Machine Learning dengan Python

PENGANTAR

Oleh: Muhamad Soleh

Semester Gasal 2019/2020

Outline

- Perkenalan
- Motivasi
- Apa itu komputer?
- Apa itu ilmu komputer?
- Apa itu computational thinking?
- Apa itu pemrograman?
- Apa itu Python?
- Administrasi kuliah

Outline

- Perkenalan
- Motivasi
- Apa itu komputer?
- Apa itu ilmu komputer?
- Apa itu computational thinking?
- Apa itu pemrograman?
- Apa itu Python?
- Administrasi kuliah

Perkenalan: Dosen

Muhamad Soleh

(muhamad.soleh@iti.ac.id)

2013: Tamat S1 Fisika UI

2018: Tamat S2 Ilmu Komputer UI

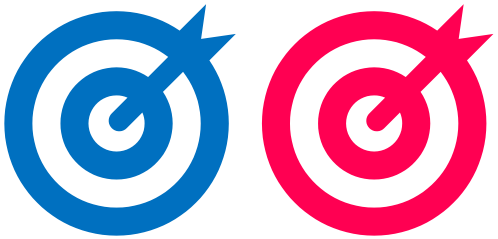
2018: Mulai menjadi dosen di ITI

Topik riset:

- Machine Learning
- Artificial Intelligent

Perkenalan: Mahasiswa/i

Sebutkan nama dan cita-cita setelah lulus dari Informatika ITI nanti!



Outline

- Perkenalan
- Motivasi
- Apa itu komputer?
- Apa itu ilmu komputer?
- Apa itu computational thinking?
- Apa itu pemrograman?
- Apa itu Python?
- Administrasi kuliah

Motivasi: Dunia industri

Software Engineer

Google

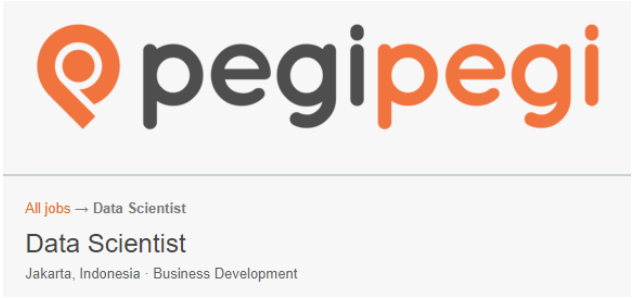
Software Engineering

Mountain View, CA, USA

Preferred qualifications:

- Experience with one or more general purpose programming languages including but not limited to: Java, C/C++, C#, Objective C, Python, JavaScript, or Go.

Motivasi: Dunia industri



Motivasi: Dunia industri

Data Engineer

Jakarta, Indonesia • Full-time

Qualifications

- Passion in big data, software engineering, and systems.
- Excellent analysis and reasoning of system behaviors
- Uphold best practices and principle around clean code, testing, continuous integration
- Strong team player and collaborator
- Having high level of responsibility and resilience in dealing with issues
- Preferably familiar with big data infrastructure (such as Kafka, Spark, etc.), cloud based infrastructure, varying databases, security concerns would be an advantage.
- Familiar with Java/JVM. Python is added advantage

Motivasi: Dunia riset

Research Associate (Pre-Doctoral)

Preferred Qualifications

Major in economics or finance, or in a quantitative discipline such as Electrical Engineering, Computer Science, Operations Research, Mathematics, or Statistics preferred. Advanced coursework/training in statistics and/or mathematics desired. Coursework in finance and/or economics preferable. Work experience in a research role, preferably in academic environment. Programming experience in one or more of the following languages: STATA, SAS, Mathematica, Matlab, Python, C++, or SQL preferred.

Motivasi: Dunia riset

Research Fellow - AiLECS

Monash University ★★★★☆ 132 reviews - Caulfield VIC

Apply On Company Site

Caulfield VIC

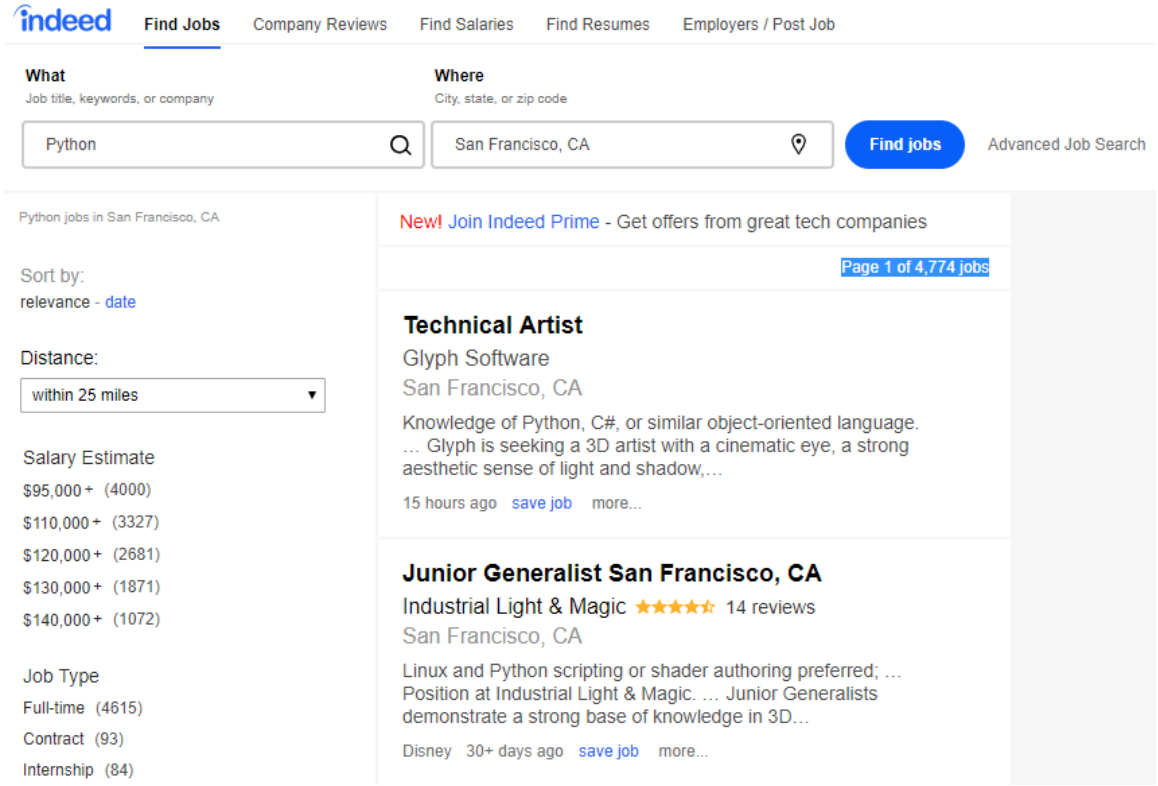
$97,203 - $115,429 a year

We are seeking an outstanding qualified researcher to join our team. Ideally you will have worked in machine learning with deep neural networks for image classification or other relevant experience. The AiLECS lab has a focus on the rapid operationalisation of research work into technologies for integration with law enforcement systems. There is also a strong emphasis in the lab on international collaboration.

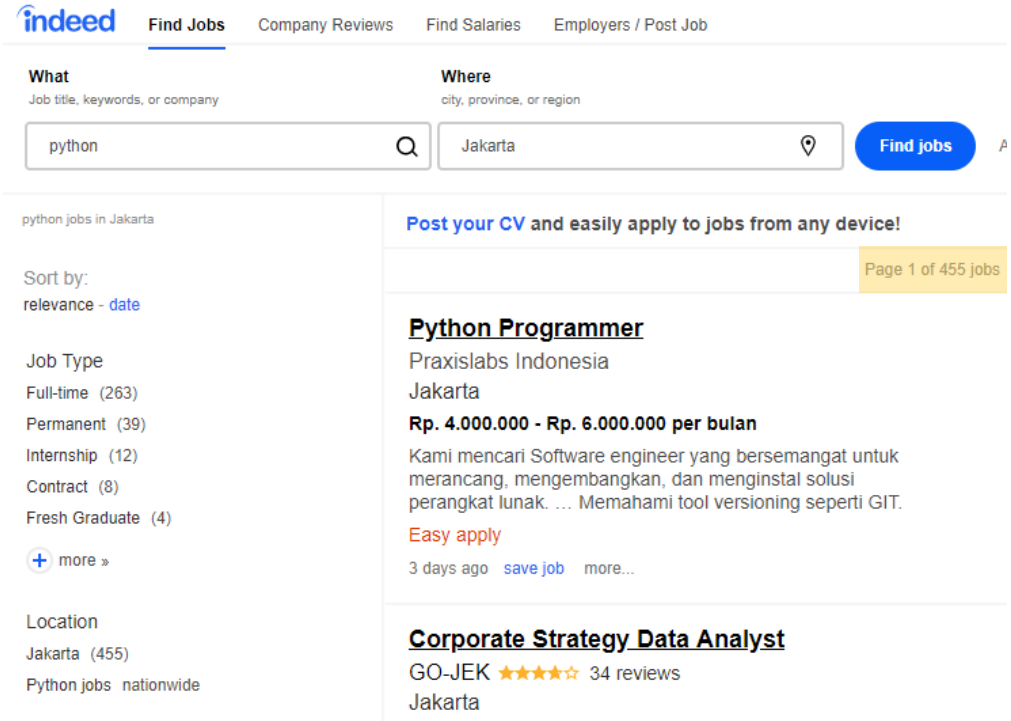
Additionally, any experience with the following will be highly regarded:

- Machine learning (image classification a bonus!)
- Extensive coding experience (particularly Python/.NET Core)
- A focus on applied research

Motivasi: So many demands!



Motivasi: So many demands!



