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COMP2012H Honors Object-Oriented Programming and Data Structures

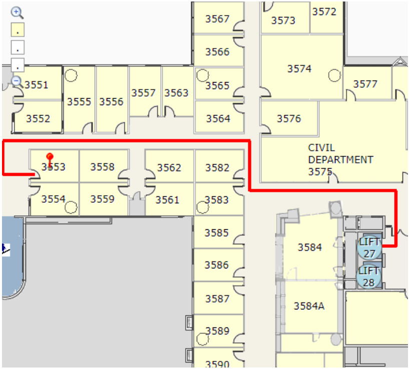
Topic 0: Course Logistics

Dr. Desmond Tsoi

Department of Computer Science & Engineering
The Hong Kong University of Science and Technology
Hong Kong SAR, China

Instructor

Dr. Desmond Yau-chat TSOI (Simply call me “Desmond” ;))



- Personal website: http://www.cse.ust.hk/∼desmond
- E-mail: desmond@ust.hk
- Office: Rm 3553 (Lift 27)
- Work phone: 2358-6984
- Office hours: To be confirmed

More about Me

List of institutes that I was teaching at: (in chronological order)

- Hong Kong University of Science and Technology (HKUST)
  - Department of Computer Science and Engineering
  - Department of Accounting
- Nanyang Technological University, Singapore (NTU)
  - Department of Computer Science, School of Computer Engineering
- Hong Kong College of Technology
  - Department of Computer and Information Technology (HKCT)
- Community College of City University (CCCU)
  - Division of Applied Science and Technology
- Hong Kong Polytechnic University
  - School of Professional Education and Executive Development (SPEED)

Now, I am once again serving CSE, HKUST

Note

You are welcome to talk to me if you have any questions about further study and/or career development!

Teaching Assistants

Full Time TA

- CHIU, Ho Tin (Kelvin)
    - E-mail: kelvinchiu@ust.hk
    - Office: Rm 3543
    - Office hours: Lab time and by appointment

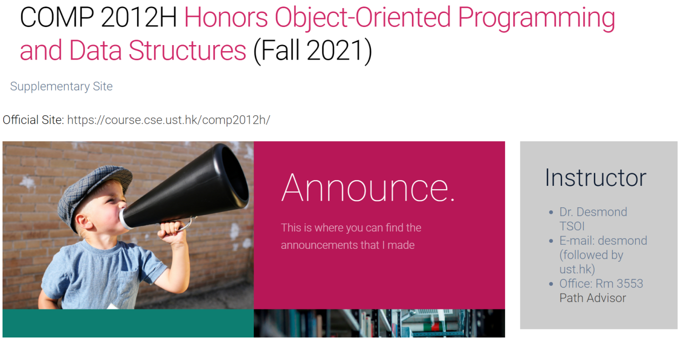
Postgraduate TAs

- CHEN, Hongkai
    - E-mail: hchencf@connect.ust.hk
    - Office: Rm 4204
    - Office hours: Lab time and by appointment
- PANG, Ho Wing
    - E-mail: hwpang@connect.ust.hk
    - Office: Rm 4223
    - Office hours: Lab time and by appointment

Course Website and Supplementary Website

- Official website (For Lecture Notes, Lab Materials, ...):
  `https://course.cse.ust.hk/comp2012h`

- Supplementary website (For Lecture Videos, Progress, ...):
  `https://www.cse.ust.hk/~desmond/comp2012h/Password_Only/`
  - Login: comp2012h
  - Password: < please mark it down :) >



COMP 2012H Honors Object-Oriented Programming and Data Structures (Fall 2021)

Supplementary Site

Official Site: https://course.cse.ust.hk/comp2012h/

Announce.

This is where you can find the announcements that I made

Instructor

- Dr. Desmond TSOI
- E-mail: desmond (followed by ust.hk)
- Office: Rm 3553 Path Advisor

- Canvas site (For Grades and Discussion via Piazza)

Lecture

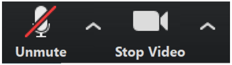
- Section L1 (Dr. TSOI, Desmond)
  Tue and Thu,
  9:00am - 10:50am,
  Rm 2405
  (Mixed-mode Lite)

Zoom Link: https://hkust.zoom.us/j/98532300600?pwd=NnNoMjlHcm9TQzc3SHduZzN1R05zUT09

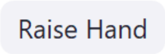
For those who are not in Hong Kong, when attending a lecture Zoom meeting, make sure to set up your screen username to:

LASTNAME Firstname studentusername E.g., CHAN Tai Man (ctaiman)

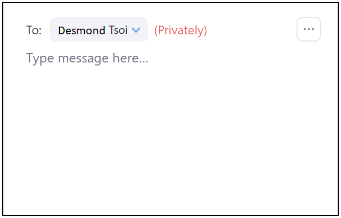
- During a Zoom lecture meeting, please remain muted in order to avoid background noise



- If you have questions, click “Raise hand” and you will be unmuted to speak



- You can also use the Chat function to post questions and comments


To: Desmond Tsoi (Privately)

Type message here...

