IM 1010: Data Structures and Advanced Programming
Spring 2018 (106-2)

Instructor: Chien-Chin Chen and Ling-Chieh Kung
Department of Information Management
National Taiwan University

This is an introductory course on data structures, concerning the various ways of organizing data so that the data can be accessed and manipulated efficiently by an application. A central concept is that of an abstract data type, which is a collection of data and a set of operations on the data. The course therefore focuses on the fundamental concepts, techniques, and tools for the design and implementation of abstract data types, following the teaching of object-oriented design and programming for computer problem solving. The first six weeks of this semester will be used to introduce object-oriented programming. The other twelve weeks are for data structures. We use the programming language C++ in this course. C++ is just something that facilitates the delivery of the concepts, principles, and ideas.

This is a required course for first-year undergraduate students in the Department of Information Management in National Taiwan University. We assume students have taken "Programming Design" in the IM department or an introductory programming course at the similar level. All students who has the required background are welcome to enroll in or audit this course. If there are too many students who want to enroll in this course, the instructor will announce the selection process in the first lecture.

Basic information

Instructor.

- Chien-Chin Chen (陳建錦): patonchen(AT)ntu.edu.tw; Room 414, Management Building 2. `http://www.im.ntu.edu.tw/~paton/`.
- Ling-Chieh Kung (孔令傑): lckung(AT)ntu.edu.tw; Room 413, Management Building 2. `http://www.im.ntu.edu.tw/~lckung/`.

Teaching Assistants. TBD.

Lectures. 2:20-5:20 pm, Monday. Room 202, Management Building 2.

Textbook.

CH *Data Abstraction and Problem Solving with C++: Walls and Mirrors* by Carrano and Henry, sixth Edition, Pearson, 2013.

DD *C++ How to Program: Late Objects Version* by Deitel and Deitel, seventh edition, Pearson Education. 臺灣代理: 歐亞圖書, (02) 8912-1188.

On-line Resources.

- To check grades: CEIBA.
- To download materials: TBA.
- To submit homework: PDOGS, `https://pdogs.ntu.im`.
- To discuss: Piazza.

Grading

Breakdown.

- Homework: 20%.

- Programming assignment: 20%.
- Final project: 20%.
- Two exams: 40%.
- (Bonus) class participation: 5%.

Conversion rule. The final letter grades will be given according to the following conversion rule:

Letter	Range	Letter	Range	Letter	Range	Letter	Range	Letter	Range
F	$[0, 60)$	C$-$	$[60, 63)$	C	$[63, 67)$	C+	$[67, 70)$	B$-$	$[70, 73)$
B	$[73, 77)$	B+	$[77, 80)$	A$-$	$[80, 85)$	A	$[85, 90)$	A+	$[90, 100]$

Regrading. The TAs will grade everything except the final project and regrade them upon request. If you have a regrading request, please contact the TAs directly.

Policies

"Flipped classroom". For some lectures, the instructor will do "lectures in videos, discussions in classes." Before those lectures, the instructor will upload videos containing some materials to be discussed on that day. The total length of those videos for one lecture will be around 60 to 90 minutes. Students must find their own time to watch the videos before the lecture. During lectures, we answer students' questions regarding materials in the videos, provide exercise problems for students to do on-site exercises, and talk about some supplemental materials. Lecture problems do not count for grades; they are for the learning purpose only.

Homework and programming assignments. There will be four programming assignments. Please upload your C++ source codes (and other files, if required) to the online grading system PDOGS by the due time. No submission in class or in lab. No hard copy. No late submission. There will be several homework that do not require programming. While discussions are highly encouraged, each student must turn in her/his own homework. Cheating will result in severe penalty for everyone involved.

PDOGS. For programming assignments, we rely heavily on the Programming Design Online Grading System (PDOGS, or P-Dogs). After a student uploads her/his C++ source file, the system will automatically compile and run the program with respect to some testing data, calculate grades, and display the grades to the student. One may repeatedly modify his program and upload again and again until she/he is satisfied. Only the last grades before the due time will be recorded.

Office hour. You are welcome to the instructors' office hour to ask him any question. You may ask him to clarify some concepts, give hints for homework problems, or discuss the final project. In fact, discussions not related to course materials are also welcome. However, because one must have enough painful experiences in debugging and revising programs, the instructors (and TAs) may refuse to debug for any student. If you want to schedule a meeting, please feel free to send the instructor an e-mail at any time.

Attendance and class participation. We do not count attendance. If you have something more important to do, please feel free to drop a lecture or a lab. Nevertheless, we encourage class participation and include it in evaluating each student. During lecture time or office hour, you are more than welcome to ask or answer questions and provide comments. You are also encouraged to use Piazza for after-class discussions.

Final project. Students should form teams to do one final project. The instructor will only specify a rough direction. Each team then decides its own topic, build a program for its own objective, and demonstrate its program to the class publicly.

Exams. For two Mondays we will have exams during the lecture time. Both exams are closed-book. No electronic device is allowed. Cheating will result in a severe penalty for everyone involved.