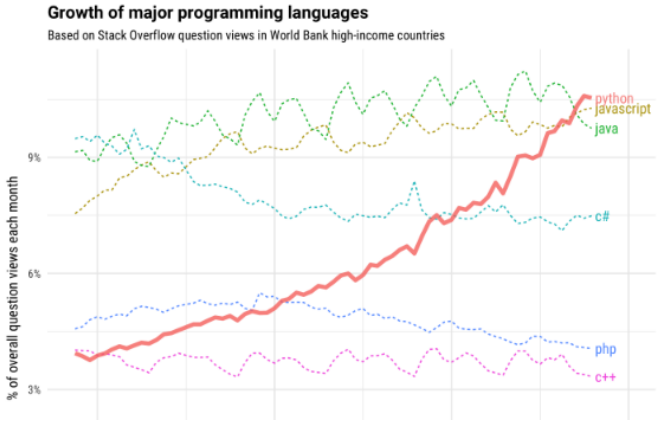
Reading time: Why I'm learning Python in 20189?

codecademy START CODING TODAY INSIGHTS UPDATES PARTNERSHIPS DEVELOPING STORIES_

12 JANUARY 2018 / INSIGHTS

Why I'm Learning Python in 2018

We might be tempted to say that Python "had a moment" in 2017. After all, the recent growth of the language has been hard to ignore.



https://news.codecademy.com/why-learn-python/

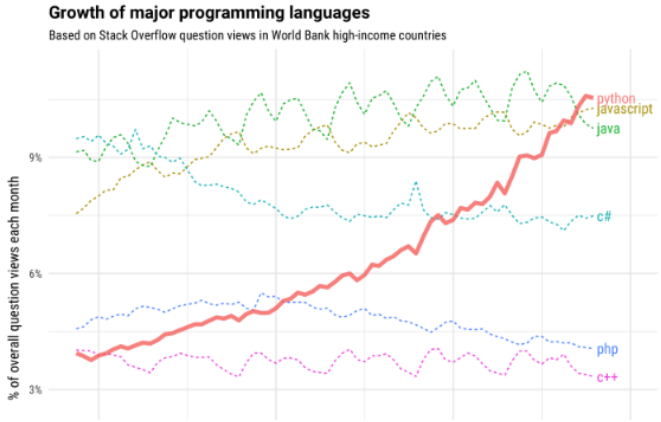
Reading time: Why I'm learning Python in 20189?

codecademy START CODING TODAY INSIGHTS UPDATES PARTNERSHIPS DEVELOPING STORIES_

12 JANUARY 2018 / INSIGHTS

Why I'm Learning Python in 2018

We might be tempted to say that Python "had a moment" in 2017. After all, the recent growth of the language has been hard to ignore.



https://news.codecademy.com/why-learn-python/

- Fastest growing
- The rise of Python can be connected to the rise of data science
- Python is simple yet versatile
- Nearly 200 thousand Python libraries available!

Outline

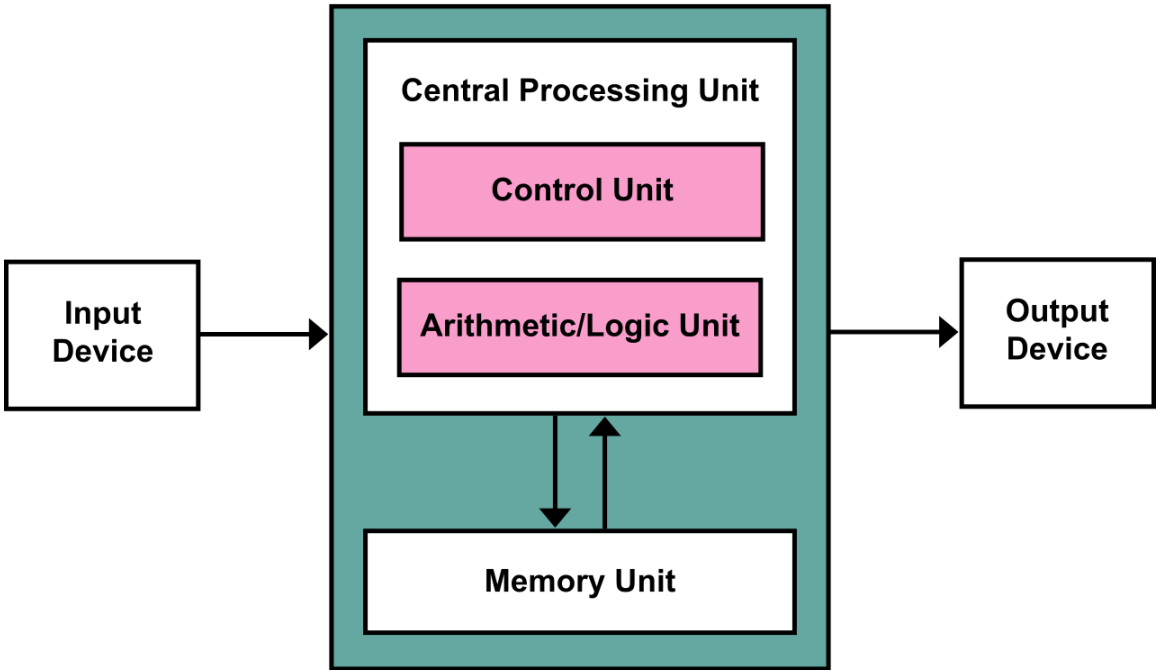
- Perkenalan
- Motivasi
- Apa itu komputer?
- Apa itu ilmu komputer?
- Apa itu computational thinking?
- Apa itu pemrograman?
- Apa itu Python?
- Administrasi kuliah

Apa itu komputer?

Komputer adalah mesin yang dapat:

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

Arsitektur komputer (von Neumann, 1945)



Hardware vs. software: which one?

Outline

- Perkenalan
- Motivasi
- Apa itu komputer?
- Apa itu ilmu komputer?
- Apa itu computational thinking?
- Apa itu pemrograman?
- Apa itu Python?
- Administrasi kuliah

Apa itu ilmu komputer?

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.

Aspek-aspek ilmu komputer

Principal areas of study within Computer Science include:

- Artificial intelligence
- Computer systems and networks
- Security
- Data science
- Human computer interaction
- Vision and graphics
- Software engineering
- And many others!

Artificial intelligence predicts which movies will succeed—and fail—simply from plot summaries

By Eva Frederick | Aug. 2, 2019 , 9:00 AM

Artificial intelligence (AI) still can't see the future, but a new algorithm may come close: Using nothing but written movie summaries, the AI can consistently tell which films will play well—or rottenly—to critics and audiences. If the model can be further refined, it could one day help producers predict whether a movie will be a flop at the box office, before it's even made.

To test several models, researchers used plot summaries of 42,306 movies from all over the world, many collected from Wikipedia. The models broke up the summaries by sentence and used something called sentiment analysis to analyze each one. Sentences considered "positive," such as "Thor loves his hammer," would receive a rating closer to one. And sentences that were considered "negative," like "Thor gets in a fight," would be rated closer to negative one.

Generally, successful movies such as 1951's *Alice in Wonderland*—which scored 80% on the movie-rating website Rotten Tomatoes—have frequent fluctuations in sentiment; unsuccessful ones, such as 2009's *The Limits of Control*, fluctuate less. It's not important whether the films begin or end happily, the researchers say. What's important is that the sentiments change frequently.

Artificial intelligence predicts which movies will succeed—and fail—simply from plot summaries

By Eva Frederick | Aug. 2, 2019 , 9:00 AM

Artificial intelligence (AI) still can't see the future, but a new algorithm may come close: Using nothing but written movie summaries, the AI can consistently tell which films will play well—or rottenly—to critics and audiences. If the model can be further refined, it could one day help producers predict whether a movie will be a flop at the box office, before it's even made.

To test several models, researchers used plot summaries of 42,306 movies from all over the world, many collected from Wikipedia. The models broke up the summaries by sentence and used something called sentiment analysis to analyze each one. Sentences considered "positive," such as "Thor loves his hammer," would receive a rating closer to one. And sentences that were considered "negative," like "Thor gets in a fight," would be rated closer to negative one.

Generally, successful movies such as 1951's *Alice in Wonderland*—which scored 80% on the movie-rating website Rotten Tomatoes—have frequent fluctuations in sentiment; unsuccessful ones, such as 2009's *The Limits of Control*, fluctuate less. It's not important whether the films begin or end happily, the researchers say. What's important is that the sentiments change frequently.


sendspace
Log In | Sign Up | Plans | Tools | Contact Us
Send, Receive, Track & Share Your Big Files!
Download
> Upload New File
DOWNLOAD
Remove Ads
eahnfltx.part01.rar
Download
Play Now
Highly experienced PHP programmer needed!
Contact us for more details
File Size: 199MB
Description: www.MyRLS.me (The best free download site)
Upgrade for Fast & Ad-free file transfers - See Plans and pricing
Click here to start download from sendspace
Pro Members: Download with Wizard
PLAY
Download
Remove Ads
Try our new android app!

Outline

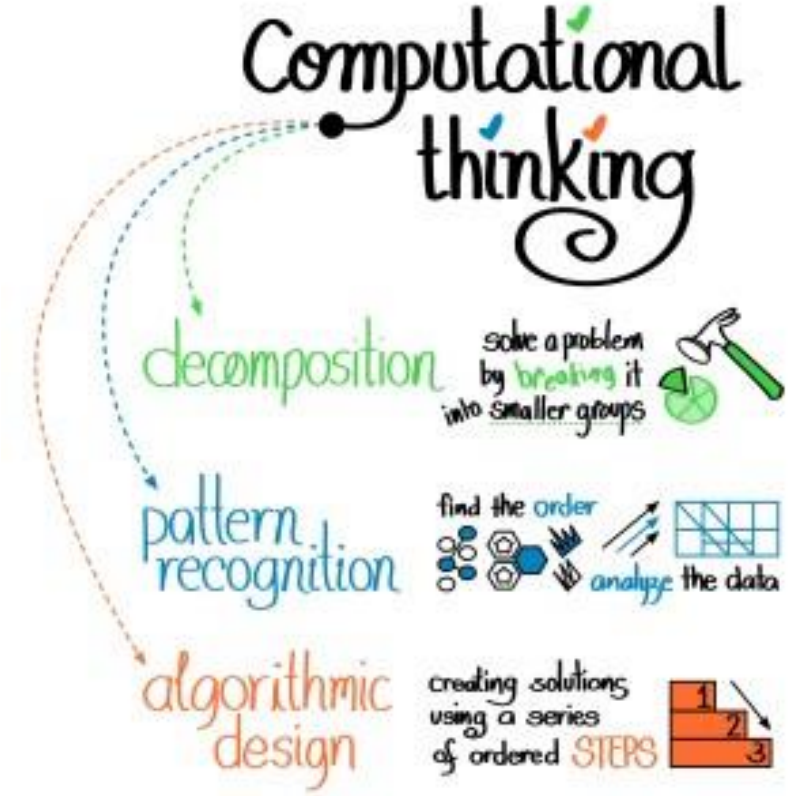
- Perkenalan
- Motivasi
- Apa itu komputer?
- Apa itu ilmu komputer?
- Apa itu computational thinking?
- Apa itu pemrograman?
- Apa itu Python?
- Administrasi kuliah

Apa itu computational thinking?

