daun bawang (iris tipis)

Garnish

Sesuai selera Beni Shoga (Acar Jahe Merah Jepang)

Sesuai selera Aonori (Serbuk rumput laut olahan)

Langkah

- ➊ Siapkan bahan sesuai petunjuk. Campur bahan bumbu hingga merata, letakkan dalam gelas atau wadah kecil. Siapkan udon dengan direndam dalam air panas dalam sebuah wadah hingga tidak lengket.
- ➋ Pindahkan udon ke wadah kaca/mangkok, lumuri dengan 2 - 3 sendok makan minyak wijen. Aduk merata.
- ➌ Panaskan wajan dengan 1 sendok makan minyak goreng, masukkan bawang putih, tumis hingga harum. Lalu masukkan bahan isian (ayam suwir, wortel, dan daun bawang). Tumis, aduk merata [~2 menit]
- ➍ Masukkan udon ke wajan lalu sirami dengan bumbu. Aduk hingga merata. [~2 menit]
- ➎ Sajikan dengan garnishing Beni Shoga (tidak wajib) dan Aonori (tidak wajib).

Designing Solution: Pseudocode (2)



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Variables

Bahan-bahan

± 2 - 3 porsi

2 bungkus mie udon

2-3 sendok makan minyak wijen

1 sendok makan minyak goreng

2 siung Bawang putih

Bumbu

3 sendok makan saus gochujang

2 sendok makan mirin (bisa pakai merk Kikkoman)

3 sendok makan Soba Shoyu (bisa pakai merk Kikkoman)

2 sendok makan kecap manis

Isian

Sesuai selera ayam suwir (rebus dan air fry terlebih dahulu)

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Sesuai selera daun bawang (iris tipis)

Garnish

Sesuai selera Beni Shoga (Acar Jahe Merah Jepang)

Sesuai selera Aonori (Serbuk rumput laut olahan)



Instructions

Langkah

- 1 Siapkan bahan sesuai petunjuk. Campur bahan bumbu hingga merata, letakkan dalam gelas atau wadah kecil. Siapkan udon dengan direndam dalam air panas dalam sebuah wadah hingga tidak lengket.
- 2 Pindahkan udon ke wadah kaca/mangkok, lumuri dengan 2 - 3 sendok makan minyak wijen. Aduk merata.
- 3 Panaskan wajan dengan 1 sendok makan minyak goreng, masukkan bawang putih, tumis hingga harum. Lalu masukkan bahan isian (ayam suwir, wortel, dan daun bawang). Tumis, aduk merata [-2 menit]
- 4 Masukkan udon ke wajan lalu sirami dengan bumbu. Aduk hingga merata. [~2 menit]
- 5 Sajikan dengan garnishing Beni Shoga (tidak wajib) dan Aonori (tidak wajib).

An example: A simple problem

Buat program
kalkulator konversi nilai huruf mahasiswa UI
yang mengkonversi nilai angka ke nilai nilai huruf
sesuai dengan tabel di samping

Nilai	Min	Maks
A	85	100
A-	80	85
B+	75	80
B	70	75

Steps 1: Design a solution (pseudocode)

Buat program kalkulator nilai huruf mahasiswa UI

Masukkan nilai angka

Jika nilai mahasiswa lebih dari sama dengan 85,
maka nilai huruf adalah A

Namun, jika nilai mahasiswa lebih dari sama dengan 80,
maka nilai huruf adalah A-

Namun, jika nilai mahasiswa lebih dari sama dengan 75,
maka nilai huruf adalah B+

Namun, jika nilai mahasiswa lebih dari sama dengan 70,
maka nilai huruf adalah B

Cetak nilai huruf

Nilai	Min	Maks
A	85	100
A-	80	85
B+	75	80
B	70	75

Steps 2: Convert to code

Konversi Pseudocode ke Sintaks Python

```
nilai_angka = input('Masukkan nilai angka')
nilai_huruf = ''

if nilai_angka >= 85:
    nilai_huruf = 'A'
elif nilai_angka >= 80:
    nilai_huruf = 'A-'
elif nilai_angka >= 75:
    nilai_huruf = 'B+'
elif nilai_angka >= 70:
    nilai_huruf = 'B'

print(nilai_huruf)
```

