INF1002

PROGRAMMING FUNDAMENTALS
Module Introduction

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Outline

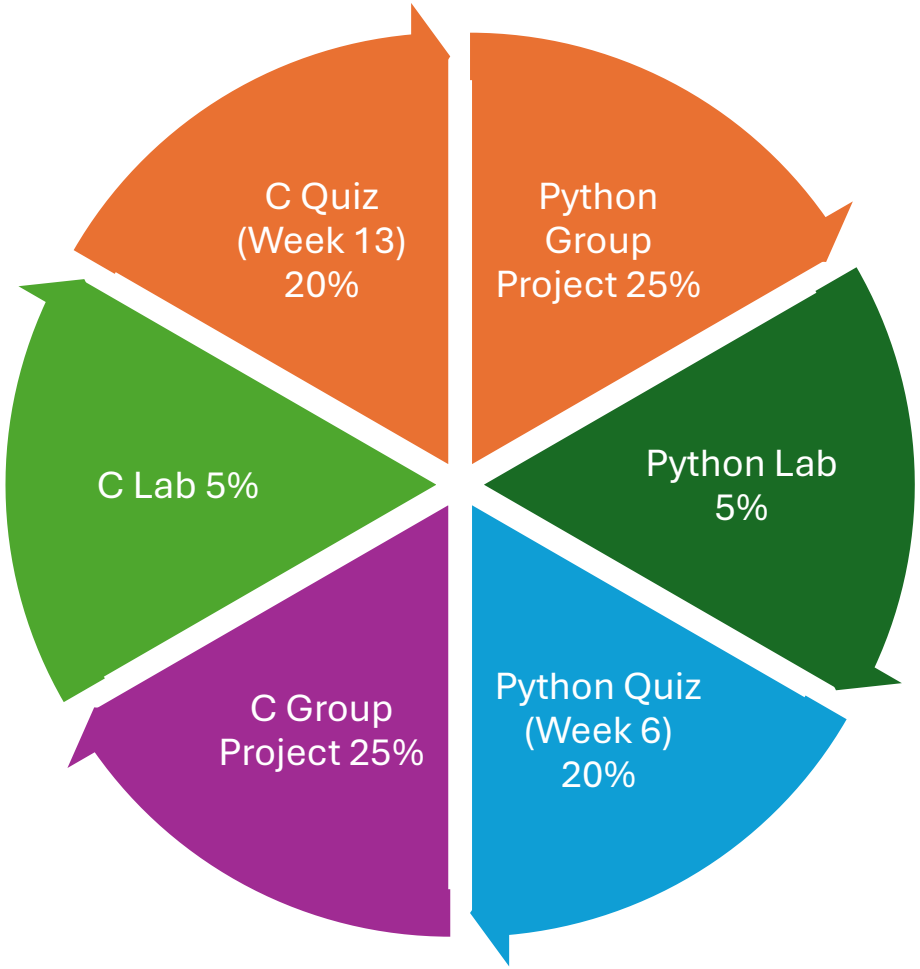
- **Module introduction**
- Python introduction
- Some concept of software engineering
- Python basic I
- Some concept of programming

Survey

- To know your background

- https://xsite.singaporetech.edu.sg/d2l/home/144699
  - Assessments → Surveys →Student Programming Experience

Assessments



No Exam!

- Quiz
  - Close book
  - Online MCQ
  - Understanding of the labs/lectures

Labs

- Programming exercises
  - Warmup questions
    - No need to submit
  - Three questions per Lab
    - Auto-graded

SINGAPORE INSTITUTE OF TECHNOLOGY

Average Calculator

ICT1002 Programming Fundamentals

Task Description:

Develop a simple average calculator program. The program requirement is as follows:

1. Allow users to run your program with three input arguments by passing three values to the program: a, b and c.
2. Your program will read the three arguments and calculate the average value.
3. After user inputs all the numbers, if the input numbers are invalid, you need to present an error message "Your input is invalid!". Otherwise, you need to print out the average value. The output average value requires to have 2 precisions. For instance, if the value is 23.456, it should print 23.45. If it is 23, it should print 23.00.