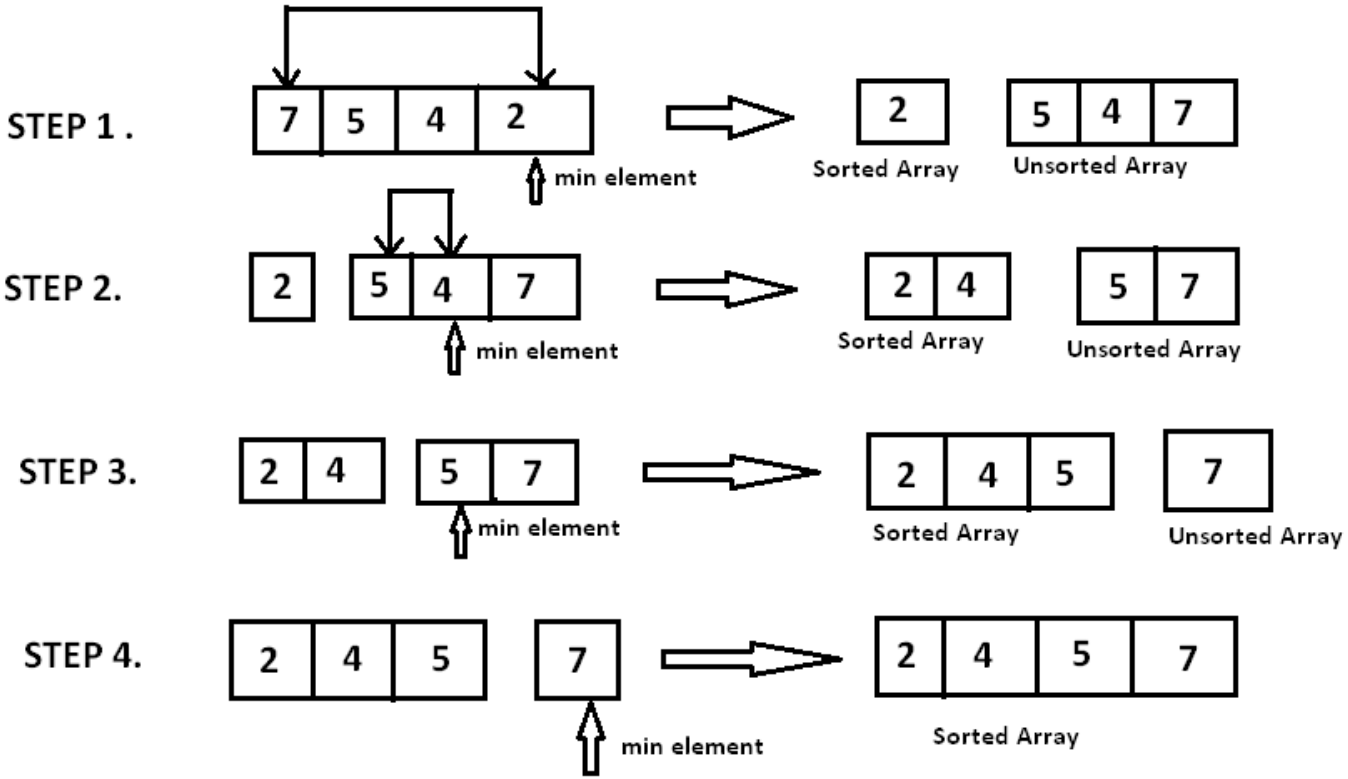
Ability to

- analyze a problem,
- identify patterns in the problem,
- provide an abstraction of the problem,
- decompose the problem,
- provide a systematic solution of the problem,
- evaluate the solution,
- optimize the solution, and
- communicate the solution in a clear and concise way.

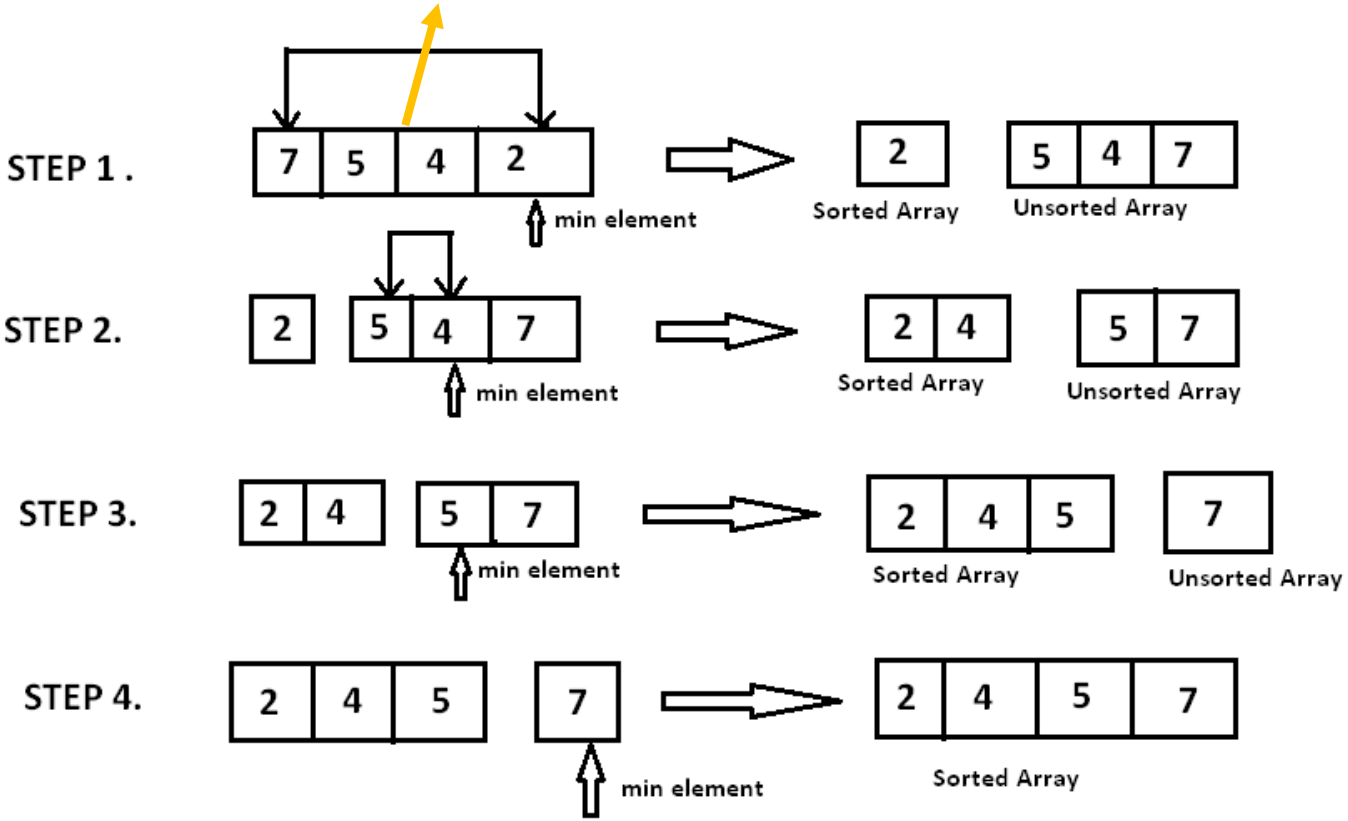
Apa itu computational thinking?



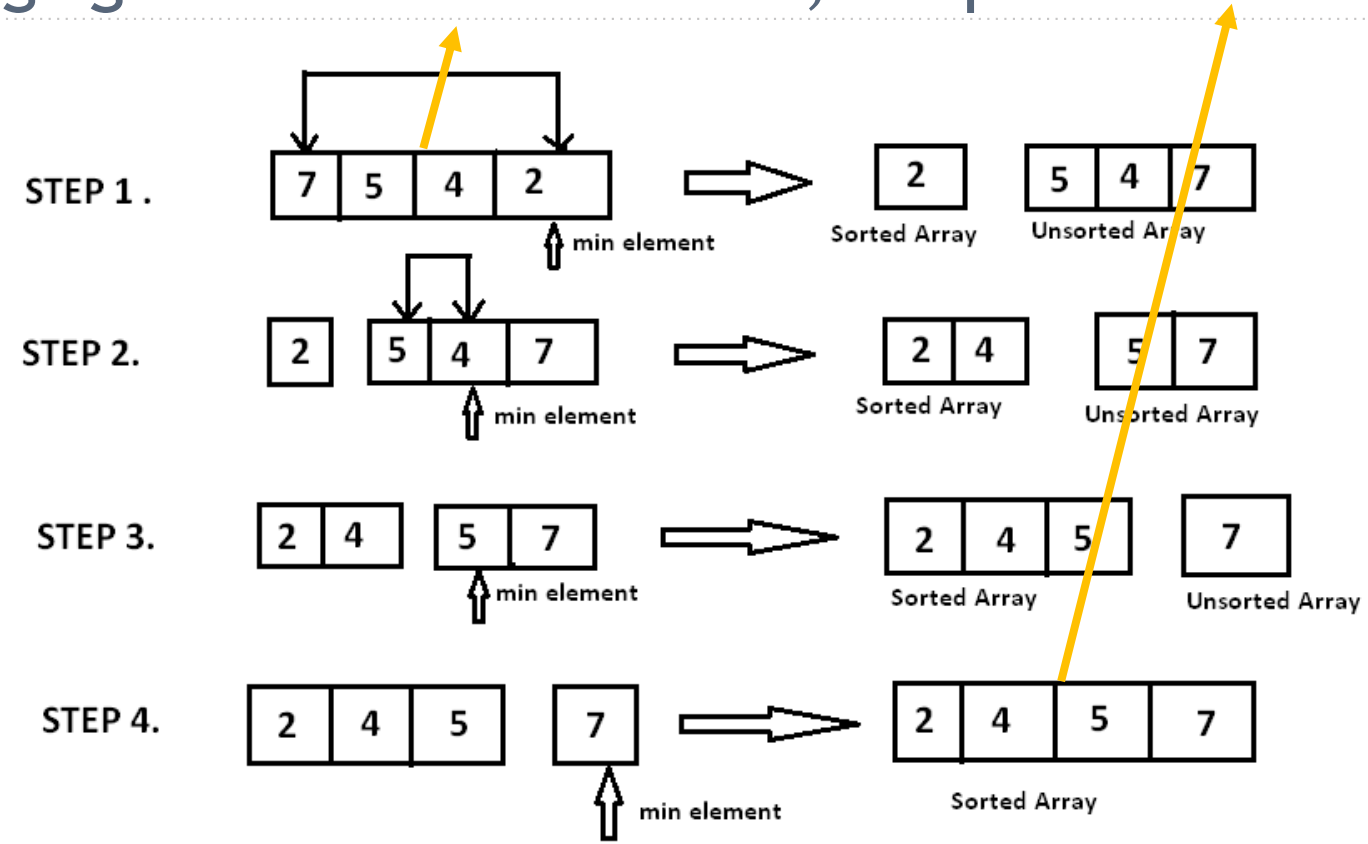
Sorting: given unordered data, output ordered data