Nilai	Min	Maks
A	85	100
A-	80	85
B+	75	80
B	70	75

Steps 3: Run the code (Debug error, if any)

Jika kode ini dijalankan apakah akan terjadi error?

```
nilai_angka = input('Masukkan nilai angka')
nilai_huruf = ''

if nilai_angka >= 85:
    nilai_huruf = 'A'
elif nilai_angka >= 80:
    nilai_huruf = 'A-'
elif nilai_angka >= 75:
    nilai_huruf = 'B+'
elif nilai_angka >= 70:
    nilai_huruf = 'B'

print(nilai_huruf)
```

Nilai	Min	Maks
A	85	100
A-	80	85
B+	75	80
B	70	75

```
Masukkan nilai angka7
Traceback (most recent call last):
  File "C:\Users\Lintang_matahari\Documents\KODINGAN\slide-1-2-error-konversi-nilai-huruf.py", line 4, in <module>
    if nilai_angka >= 85:
TypeError: '>=' not supported between instances of 'str' and 'int'
```

>>>

Steps 3: Run the code (Debug error, if any)

An alternative solution:

```
nilai_angka = int(input('Masukkan nilai angka'))
nilai_huruf = ''

if nilai_angka >= 85:
    nilai_huruf = 'A'
elif nilai_angka >= 80:
    nilai_huruf = 'A-'
elif nilai_angka >= 75:
    nilai_huruf = 'B+'
elif nilai_angka >= 70:
    nilai_huruf = 'B'

print(nilai_huruf)
```

Nilai	Min	Maks
A	85	100
A-	80	85
B+	75	80
B	70	75

Steps 4: The code is ready

Masukkan nilai angka

Jika nilai mahasiswa lebih dari sama dengan 85,
maka nilai huruf adalah A

Jika nilai mahasiswa lebih dari sama dengan 80,
maka nilai huruf adalah A]

Jika nilai mahasiswa lebih dari sama dengan 75,
maka nilai huruf adalah B+

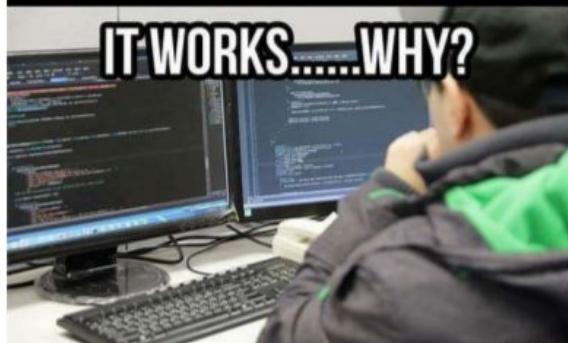
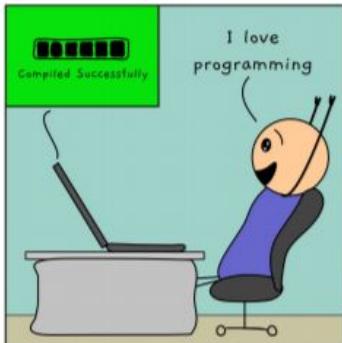
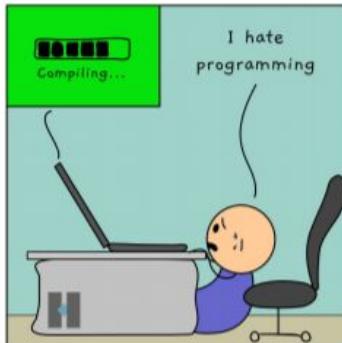
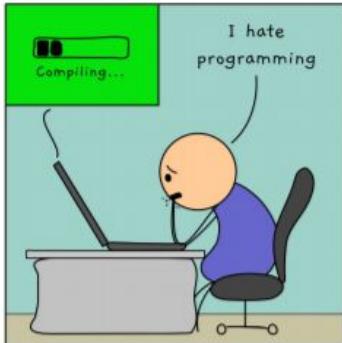
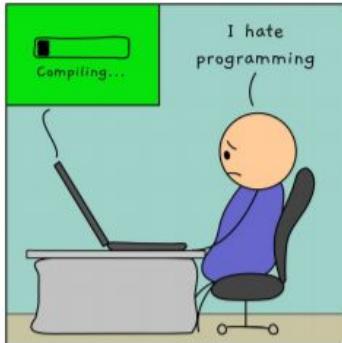
Jika nilai mahasiswa lebih dari sama dengan 70,
maka nilai huruf adalah B