NOTE: You have to strictly follow the input and output format.

Assume your program is named as AverageCalculator.py. Example output is as follows:

Labs

- Groups and instructors
  - You can find in xsite
    - Class Activities → Classlist → View By Sections
- Friday

Projects

- Group Project – 5 people per group
  - Form groups freely inside your Lab groups
    - If you are in LAB-P1, find your friends inside LAB-P1
    - Class Activities → Groups
  - If you haven't found a group by 7 Sep, the system will randomly allocate one for you
    - If you find that your group does not have enough people, please let me know
- Example project ideas and rubrics are ready
- Timeline

Project proposal	Sunday 15 Sep 2024 11:59pm
Progressive report	Sunday 29 Sep 2024 11:59pm
Final report submission deadline	Friday 11 Oct 2024 11:59pm
Presentation/demo Video submission deadline	
Source code submission deadline	
Peer evaluation deadline	

Projects

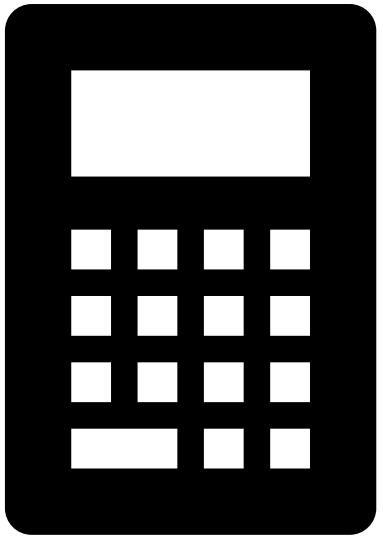
- A complex programming exercise
  - To demonstrate your ability to write Python programs by solving a small practical problem
    - Data Processing, Data Analysis, Data Visualization
    - Able to write well-designed, modular, and efficient code that is easy to maintain and optimized for performance
    - Application of Development Framework, modules
  - To understand and to overcome the challenges you encounter in a project
    - Differences between the initial plan and actual progress
    - Effective communication, conflict resolution, and collaborative problem-solving

Projects

- A complex programming exercise
  - To practice academic writing
    - Title, Abstract, Introduction, Related work, Method, Experiments, Results, Conclusion, References
    - Present findings objectively
  - Innovation
    - You must use advanced tools like ChatGPT, co-polite etc.
    - You create something new. (bonus)

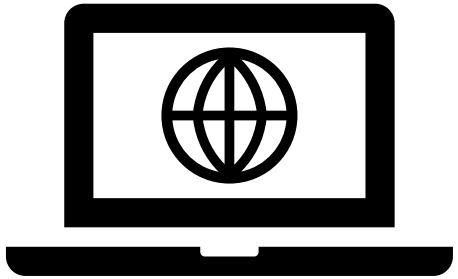
Projects

- About ChatGPT
  - ChatGPT does not have a soul; you should have one
  - To learn 1+1, do not use a calculator
  - To finish your lab assignment, please do not use it
  - To solve word problems, it's an efficient tool
  - To finish your project, please use it to enhance your efficiency and the project quality
  - Check the generated code line by line



Equipment

- For class
  - Have a Google account
  - https://colab.research.google.com/
  - Laptop is preferred
  - iPad is also fine
- For project / lab
  - Laptop is strongly recommended



Course Aims

- Fundamental skills in programming (Python & C)
- Don't worry even you have never been exposed to programming before
- I hope you learn and contribute something even you are already an expert
- Improved problem-solving ability

- Required a lot of effort of self-learning

Classroom Expectations

- It is a disciplinary offence to copy another student's work or to allow another student to copy your work.
- Do not lie to yourself.
- You must use ChatGPT, but please use it appropriately.