Sorting: given unordered data, output ordered data



Sorting: given unordered data, output ordered data



Pada apa saja CT dapat diterapkan?

Video time: Thinking like a computer

Outline

- Perkenalan
- Motivasi
- Apa itu komputer?
- Apa itu ilmu komputer?
- Apa itu computational thinking?
- Apa itu pemrograman?
- Apa itu Python?
- Administrasi kuliah

Apa itu program?

Suatu urutan instruksi yang dilakukan komputer dalam pemecahan masalah.

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

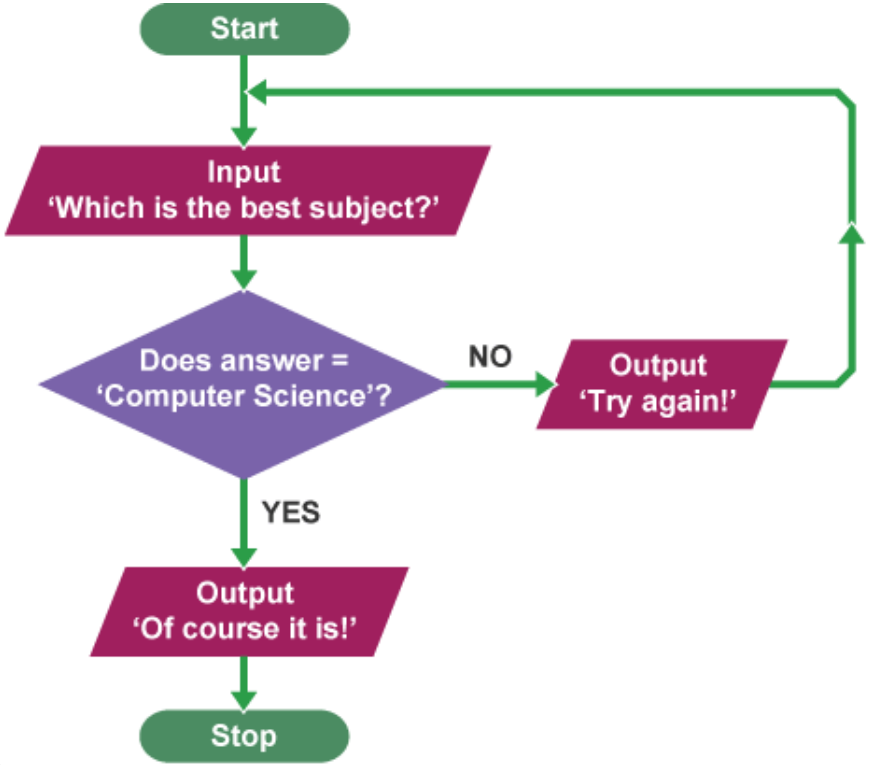
Apa itu programming?

Proses pembuatan program, yang meliputi:

- **Mendesain** solusi dari masalah yang akan dipecahkan program komputer (misalnya flowchart, pseudocode)
- **Mengimplementasikan** program di suatu bahasa pemrograman tertentu (seperti Python, C, Java)
- **Memeriksa dan memperbaiki** error yang muncul (debugging)

Apa itu programming?

Contoh flowchart



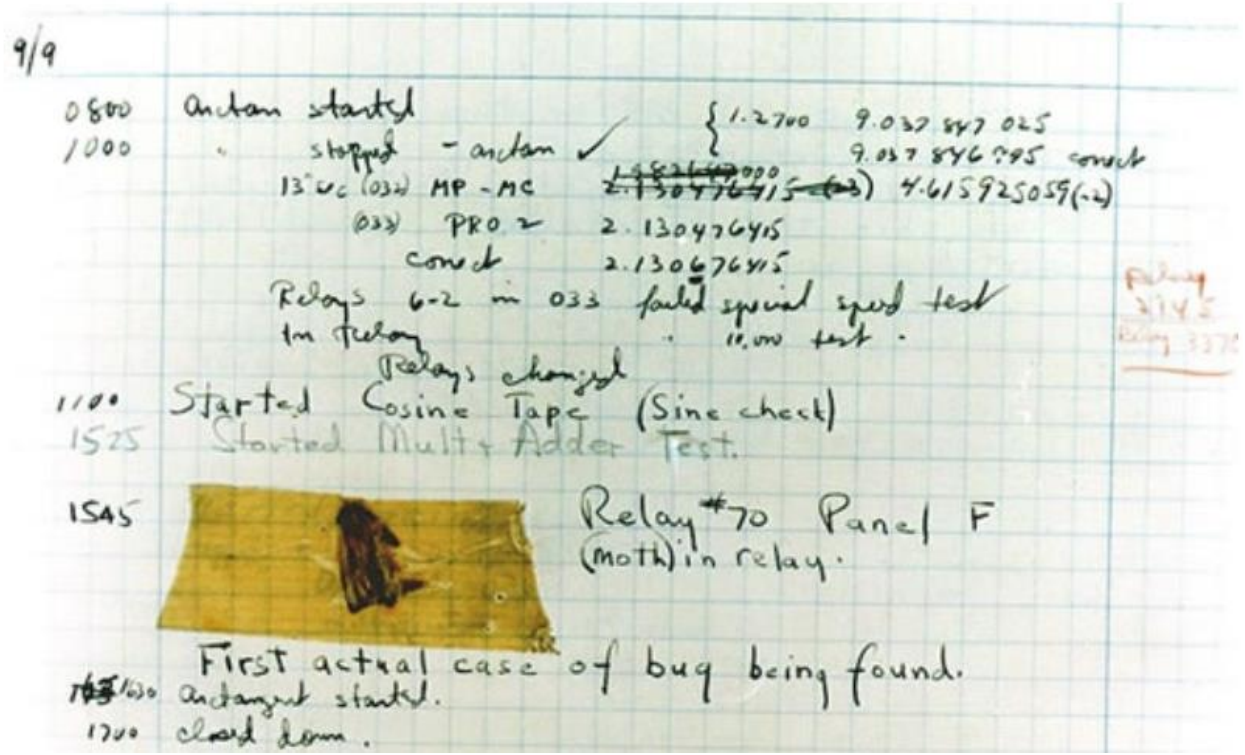
Contoh pseudocode

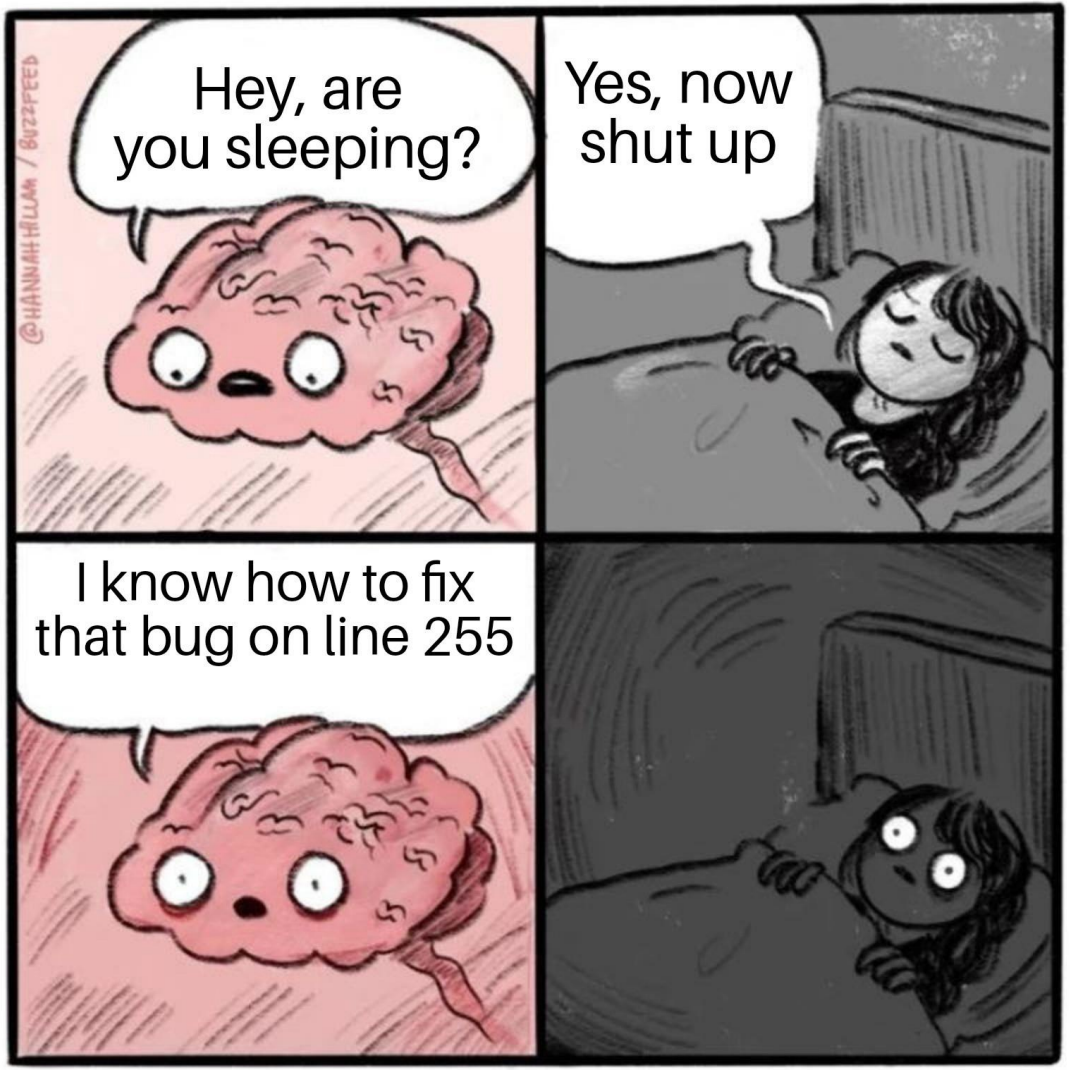
Write down the first number in the list, and call it 'max'
For each number in the list
if it's bigger than 'max'
replace the value of 'max' by the larger value
When we're all done, 'max' is the largest number we found