- Try to join the meeting with your camera turned on as this helps create a more interactive online class experience

I will start the Zoom meeting 5 to 10 minutes earlier. :)

Labs

- Section LA1 (CHIU Ho Tin, CHEN Hongkai & PANG Ho Wing)
  Wed, 3:00pm - 4:50pm, Zoom
  (Real-time Online Mode)
  Zoom Link: `https://hkust.zoom.us/j/94262094077?pwd=RDQrRTkvejFzTFhmTEsxeWJNVGtRUT09`
- Section LA2 (This session will have no scheduled meetings)
  You will be provided with access to video-on-demand recordings of the weekly lab material which you will follow at your own pace.
- Check the lab page in the course website
  `https://course.cse.ust.hk/comp2012h/`

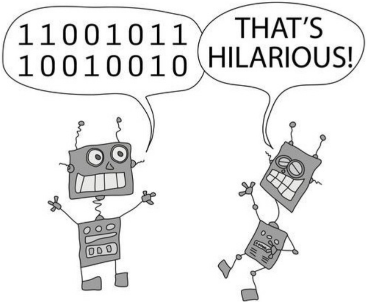
Note

- There will be no lab in the first two weeks
- The lab time for the first two weeks (i.e., 1 & 8 September (Wednesday) from 3:00 - 4:50pm) will be used to cover some COMP 2012H topics ;)
- The first "real" lab will be conducted in week 3 (i.e., 15 September)

When attending a Zoom lab meeting, make sure to set up your screen username to:

LASTNAME Firstname studentusername E.g., CHAN Tai Man (ctaiman)

- During a meeting
  If you want to talk to your TA, "raise your hand", the TA will answer your questions. If you need to share your screen, the TA will place you in the "Private Discussion Room" and go in temporarily to handle it. TA will follow chronological order when handling the raise hand request.



Important Notes about the Labs

- 8 lab exercises will be given to consolidate your understanding of course materials.
- Although we do not expect you to finish the lab exercises before you attend the lab, we expect you to have read the lab's materials and understand what you are required to do.
- 1 point for each lab.
- To get point/partial point for the lab, you are required to finish the requirement/program and submit it to ZINC (automatic grading system) on or before 23:59 on Friday of the lab week. No late lab assignment will be accepted.
- The higher of two successive lab scores will be counted towards the final lab score, i.e., Max(Lab1, Lab2), Max(Lab3, Lab4), Max(Lab5, Lab6), Max(Lab7, Lab8)
- Materials will be released around a week before the lab.
- Holiday policy.

Course Description

- The course consists of, per week
  - 4 hours of lectures
  - 2 hours of lab exercises

  and it gives 5 credits for successful completion of the course.
- Prerequisites
  Grade A or above in
  - COMP 1002 Computer and Programming Fundamentals I (prior to 2013-14) OR
  - COMP 1021 Introduction to Computer Science OR
  - COMP 1022P Introduction to Computing with Java OR
  - COMP 1022Q Introduction to Computing with Excel VBA OR
  - ISOM 3230 Business Applications Programming
- Exclusion
  - COMP 1004 Programming Fundamentals & Methodology (prior to 2013-14)
  - COMP 2011 Introduction to Object-Oriented Programming / Programming with C++
  - COMP 2012 Object-Oriented Programming and Data Structures

Course Objectives / Aims

- This is an accelerated and intensive course on concepts and techniques behind object-oriented programming (OOP) and data structures using an OOP language.
- It covers the major materials of COMP2011 and COMP2012, and its curriculum is designed for students with excellent programming background or substantial programming experience.

In short

COMP2012H is a highly accelerated course, “not depth”.

