Welcome to CS 1

- Lecture will start at **10:40** (let's wait for everyone).
- If you have any question, please ask in the chat.
- Zoom link will be the same for all CS lectures in Q3.
- Please note that lecture will be recorded.
0: Course Guidance and Overview

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October 2020
Course Guidance

- Instructor: François Bonnet
- TAs: Nesrine Berjab and Luthfan Anshar Lubis
- Day/Time: Mondays 3-4, from **10:40**
- Classroom: GSIC, 3F, Practice Room 1 **Zoom**
Course Guidance

• Course webpage:
  https://titechcomp.github.io/y20-bonnet/

• Evaluation:
  - 3 homeworks, 3 projects, 1 final exam
    (3 x 5 pt) (3 x 15~20pt) (30~40 pt)

Details still to be decided 😊
Course Slack

discussion channels

private discussion

react, reply,....
Course Plan

W1  (Oct 5)  Course overview, Introduction Python language
no class on Oct 12 (due to cancelled Tokyo Tech festival)
W2  (Oct 19) Introduction to Computation
W3  (Oct 26) Animation using the four arithmetic operations
W4  (Nov 2)  Calculation of repeating decimals
W5  (Nov 9)  Cryptography and Functions
W6  (Nov 16) Cryptography and Cryptanalysis
W7  (Nov 19) Course summary and Q/A

Thursday
Course Overview
Course Overview

What is a computer?

Why is it used everywhere?
So, what is a computer?
Computer is...

a machine

Raw Materials

Objects
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Computer is a machine.
Where computers are used?

everywhere!

- Typhoon prediction
- Supercomputers
- Control systems
- Simulation
- Data analysis
- Cloud systems
CS Course Goals

- Learn Python language
- Learn how to program
- Understand the concepts with practical experience

→ Possible to study CS without computer

Not main goals bonus side effect
CS Course Goals

• 3Q.  
  1. What is computation?  
  2. What is data processing?

• 4Q.  
  1. **Benefits** of data processing ➔ Visualization  
  2. Study of some **Algorithms**
CS 1 Course Goals

1. What is computation?
2. What is data processing?

We will answer the above questions via practical experience of working with computers.
Projects

1. Animation using the four arithmetic operations.
2. Calculation of repeating decimals.
3. Cryptanalysis using basic data structures.
1: Introduction to Python language
What is a computer?

a machine

In

Information

Program

Information

Out

def next_matrix(matX, matY):
    n = len(matX)
    matZ = [[0] * n for _ in range(n)]
    for i in range(n):
        for j in range(n):
            tmp = INFTY
            for k in range(n):
                d = matX[i][k] + matY[k][j]
                tmp = min(tmp, d)
            matZ[i][j] = tmp
    return matZ

def sp_length(matA):
    # Minplusalgorithm
    # TODO: improve complexity
    n = len(matA)
    matD = [[matA[i][j] for j in range(n)] for i in range(n)]
    t = 1
    while t < n-1:
        # Program
        In
        Out
Basic settings and environment
Terminal

• Start Finder
• Open Applications
• Open Utilities
• Start the terminal

$ spyder &
Terminal

- Start Finder
- Open Applications
- Open Utilities
- Start the terminal

```
$ spyder &
[1] 14230
GVA info: Successfully connected to Intel plugin, offline Gen9
```

Old slides describing Titech computer rooms
Spyder: Python environment

Python 3.6.5 |Anaconda custom (64-bit)| (default, Mar 29 2018, 13:14)
Type "copyright", "credits" or "license" for more information.

IPython 6.3.1 -- An enhanced Interactive Python.

In [1]: print ("Hello")
Hello

In [2]:
Spyder: Python environment

- In the File menu
- Save the file
- Choose a name/folder:
  - Documents/CS1
  - hello.py
```python
#!/usr/bin/env python3
# -*- coding: utf-8 -*-

print("Hello")
```

S  Save the file

```
$/ cd ~/Documents/CS1
$/ python hello.py
Hello
```
Basic settings and environment (online version)
Google Colab (again)

Use a unique cell to write a full program

Cell containing Python code

Result of computation

Click to run (execute) the cell
shortcut: Shift + Enter (or Ctrl/Cmd+Enter)

Move/delete cells
Practice
```python
# hello_me.py

person = "Francois"
print("Hello", person)

person = "Francois"
print(f"Hello {person}")

person = input("What's your name? ")
print(f"Hello {person}"))
```
• Try with these values:
  ➤ x = 10 ; y = 2
  ➤ x = 5 ; y = 2
  ➤ x = 5 ; y = -2
  ➤ x = 5 ; y = 0
```python
x = int(input("x = "))
y = int(input("y = "))
print(f"x+y = {x + y}\nprint(f"x-y = {x - y}\nprint(f"x*y = {x * y}\nif not y == 0:
    print(f"x/y = {x / y}\n    print(f"x div y = {x // y}\n    print(f"x mod y = {x % y}"
else:
    print("Division by zero")
```

Be careful with indentation here (any number of spaces is OK, but it must be **consistent**).
x = int(input("x = 
if x % 2 == 0:
    print(f"x (\{x\}) is even 偶数")
else:
    print(f"x (\{x\}) is odd 奇数")
if x > 0:
    print(f"x (\{x\}) is positive")
elif x == 0:
    print("x is null (zero)")
else:
    print(f"x (\{x\}) is negative")
n = int(input("n = "))
print ("----------")

if n < 0 or n > 50:
    print(f"bad value of n ({n})")
else:
    total = 0
    while n >= 0:
        print(f"n = {n}"
        n = n - 1
        total = total + 1
    print("done.")
    print(f"total = {total} iterations")
Install Python on your own computer (optional)
Install Python (optional)

- Anaconda (full environment):
  https://www.anaconda.com/products/individual

- Only Python:
  https://www.python.org/downloads/

  ➔ Special (optional) session to install on your computer. See slack for details (not yet)