OLLEGE OF ARCHITECTURE AND PLANNING

The very first recorded computer bug

by BORIS VELDHUIJZEN VAN ZANTEN — Sep 18, 2013 in SHAREABLES



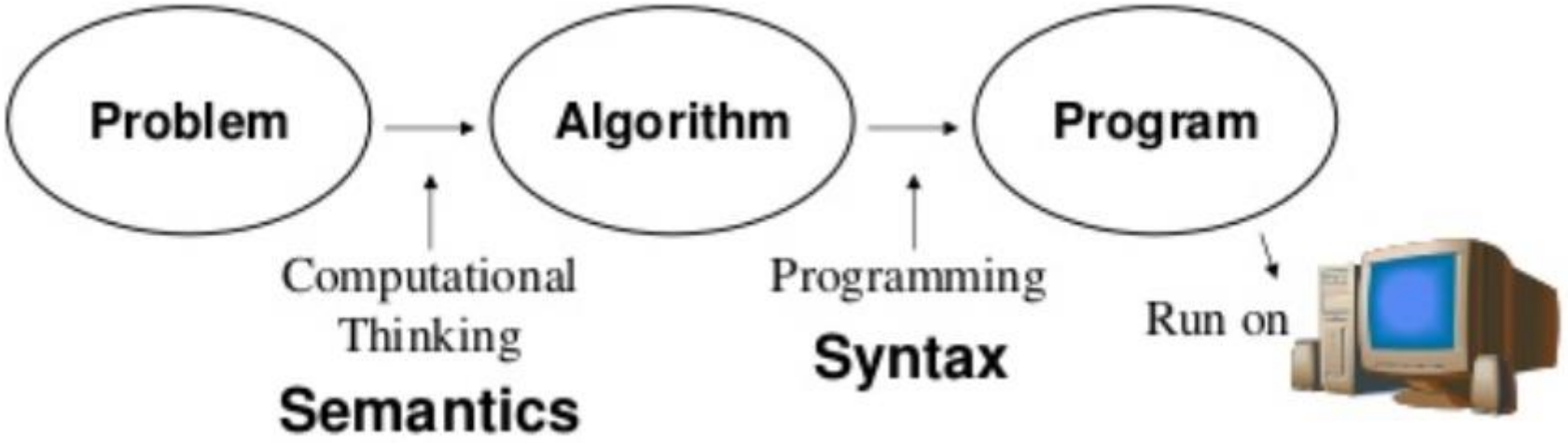

Hey, are you sleeping?
Yes, now shut up
I know how to fix that bug on line 255
@HANNAHHILLAM / BUZZFEED

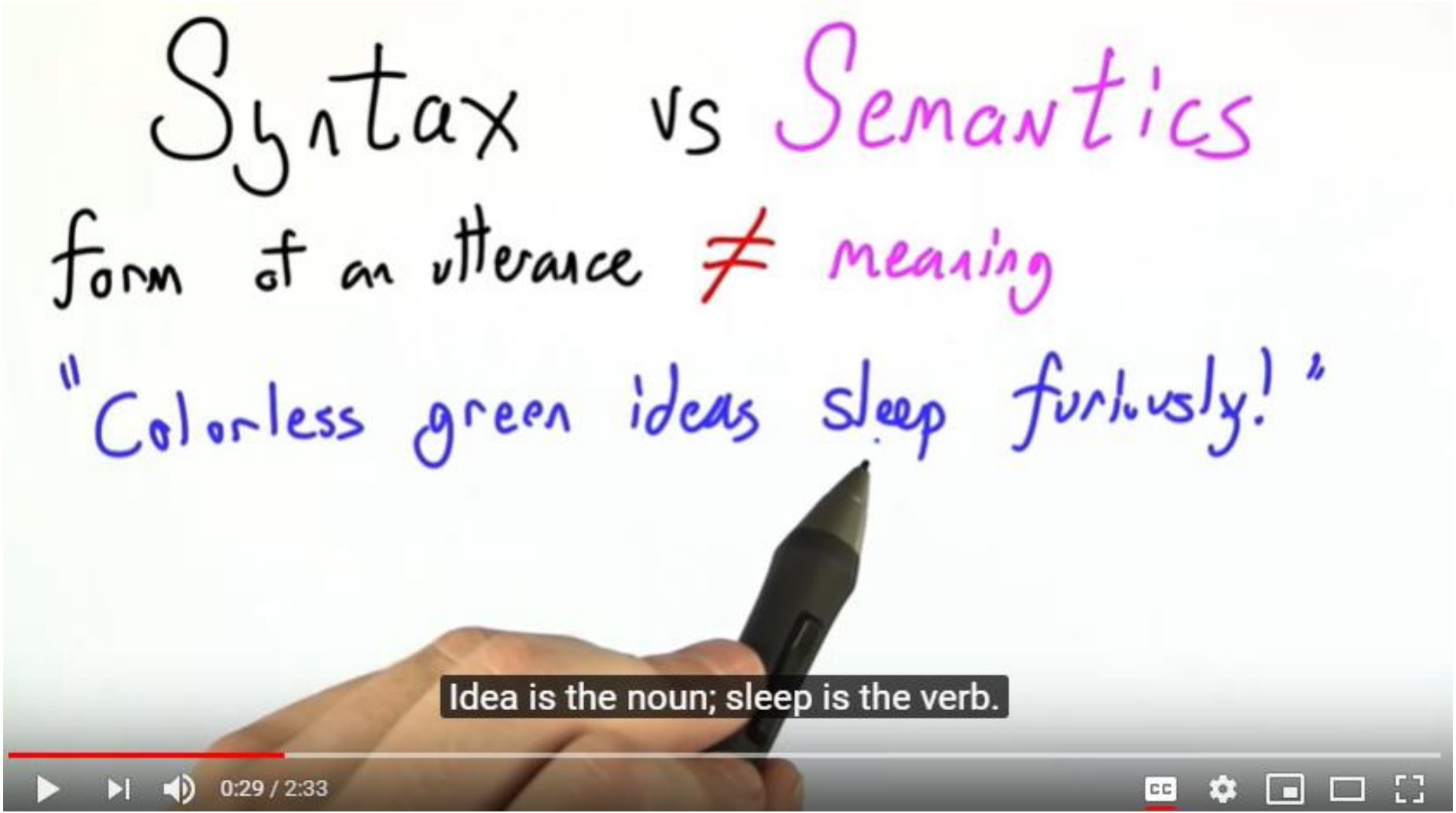
Sintaks dan semantik

Pemrograman memiliki dua aspek pokok:

- **Sintaks:** bagaimana menulis program dengan struktur yang benar dan rapi (analogi layaknya sistem ejaan untuk Bahasa Indonesia)
- **Semantik:** bagaimana program berjalan dengan benar (correct) sesuai dengan apa yang kita maksud

Sintaks dan semantik




Syntax vs Semantics
form of an utterance ≠ meaning
"Colorless green ideas sleep furiously!"
Idea is the noun; sleep is the verb.
0:29 / 2:33

Outline

- Perkenalan
- Motivasi
- Apa itu komputer?
- Apa itu ilmu komputer?
- Apa itu computational thinking?
- Apa itu pemrograman?
- Apa itu Python?
- Administrasi kuliah

Apa itu Python?

Apa itu Python?

Programming Language

Created in 1991 by Guido van Rossum

Cross Platform

Freely Usable Even for Commercial Use

The first program: hello world

Permasalahan: Cetak "hello world" pada layar.

The first program: hello world

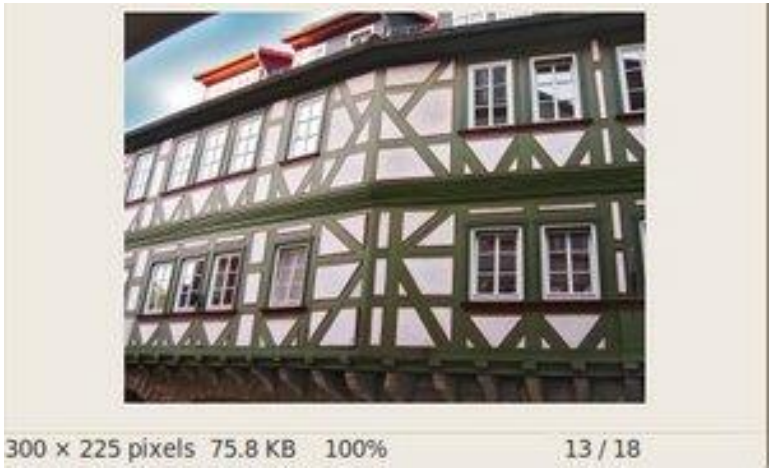
Permasalahan: Cetak "hello world" pada layar.