Course Objectives / Aims

- Topics include:
  - introduction to computer programming;
  - fundamentals of C++:
    data types, variables, operators;
  - flow controls;
  - arrays;
  - functions, scope, and recursion;
  - file I/O;
  - pointers;
  - structures and linked lists;
  - class, object construction, initialization, and destruction;
  - inheritance and polymorphism;
  - generic programming;
  - some new features in C++11;
  - rvalue reference and move semantics;
  - Standard Template Library;
  - static data members and member functions;
  - stack and queue;
  - binary search trees;
  - hashing.

Intended Learning Outcomes

On successful completion of this course, you are expected to be able to:

1. Use common software tools to develop and debug a program written in an OOP language.
2. Demonstrate that recursive and non-recursive functions are abstractions of sub-problems in a task.
3. Describe the concept and the use of pointers in indirect addressing and dynamic memory allocation.
4. Write object-oriented programs in C++ with object creation, destruction, member variables and functions, inheritance, polymorphisms, and templates.

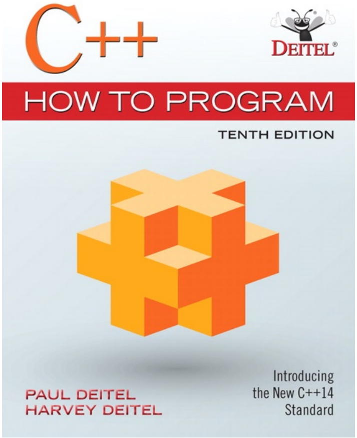
Intended Learning Outcomes

On successful completion of this course, you are expected to be able to:

5. Analyze a program and provide simple solutions with OOP.
6. Write basic algorithms associated with data structures such as stacks, queues, lists, trees, and hashes.
7. Define binary tree and search tree and describe how they are used to solve problems.
8. Develop a large program using separate compilation, good OOP design, and code reuse.

Recommended Textbooks

- C++ How to Program, Paul J. Deitel and Harvey M. Deitel & Associates, Pearson, c2017, Tenth Edition.
- ISBN: 9789332585737 (1104 pages)
- Available at campus bookstore
- Online version is also available at UST library



Note

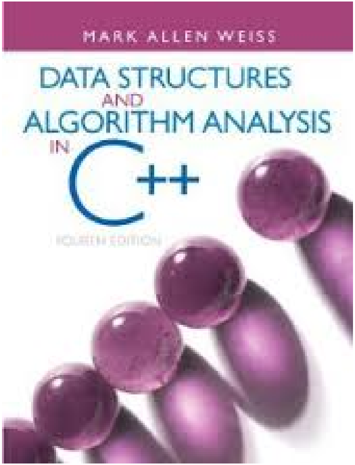
- This textbook uses C++11 codes
- Discusses about new features in C++14

There are only few copies availale in the campus bookstore. On the other hand, you may purchase an e-version of book from the campus bookstore for HK$316. We were told that it may take around 3 days to get the code for an ebook.

Recommended Textbooks

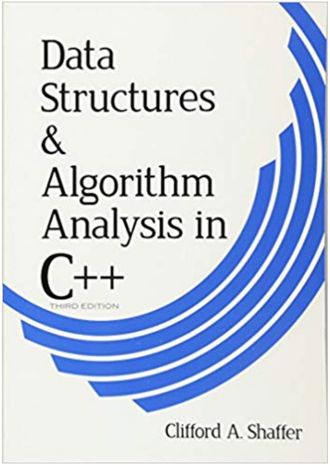
- Data Structures and Algorithm Analysis in C++, Mark Allen Weiss, Pearson, c2014, Fourth Edition.
- ISBN: 013284737X (635 pages)
- Available at HKUST Library.
  - QA76.73.C153 W46 2014
  - QA76.73.C153 W46 2014 c.2

The book is out of print. You may be able to find some free PDF copy on the Web.



Recommended Textbooks

- Data Structures and Algorithm in C++, Clifford A. Shaffer, Dover Publications, c2011, Third Edition.
- ISBN: 9780486485829 (615 pages)
- Available at HKUST Library.
  - QA76.9.D35 S45 2011b



Data Structures & Algorithm Analysis in C++

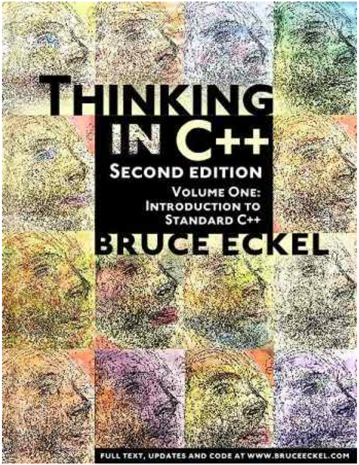
THIRD EDITION

Clifford A. Shaffer

A free copy from the author, Clifford A. Shaffer is available at:
`http://people.cs.vt.edu/~shaffer/Book/C++3elatest.pdf`