Best Wishes

- Focus on improving your skills rather than worrying about one or two points.
    - You can try to tell your interviewer that you could have scored two more points in programming basic module.
- **Focus on your main problem**
    - Make you life easier

Review

- Survey
- Labs, a project, a quiz
- https://colab.research.google.com with a google account

Schedule 1st Half

Week	Topics	Labs
1	Module Introduction & Python Basic I	No lab
2	Python Basic II	Lab1: Python Basic
3	Advanced data structures: list, tuples, dictionary & iteration (for, while)& Files I/O	Lab2: Loops and Advanced Data Structures
4	Functional abstraction	Lab3: Functions
5	Introduction to recursion	Lab4: Recursion
6	Python Test Explain the test questions High-order functions	Lab5: High-order functions Python Project Submission
7	Recess Week	

Schedule 2nd Half

Week	Topics	Labs
8	Introduction to C User defined data types	Lab W8: Introducing VSE, Tic-Tac-Toe Template
9	Functions Introduction to Arrays and Pointers	Lab W9: Using Arrays
10	More on Arrays and Pointers	Lab W10&W11: Arrays & User defined data type
11	Strings & Files	
12	Introduction to Data Structures	Submit Assignment 2 Lab W12: Using Files and advanced data structures
13	Lecture Test 2	

Module Road Map

Variables & Types & Operators

Control Flow

Advanced Data Structures & I/O

Functional abstraction

Recursion

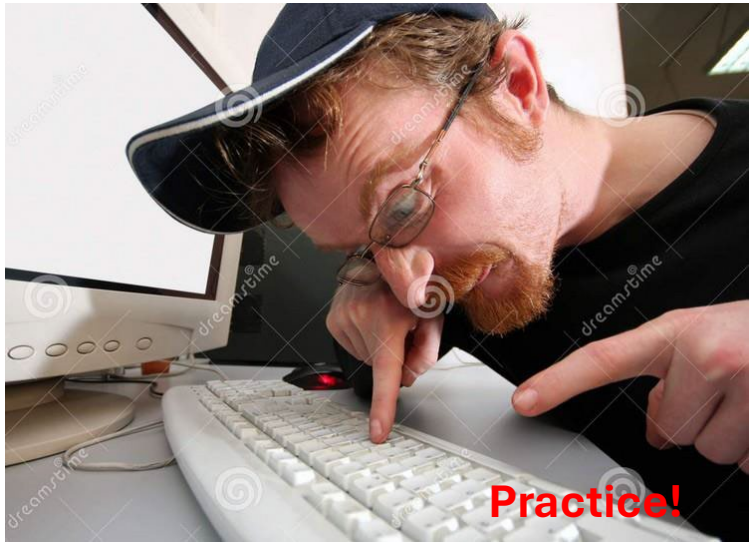
Higher order function

Real World Problems / Project Management Problems/ Innovation / Self-study

- Learn the basics
- Practice more
- Think more about the logic, instead of repeating
  - Read books
  - Read codes
  - Fast is slow
  - Slow is fast

https://www.rocketacademy.co/software-engineering/software-engineering-career-path

How to success in programming



Suggestions from industry experts

- **Data Structure and Algorithms**
  - https://leetcode.com/
- Real world projects, Internship
- Find a good piece of open-source software in a specific direction and develop a deep understanding of it.
  - APP Development
  - Web Server
  - Database
  - Middleware
  - Cloud Computing
  - …