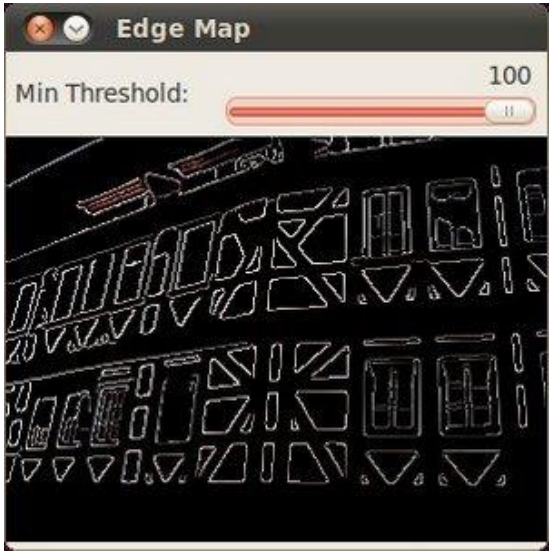
```
print("hello world")
```

The first program: hello world

- Used to illustrate the basic syntax of a programming language
- Often first program by people learning to code
- Also traditionally used in a sanity test to make sure that a computer language is correctly installed, and that the operator understands how to use it
- First known version of hello world was in 1972

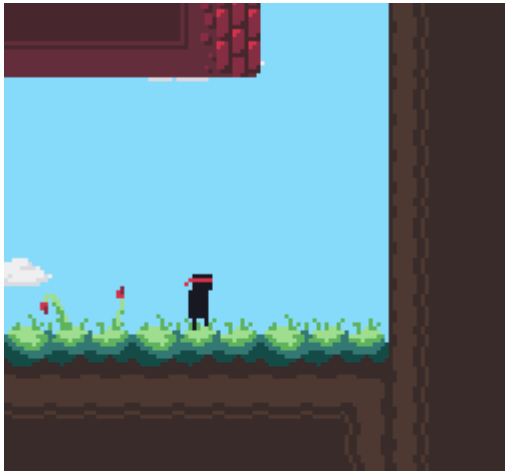
Python is versatile: useful for various purposes





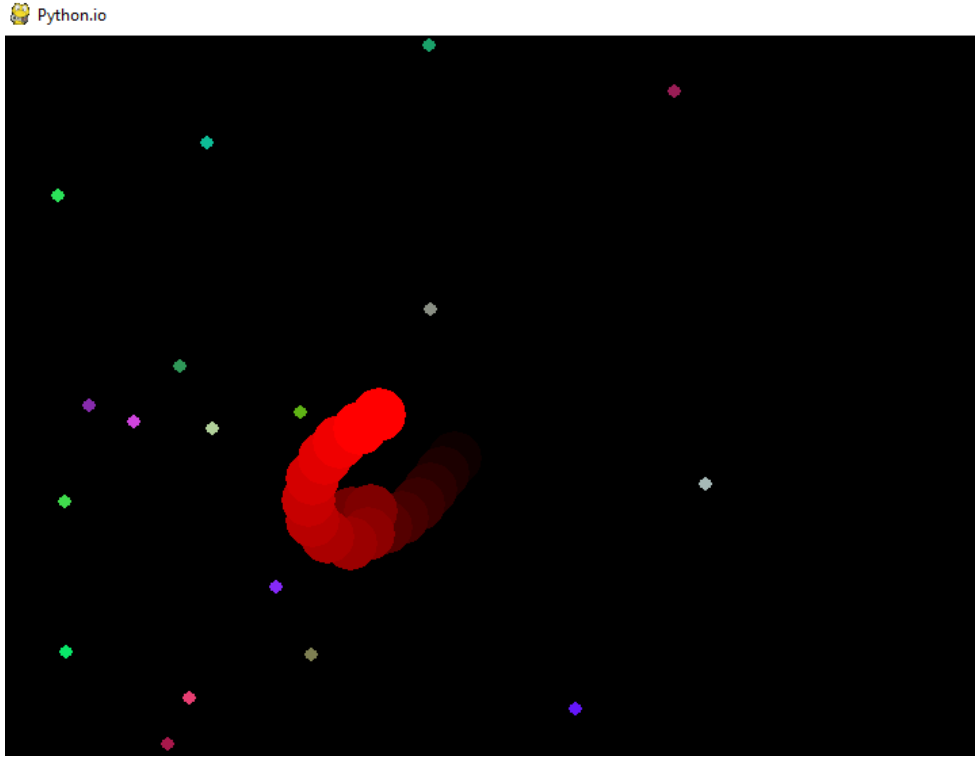
https://opencv.org/
Image Processing using ***Python***

Python is versatile: useful for various purposes

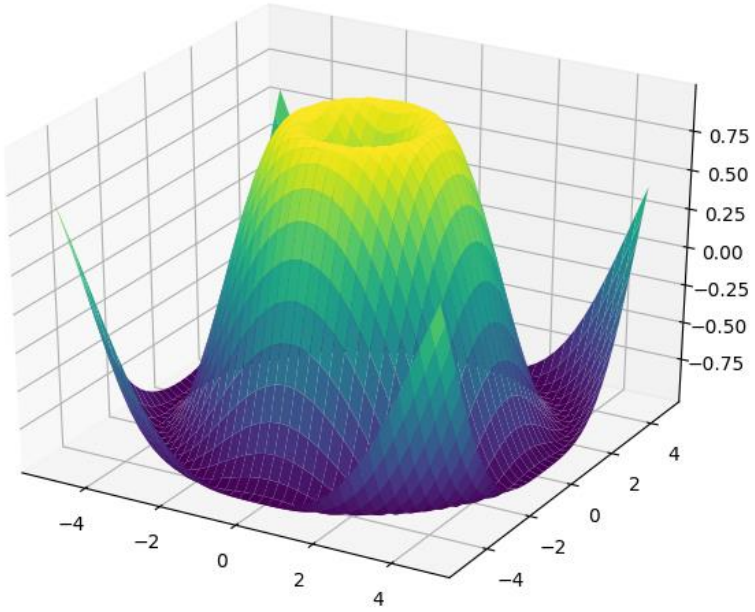


https://www.pygame.org
*Game Development using **Python***

Python is versatile: useful for various purposes



Python is versatile: useful for various purposes



https://matplotlib.org/

Data Science using ***Python***

Python is versatile: useful for various purposes

https://github.com/amueller/word_cloud

Natural Language Processing (NLP) and Text Mining using ***Python***

Python is versatile: useful for various purposes

https://flask.palletsprojects.com

*Web development using **Python***

Outline

- Perkenalan
- Motivasi
- Apa itu komputer?
- Apa itu ilmu komputer?
- Apa itu computational thinking?
- Apa itu pemrograman?
- Apa itu Python?
- Administrasi kuliah

Administrasi kuliah

4 SKS: what does this mean?

- 4x50 menit/minggu: tatap muka
- 4x50 menit/minggu: tugas terstruktur
- 4x50 menit/minggu: **belajar mandiri**

Total: 12 jam/minggu

Administrasi kuliah

Materi: https://scele.cs.ui.ac.id/course/view.php?id=684

Diskusi: WA/Line dengan asdos, WA/email dengan dosen

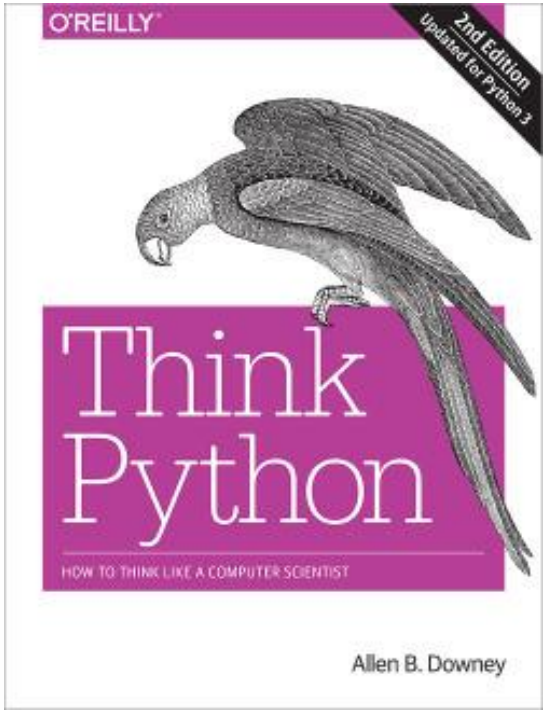
Referensi utama:

William F. Punch and Richard Enbody.

Practice of Computing Using Python, 3rd edition.

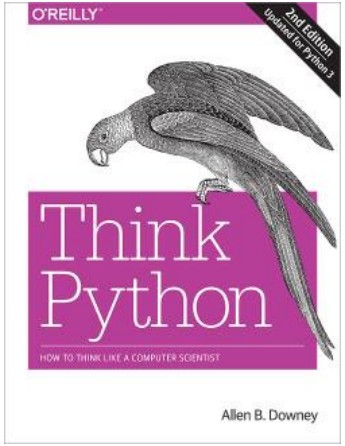
Administrasi kuliah

Referensi penunjang:



https://greenteapress.com/wp/think-python-2e/

Chapter 1 The way of the program



The goal of this book is to teach you to think like a computer scientist. This way of thinking combines some of the best features of mathematics, engineering, and natural science. Like mathematicians, computer scientists use formal languages to denote ideas (specifically computations). Like engineers, they design things, assembling components into systems and evaluating tradeoffs among alternatives. Like scientists, they observe the behavior of complex systems, form hypotheses, and test predictions.

The single most important skill for a computer scientist is **problem solving**. Problem solving means the ability to formulate problems, think creatively about solutions, and express a solution clearly and accurately. As it turns out, the process of learning to program is an excellent opportunity to practice problem-solving skills. That's why this chapter is called, "The way of the program".

