Computer Science Fundamentals

Seminar 1

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Tutorial objectives

1. To review lecture
2. To explore collaboration tools
3. To explore Google docs from revision point of view
4. To gain basic understanding of version control
    a. To explore how Google documents related to Git
5. To get introduced to Python
    a. Using the Python Interpreter Interactively
    b. Running a Python Script from the Command Line
    c. Online Python REPL Sites
    d. IDE

Part A: Lecture review

Activity 1: Systems vs applications programmer

- Refer to the diagram below and distinguish between a systems programmer and an applications programmer.

- What was the rationale behind the development of operating systems?

Activity 2: Match the samples of code

Given samples of code, which of them correspond to machine, assembly, high-level language?

```
class Triangle {
  ...
  float surface()
    return b*h/2;
  }
```

```
0001001001000101
0010010011101100
10101101001...
DIV r1,#2
RET
```

```
LOAD r1,b
LOAD r2,h
MUL r1,r2
DIV r1,#2
RET
```

- Distinguish between machine language and assembly language.
- Distinguish between assembly language and high-level languages.

Activity 4: My development team

Development process steps are listed below (not in order). Define and tell what happens at each step:

programming **documenting** **designing** **specifying**

conceiving **testing** **bug fixing**

Arrange the steps above in chronological order

Activity 4: My development team

Now with steps more or less clear, what roles are associated with each step?

programming **documenting** **designing** **specifying**

conceiving **testing** **bug fixing**

Activity 4: Focus on collaboration

Now you got the development team

At which step do you think the team members need to collaborate together?

programming **documenting** **designing** **specifying**

conceiving **testing** **bug fixing**

Activity 5: demo

Review collaboration no Google doc, Figma

1. Naming significant revisions, experiment with rollback
2. Leaving comments, and discuss with team members
3. Chatting while working on presentation
4. Playing with sharing rights, explore difference between viewer, commenter and editor roles.

Viewer and commenter cannot see version history, note it for sharing coursework with wiut.tutor@gmail.com

1. Tag other users to get their attention using @nameoftheuser

Activity 6: Version control

How do you understand term version control?

Have you heard about Git?

Git is a powerful piece of version control software that helps you to keep track of different versions of your code, collaborate on your code with other people, and experiment with new changes to your code [1]

Watch What is Git?

A quick introduction into Git

So how revisions you made in your Google presentation related to Git?

Read about Git https://git-scm.com/about for upcoming tutorials

[1] Git-scm.com. 2022. *About - Git*. [online] Available at: <https://git-scm.com/about> [Accessed 19 April 2022].

Part B

Python interpreter

More about differences between interpreter and compiler can be found here

Python

Options to use Python

A. Using the Python Interpreter Interactively
B. Running a Python Script from the Command Line
C. Online Python REPL Sites
D. IDE