Recommended Textbooks

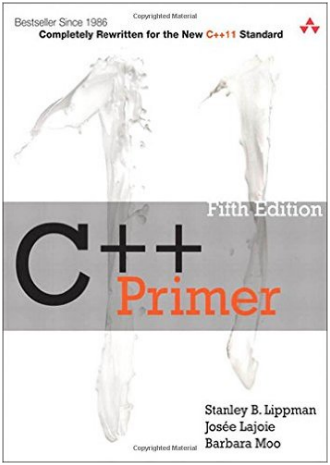
- Thinking in C++, Eckel Bruce, Prentice Hall, c2000 - c2004, Second Edition.
- ISBN: 0139798099
- Available at HKUST Library.
  - QA76.73.C153 E247 2000 v.2
  - QA76.73.C153 E247 2000 v.2 c.2


THINKING IN C++
SECOND EDITION
VOLUME ONE: INTRODUCTION TO STANDARD C++
BRUCE ECKEL
FULL TEXT, UPDATES AND CODE AT WWW.BRUCEECKEL.COM

A free copy from the publisher is available online at:
`http://www.cs.ust.hk/~dekai/library/ECKEL_Bruce/`

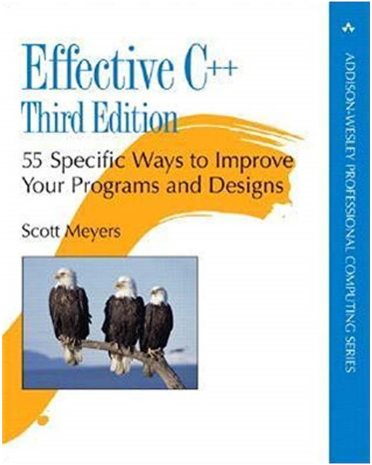
Recommended Textbooks

- C++ Primer, Stanley B. Lippman, Josee Lajoie, Barbara E. Moo, Addison-Wesley, c2013, Fifth Edition.
- ISBN: 9780321714114 (938 pages)
- Available at HKUST Library.
  - QA76.73.C153 L57697 2013



Recommended Textbooks

- Effective C++, Scott Meyers, Addison-Wesley Professional, c2005, Third Edition.
- ISBN: 9786612647499 (297 pages)
- Available at HKUST Library.
    - Online Access


Effective C++
Third Edition
55 Specific Ways to Improve Your Programs and Designs
Scott Meyers
ADDISON-WESLEY PROFESSIONAL COMPUTING SERIES

Other Materials

- Self-tests
- Past COMP 2011, COMP 2012 & COMP 2012H exam papers
- Reserved books in HKUST library
  - The C++ Programming Language
    - ★ Author: Bjarne Stroustrup
    - ★ Call#: QA76.73.C153 S77 2013
  - Problem Solving with C++
    - ★ Author: Walter Savitch
    - ★ Call #: QA76.73.C153 S273 2012
  - Programming in C++: Lessons and Applications
    - ★ Author: Timothy B. D' Orazio
    - ★ Call #: QA76.73.C153 D66 2009
  - C++ for Everyone
    - ★ Author: Cay S. Horstmann
    - ★ Call #: QA76.73.C153 H6685 2012

Bjarne Stroustrup
[Pronunciation]
Designer and original implementor of C++

Alan Kay
Pioneer of OOP

Tentative Teaching Schedule

Topic	#Lectures	Cumulative #Lectures
Introduction	1	1
Fundamentals of C++	1	2
Flow Controls	1.5	3.5
Functions, Scope, and Recursion	2	5.5
Arrays	1	6.5
Pointers	2	8.5
Structures and Linked List	2	10.5
Class, Object Constr., Init., & Destruction	2	12.5
Inheritance and Polymorphism	3	15.5
Generic Programming	3	18.5
rValue Reference and Move Semantics	2	20.5
Some Features in C++11	2	22.5
Standard Template Library	2	24.5
Static Data Members and Member Functions	0.5	25
Stack and Queue	0.5	25.5
Binary Search Tree (BST)	2	27.5
Hashing	1.5	29

Note

- The schedule is subject to change according to the teaching and learning progress!
- Makeup/Additional classes will be offered
  - October 14 (Thursday): Chung Yeung Festival