On one level, you will be learning to program, a useful skill by itself. On another level, you will use programming as a means to an end. As we go along, that end will become clearer.

1.1 What is a program?

A **program** is a sequence of instructions that specifies how to perform a computation. The computation might be something mathematical, such as solving a system of equations or finding the roots of a polynomial, but it can also be a symbolic computation, such as searching and replacing text in a document or something graphical, like processing an image or playing a video.

Software tools

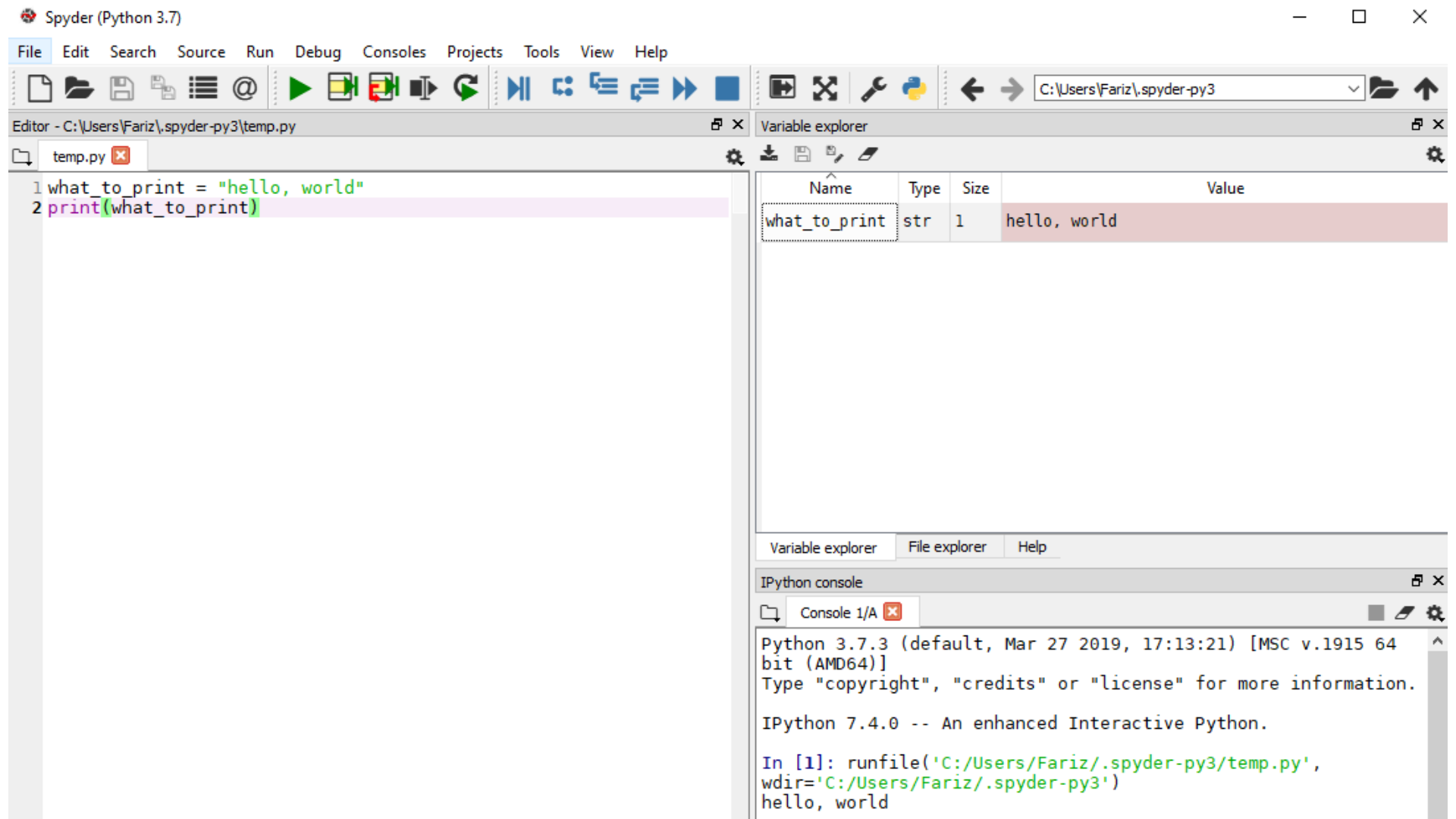
Python 3.5+

Anaconda: https://www.anaconda.com/download/

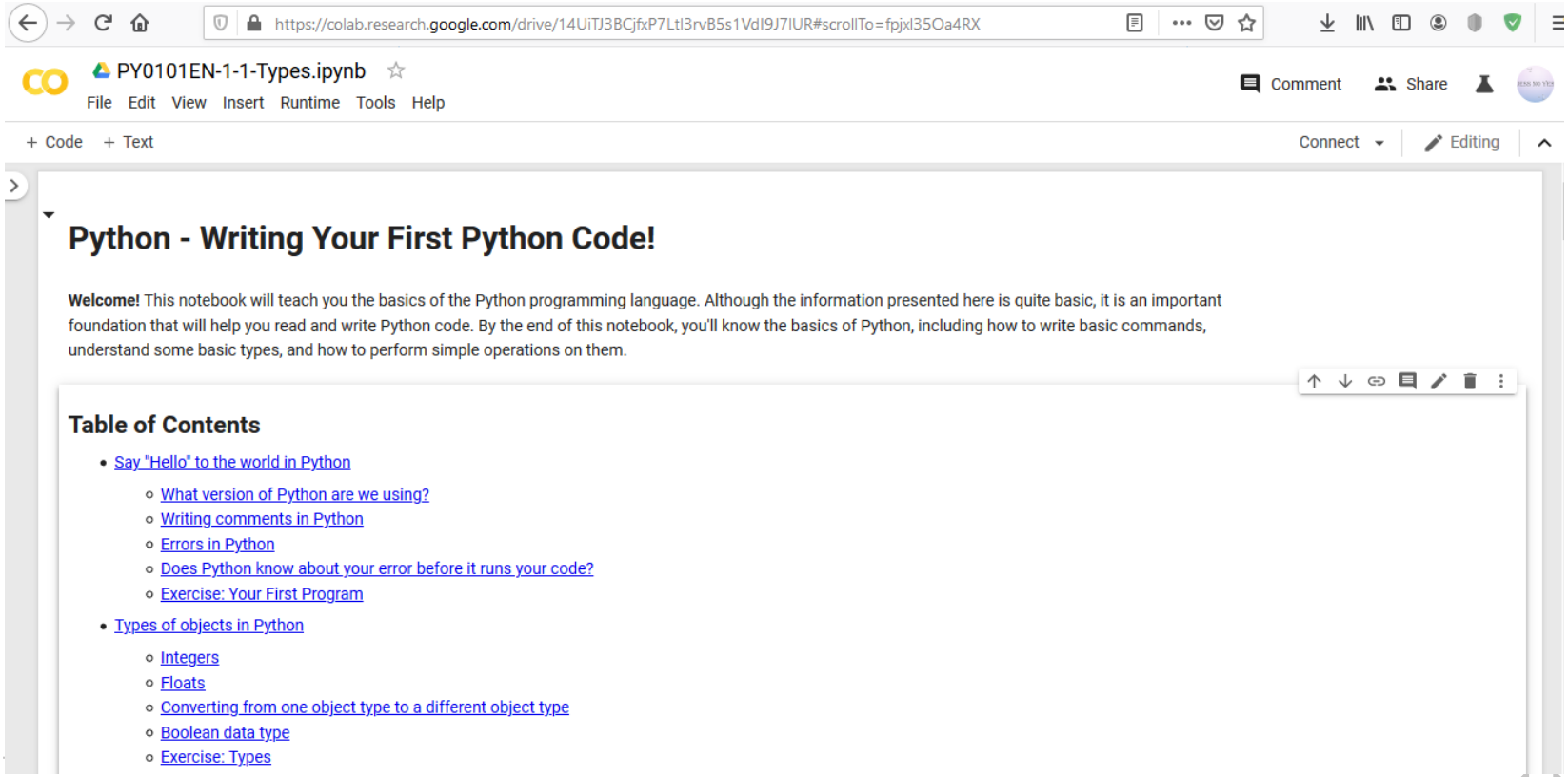
IDE: Spyder

Cloud:

https://colab.research.google.com


Spyder (Python 3.7)
File Edit Search Source Run Debug Consoles Projects Tools View Help
C:\Users\Fariz\.spyder-py3
Editor - C:\Users\Fariz\.spyder-py3\temp.py
temp.py
1 what_to_print = "hello, world"
2 print(what_to_print)
Variable explorer
Name Type Size Value
what_to_print str 1 hello, world
Variable explorer File explorer Help
IPython console
Console 1/A
Python 3.7.3 (default, Mar 27 2019, 17:13:21) [MSC v.1915 64 bit (AMD64)]
Type "copyright", "credits" or "license" for more information.
IPython 7.4.0 -- An enhanced Interactive Python.
In [1]: runfile('C:/Users/Fariz/.spyder-py3/temp.py', wdir='C:/Users/Fariz/.spyder-py3')
hello, world

Google Colab



Assessment

Tugas pemrograman (4)	20%
Tutorial di lab (10)	15%
Quiz + independent initiatives	10%
UTS	25%
UAS	30%
Bonus Kehadiran (80%)	5%
TOTAL	105%

Independent initiatives

Cara Belajar Pemrograman Yang Cepat dan Efisien

Riza Fahmi Follow
Sep 17, 2018 · 9 min read

> Karena satu dan lain hal, saya tidak akan menerbitkan artikel di medium lagi. Teman-teman bisa cek ke rizafahmi.com untuk artikel-artikel terbaru dari saya.

Artikel ini akan memaparkan beberapa tips buat teman-teman yang ingin belajar pemorgraman dengan efisien. Seluruh tips disini murni adalah

Independent initiatives

Independent initiatives

Peraturan kuliah

Kehadiran

Minimum 75% kehadiran peserta kuliah dari kehadiran dosen supaya dapat mengikuti ujian akhir.