Suggestions from industry experts

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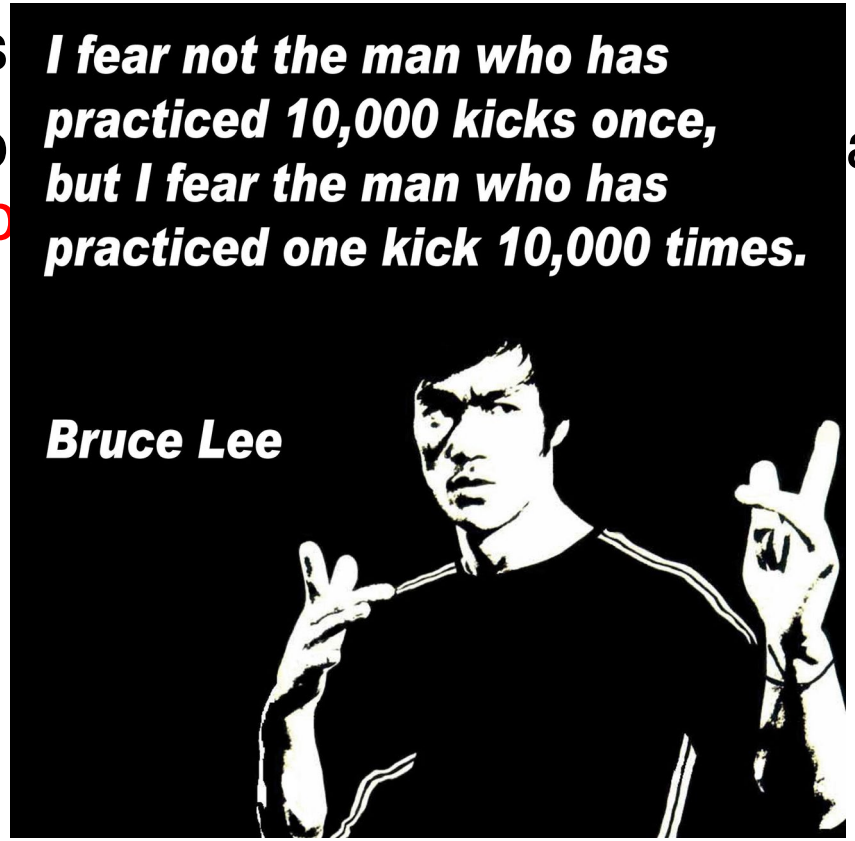
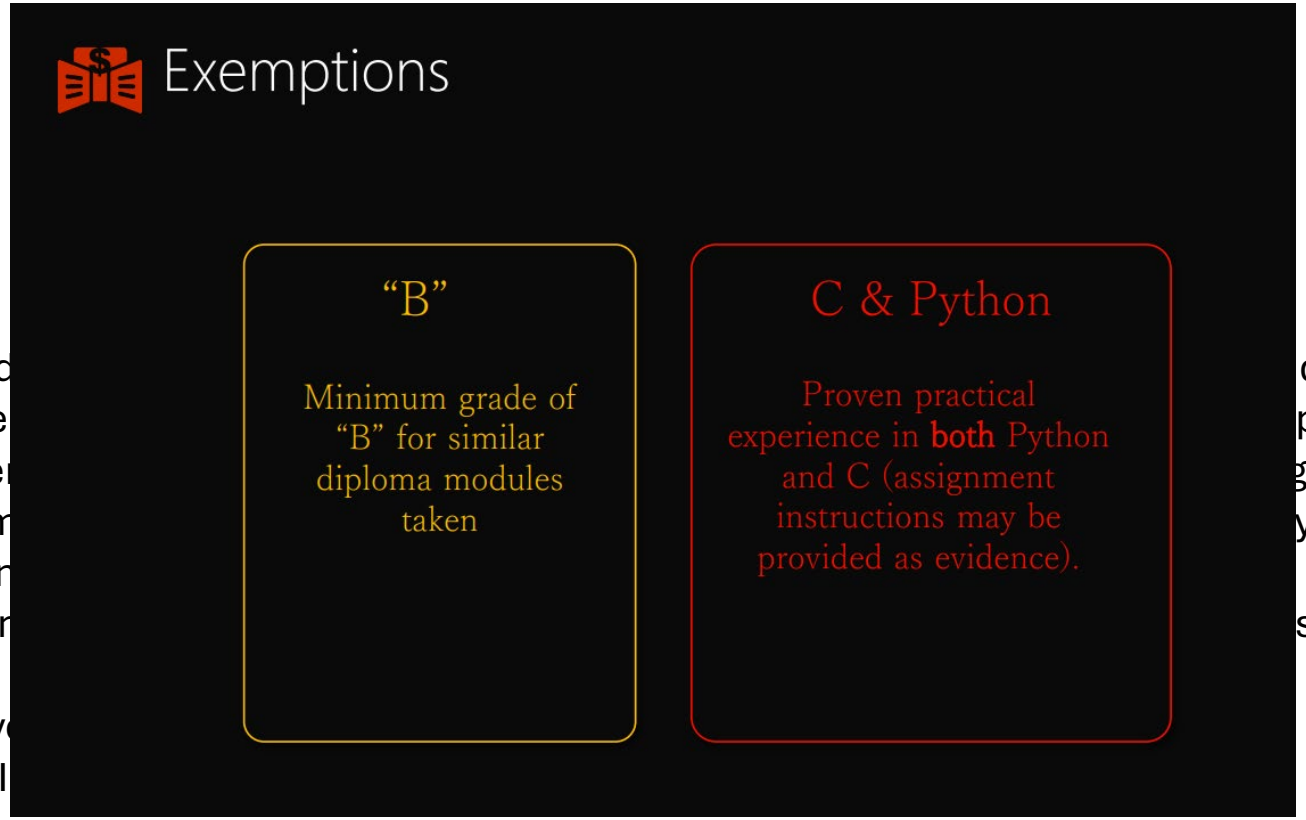