Task 0: Install python and PyCharm

Install python 3.10 or later

https://www.python.org/about/gettingstarted/

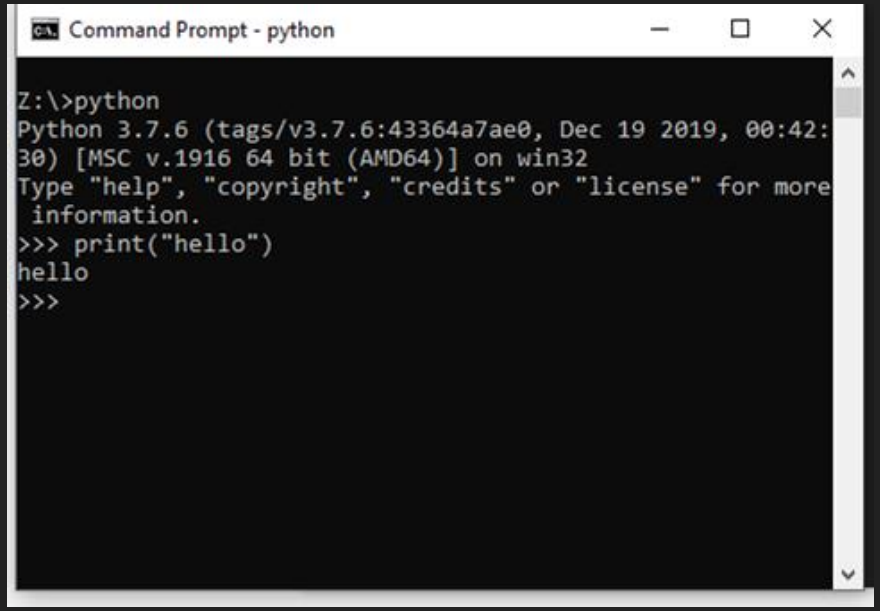
https://www.python.org/downloads/

Install PyCharm IDE Community edition

https://www.jetbrains.com/pycharm/download/#section=windows

a. Using the Python Interpreter Interactively

1. Open command line
2. Type python to start interpreter
3. Type print(“hello”)
4. Type exit()



b. Running a Python Script from the Command Line

1. Open Sublime or Notepad
2. Type print(“hello”)
3. Save file as hello.py to Z:
4. Open command line, go to Z: by typing z:
5. Run the file by typing python hello.py

c. Online Python REPL Sites

Go to https://repl.it/languages/python3

Print the following:

```
======
  WIUT
======
```

d. open PyCharm

Click on Start button

Search for PyCharm

Task 1

Try: print('='*10)

Recreate the logo using rule above

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Important terms

Variables are simply places to store information and to give that information a name. As the term indicates the information stored is "variable", meaning that it can change

Expressions are combinations of values, variables, and operators that the Python interpreter evaluates to compute a resulting value.[2]

```
2 + 2
1 + 2 + 3 * (8 ** 9) - sqrt(4.0)
max(3, 94)
round(81.5)
"hello"
"hello" + "world"
None
True
False
```

[2] Downey, A. B., Elkner, J., & Meyers, C. (2015). Learning with python: How to think like a computer scientist. Green Tea Press., Chapter 1

Data types

Variables can store data of different types, and different types do different things.

Python has the following data types built-in by default: [3]

Text Type:	`str`
Numeric Types:	`int`, `float`, `complex`
Sequence Types:	`list`, `tuple`, `range`
Mapping Type:	`dict`
Set Types:	`set`, `frozenset`
Boolean Type:	`bool`
Binary Types:	`bytes`, `bytearray`, `memoryview`

We will cover the data types in detail in **upcoming weeks**

[3] Downey, A. B., Elkner, J., & Meyers, C. (2015). Learning with python: How to think like a computer scientist. Green Tea Press., Chapter 1

Data types

In Python, the data type is set when you assign a value to a variable:

Data type of any object can be identified by using the type() function: [4]

```
year = 2021

module_name = “CSF”

print(type(year))

print(type(module_name))
```

[4] Downey, A. B., Elkner, J., & Meyers, C. (2015). Learning with python: How to think like a computer scientist. Green Tea Press., Chapter 1

Task 2

Print this using variables for all possible components

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For more advanced feature, try input() function for getting input from user

Homework 0: Install git

https://git-scm.com/book/en/v2/Getting-Started-Installing-Git

https://youtu.be/8JJ101D3knE

Register on Github with your google account (containing ID, not your name)

Homework 1

Review python operators

https://www.w3schools.com/python/python_operators.asp

Write a code for calculating total mark for the CSF module.

Assessment components: **40%** CW **60%** Exam

Homework 2: Generations of hardware

Fill out the table below.

	Memory (primary and secondary)	Processing power	Purpose
First generation hardware			
Second generation hardware			
Third generation hardware			

Homework 4: Review the collaboration tools

Explore some examples of collaboration tools (videos) are available on internet:

- Google docs
- InVision Studio
- Trello

Guess what steps they are for? What other tools you may need in different steps of the development? Your coursework is closely related to given topic

Recommended actions

- Dale, N., & Lewis, J. (2020). Computer Science Illuminated (7th ed.). Jones & Bartlett Learning, Chapter 2.
- Downey, A. B., Elkner, J., & Meyers, C. (2015). Learning with python: How to think like a computer scientist. Green Tea Press., Chapter 1
- Do homework on slides
- Read https://www.python.org/about/gettingstarted/

Explore additional sources:

- https://realpython.com/installing-python/
- https://realpython.com/interacting-with-python/
- https://realpython.com/run-python-scripts

References

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- Youtube.com. 2022. What's a Trello Board? | Start Here: Trello Tutorial. [online] Available at: <https://www.youtube.com/watch?v=l3F3l3psqXY> [Accessed 19 April 2022].

Thank you and good bye!