Tidak dapat mengikuti ujian (mid & final)

Ada aturan yang membatasi siapa yang berhak ujian susulan

Surat sakit dari rumah sakit

Peraturan kuliah

Terlambat menyerahkan tugas

Tugas terlambat tidak akan diterima (so, plan ahead)

Pada kasus sangat khusus (lomba/sakit keras), lapor dosen

Tidak dapat mengikuti laboratorium

Menghubungi asisten untuk menjelaskan penyebabnya

Cheating

What is cheating (“curang”, KKN)?

Belajar bersama dalam bentuk grup adalah hal yang baik.

Tapi hasil pekerjaan harus merupakan buah karya sendiri.

Contoh curang: salin pekerjaan dari teman (running out of time), “meminjam” dan melihat hasil pekerjaan teman, menyogok teman untuk mengerjakan tugas sendiri

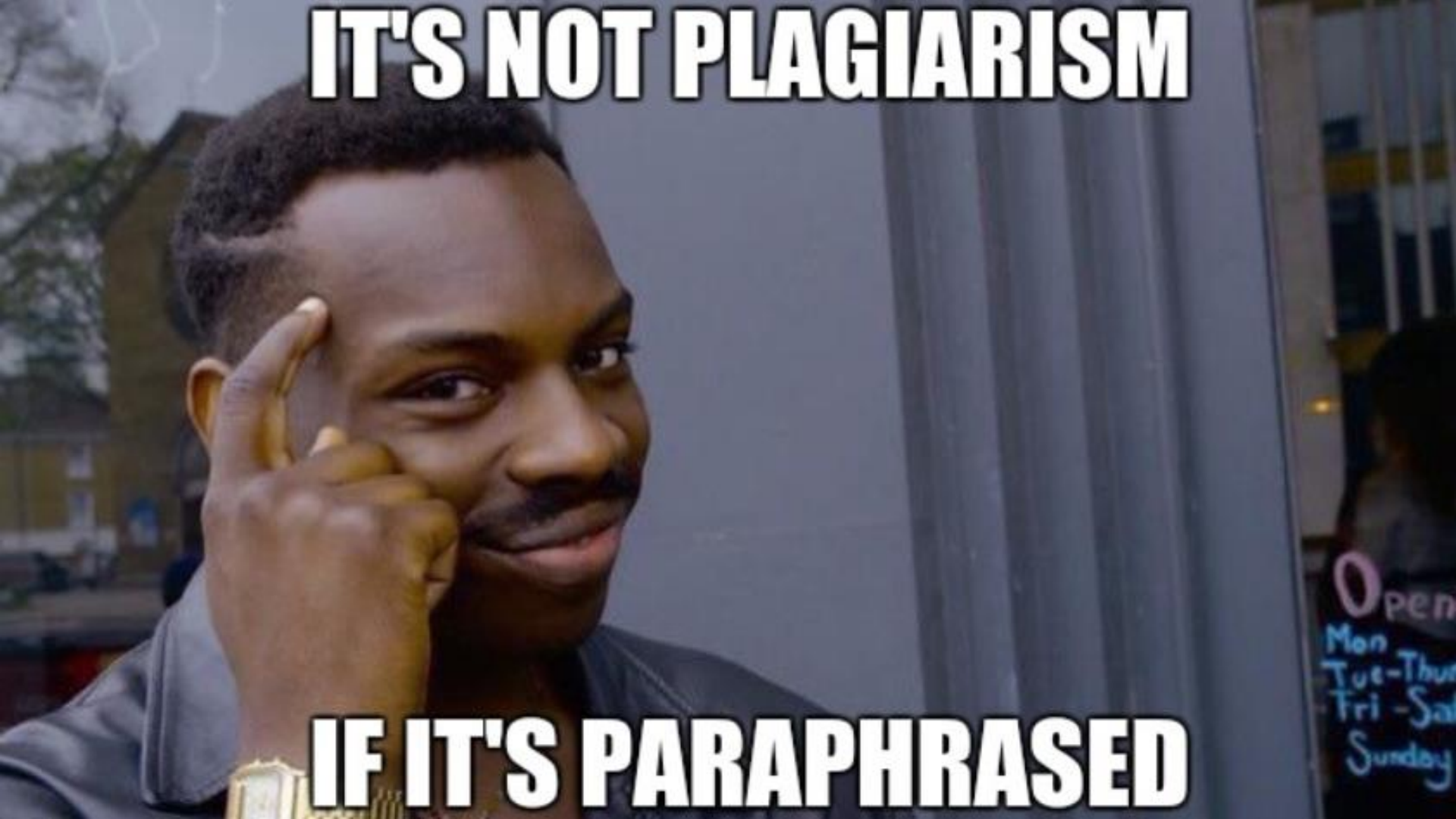
Avoid risks: Jangan sekali-kali memberi code (via email/jalur lain) ke orang lain, rentan disalahgunakan

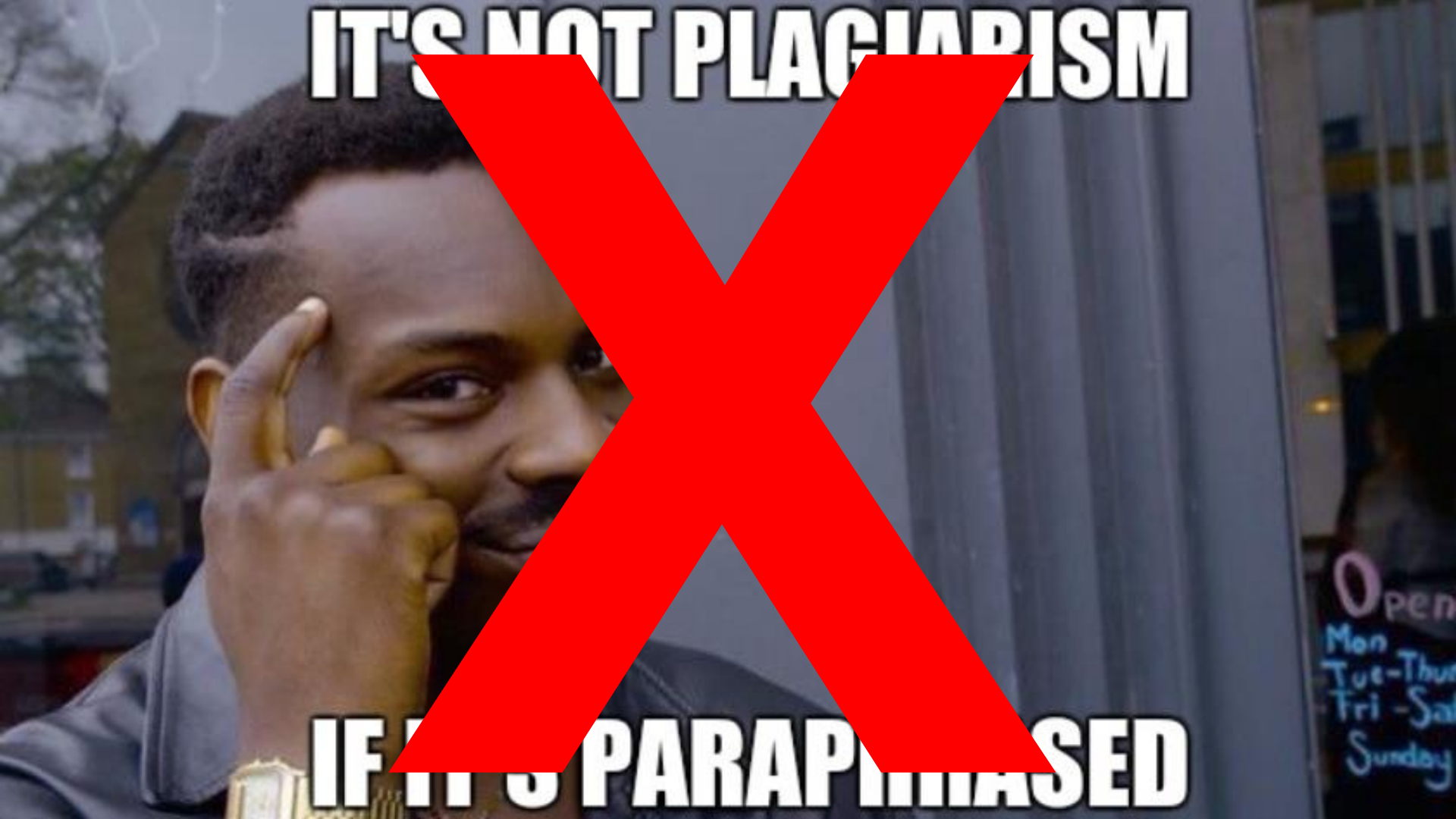
Cheating

Setiap bentuk kecurangan akan mendapatkan sanksi dengan tegas sesuai dengan peraturan universitas!

Kecurangan akan diberi peringatan 1 kali, dan mendapatkan nilai 0 baik untuk pelaku dan pemberi kesempatan.
Kejadian kedua, **nilai E**.

Setiap kejadian kecurangan akan dilaporkan ke Dekan.


IT'S NOT PLAGIARISM
IF IT'S PARAPHRASED


IT'S NOT PLAGIARISM
IF IT'S PARAPHRASED
Open
Mon
Tue-Thur
Fri - Sat
Sunday

Study tips

Preview before class

Take a quick look on the topic before class, like doing sports it is better to do some warming-up beforehand

Focus and active during class

Make the most of your time in the class, you are here for obtaining knowledge useful for your own career

Review after class

A quick review makes the learned material stay longer in your mind

Reading time: Memory hacking

[Learning Home][Topics Menu][Study Skills][Concepts of Learning]
[Web Site Resources][BC3 Help Resources][Learning Site Map]

Memory and the Importance of Review

Memory

"We remember what we understand; we understand only what we pay attention to; we pay attention to what we want." - Edward Bolles

http://faculty.bucks.edu/specpop/memory.htm

Thanks
and have fun coding!

Bonus


I'm Dutch I grew up in the Netherlands
in fact I created Python while
Guido van Rossum
Creator of Python
0:11 / 4:01