C++ Version and Software

- We use C++ version 2011
  as the programming standard for this course
- Integrated Development Environment (IDE)
  - VSCode with MinGW/GCC version 8.1.0
- C++ Compiler
  - g++

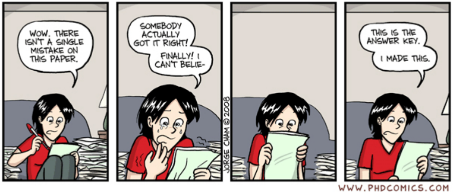
Note

- Starting from 2011, C++ rolls out a new standard every 3 years!
- Compilers need time to catch up
- You are suggested to check your compilers if they support the new codes

Grading Scheme

Assessment breakdown:

- Coursework (64%)
  - 4 Lab Exercises (8%) The higher of two successive lab scores will be counted towards the final lab score, i.e., Max(Lab1, Lab2), Max(Lab3, Lab4), Max(Lab5, Lab6), Max(Lab7, Lab8)
  - 4 Individual Programming Assignments (32%)
  - 1 Group Programming Project (24%)
- Final Examination (36%)



Coursework (64%) + Examination (36%) = Total (100%)

Note

No make-up exams will be given unless under very unusual circumstances, e.g., sickness, with letters of proof

Individual Programming Assignments

Tentative schedule

	Release Date	Due Date	Duration
PA1	September 13 (Monday)	September 27 (Monday)	2 weeks
PA2	September 27 (Monday)	October 11 (Monday)	2 weeks
PA3	October 11 (Monday)	October 25 (Monday)	2 weeks
PA4	October 25 (Monday)	November 8 (Monday)	2 weeks

Code Submission

Submission should be done on ZINC - automatic grading system

Group Programming Project

- Form a group of 2 to 3 people to work on a self-proposed project.
- Project deliverables
  - Proposal report (one A4 page) describing what problem(s) you try to address and state why you find the problem(s) important or interesting
  - Code with documentation
  - Project Demonstration
- Tentative schedule

Group Forming Deadline	Proposal Submission Deadline	Project Submission Deadline	Project Demonstration
October 11 (Monday)	October 25 (Monday)	November 29 (Monday)	December 1 (Wednesday)

Proposal and Code Submission

Submission should be done on Canvas

Academic Dishonesty

- Anyone “both the copier and the copiee” caught cheating on their assignments will get zero marks for the assignment.
- In addition, they BOTH will get an additional 10% deduction from the final grade for the first time of cheating. Anyone get caught for cheating in an assignment for the 2nd time will get an immediate FAIL grade.
- On the other hand, anyone caught cheating in the final exam will get a FAIL grade immediately.
- There can be additional disciplinary actions as well from the department and university.
- Links:
  - University's Honor code: `http://ugadmin.ust.hk/integrity/student-1.html`
  - University's Penalties for Cheating: `http://ugadmin.ust.hk/integrity/student-5.html`

Academic Dishonesty (Cont'd)

- We will use a software to check your codes with others' program, and even with previous assignments. The tool is hard to beat. The suspected cases will be further studied by the instructor and the TAs.

COPYING WITHOUT PERMISSION IS STEALING!
mimiandeunice.com
COPYING WITHOUT PERMISSION IS STEALING!
!
THIEF!

If you are not sure what is considered plagiarism

- DO NOT copy program codes from another student/person.
- DO NOT look at the actual program codes of another student.
- DO NOT share actual program codes with other students/people (by paper, emails, blogs, FB, Google Doc, etc.).
- DO NOT give your program codes to other students who ask for it, and do not ask for a copy of their code either.
- DO NOT post your program codes anywhere online.
- DO NOT leave your finished/unfinished program codes unattended.
- While we encourage discussion among students, you have to write codes on your own.
- During discussion, you SHOULD NOT go to the details such that everyone will end up in the same code.

The list is by no means exhaustive, and you will need to use your own discretion.

How Hard Should I Work?

- Some people say that a 3-unit course takes 8 hours/week.
- For COMP 2012H, it is a 5-unit course, so you are expected to spend more time, e.g., 13-14 hours/week.
- Guideline:
  - Pre-study (1 hour): what topic/materials will the coming lecture be covering?
  - Attend class (4 hours): The A+ students tell you that they pay FULL attention in class and try to understand everything in the class so that it is easy to review the class materials.
  - Attend labs (2 hours)
  - Post-study (8-9 hours): Re-reading the notes, book reading.

That's all!

Any question?