Cetak nilai huruf



```
nilai_angka = int(input('Masukkan nilai angka'))  
nilai_huruf = ''  
  
if nilai_angka >= 85:  
    nilai_huruf = 'A'  
elif nilai_angka >= 80:  
    nilai_huruf = 'A-'  
elif nilai_angka >= 75:  
    nilai_huruf = 'B+'  
elif nilai_angka >= 70:  
    nilai_huruf = 'B'  
  
print(nilai_huruf)
```

Memes



Triggering Question 3

Nilai	Min	Maks
A	85	100
A-	80	85
B+	75	80
B	70	75

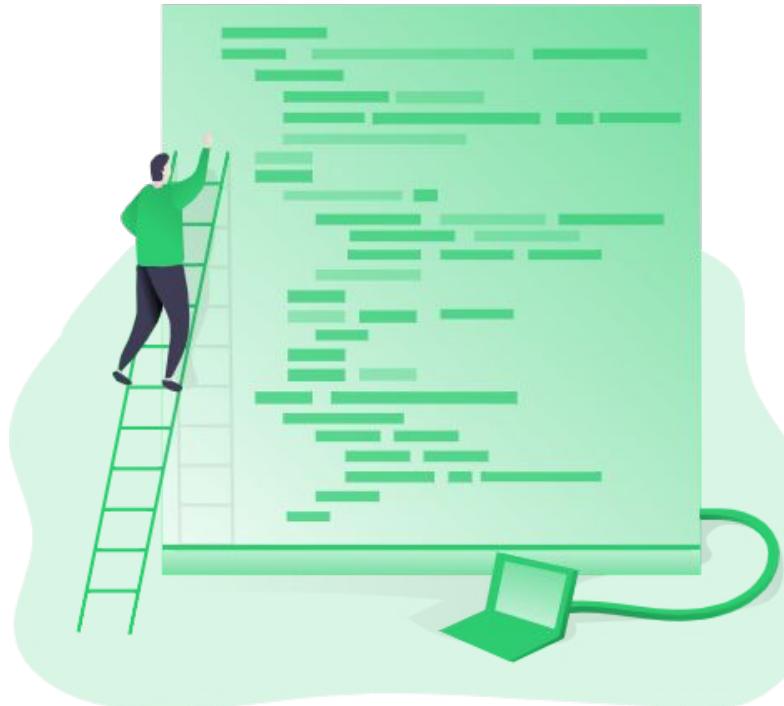
What if those who got Score >100 get “A+” ?

Write your idea/pseudocode in the **Discord Channel
Kelas E**



Practice at Home

- <https://codingbat.com/python/Warmup-1>
- <https://hackerrank.com/> (Delicious problem, Oishii~)



Review Questions

What is computer? How we define it? Is this a computer?

What is programming? Why we create pseudocode?

What is computational thinking?

How python is executed?



Weekly Challenges

**Write a simple Python program that uses
input() and print()**

**The program is up to you.
Express your creativity. ^▽^**

Post it to Discord Channel Kelas E





Q&A Session