Story of Exemptions

- 7 out of 101 applications are approved



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sTaken/Simple-Food-

Story of Exemptions

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Using C, we were told to develop a product that can tackle an everyday problem. We made a medicine dispenser which reminds and dispenses medicine when the set time is met. This project was made by programming a PIC18 microcontroller using concepts of C programming, OOP and solid programming knowledge. My project can be found here: https://github.com/WolfverusWasTaken/PIC18-Med-Dispenser/tree/main/CDIO_PIC_Project

Using python and tensorflow, we developed an image classification model for our final project. We were taught on the various python programming techniques on how to make AI models with python. Here is my code in my github repo: https://github.com/WolfverusWasTaken/Simple-Food-Image-Classifier

Story of Exemptions

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and solid programming knowledge. My project can be found here: https://github.com/WolfverusWasTaken/PIC18-Med-Dispenser/tree/main/CDIO_PIC_Project

Some friends just throw a transcript with C grade in my face

https://github.com/WolfverusWasTaken/Simple-Food-Image-Classifier

Story of Exemptions

- Read the instructions carefully
- Thinking from the other person's perspective
- If you have some basic programming knowledge, the lecture should be easy for you.
- Contribute more to the team project
  - It does not mean you do all the work.

Lecturers

Dr. ZHANG Zhengchen

- Associate Professor
- InfoComm Technology
- Email: zhengchen.zhang@singaporetech.edu.sg
- Workstation: E1-L7-7
- Consultation hour: by appointment
- Research interest
  - Text-to-Speech
  - Natural Language Processing

Lecturers

Dr. Frank GUAN Yunqing

- Associate Professor
- InfoComm Technology
- Email: Frank.Guan@singaporetech.edu.sg
- Workstation: E1-L7-76
- Consultation hour: by appointment
- Research interest
  - Augmented Reality
  - Virtual Reality
  - Artificial Intelligence
  - Computational Imaging
  - 3D Visualization
  - Computer Graphics

- We are here to help you
  - Feel free to email me
  - zhengchen.zhang@singaporetech.edu.sg
- Wish you have a good start
  - Programming
  - Your university life

Review

- Assessment
  - Quiz
  - Lab
  - Project
- Module Road Map
  - Variables & Types
  - Control Flow
  - Advance Data Types: List, Dictionary etc.
  - Recursion
  - High Order Functions

Review

- Think about your future
  - Software Engineering
  - Operating System
  - Internet of Things
  - ...
- Do not lie to yourself.
- Exemption Story
  - Read the instructions carefully
  - Thinking from the other person's perspective
- Self-study is very important
- We are here to help you

Reference

- https://www.tutorialspoint.com/python/index.htm