浙江大學

COMP923
Data Structures & Algorithms

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Instructor Contact Details

Lecturer-in-charge: TBA

Email: wlwyxy_29@zju.edu.cn

Office location: Huajiachi Campus, Zhejiang University

Consultation Time: to be announced, and by appointment

Teaching Times, Modes and Locations

The Time: TBA

Modes: Online/Face-to-face

Location: Anywhere via online/Huajiachi Campus, Zhejiang University via face-to-face

Academic Level

Postgraduate

Units of Credit

The course is worth 6 units of credit

Credit Hours

The number of credit hours of this course equals to the credits of a standard semester-long Australian university course.

Contact Hours

The course contains a total of 53 contact hours, which consists of orientation, lectures, seminars, quiz, discussion, research, case study, small tests, assignments, on-site field trip(s), in-class and after-class activities, revision and final exam. Students will receive an official transcript which is issued by Zhejiang University when completing this course.

Course Description:

The course covers analysis and design of fundamental data structures and engages learners to use data structures as tools to algorithmically design efficient computer programs that will cope with the complexity of actual applications. The course focuses on basic and essential topics in data structures, including array-based lists, linked lists, skiplists, hash tables, recursion, binary trees, scapegoat trees, red–black trees, heaps, sorting algorithms, graphs, and binary trie, deepen your understanding of data structures and algorithms and how these can be employed effectively in the design of software systems. It is an important course in covering a range of core data structures and algorithms that will be used in context in later courses. You explore these ideas in lectures, tutorials, lab classes, and assignments. Assessment involves labs, tutorials, practical lab exams, a practical final exam, and a theory exam.

Prerequisite:

N/A

Learning Resources

Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest and Clifford Stein, Introduction to Algorithms, Third Edition, MIT Press.

Recommended further reading:

1. Algorithms and Data Structures - The Basic Toolbox by Kurt Mehlhorn and Peter Sanders, Springer, 2008. (the full text is available on the Author's website).

2. Data Structures and Algorithms in Java by Michael T. Goodrich, Irvine Roberto Tamassia, and Michael H. Goldwasser, Wiley, 6th Edition, 2014. (available in the library).

Learning Objectives

By the end of this course you should be able to:

・Explain the systematic methods of efficiently organizing and accessing data in data structures and algorithms.

・Identify the properties and structural patterns in data structures.

・Apply abstract data types to the design of data structures.

・Analyze algorithms using a mathematical notation and experimental studies.

・Perform comparative analysis of the typical data structures and algorithms.

・Design and analyze recursive algorithms in data structures.

・Write code in pseudocode and high-level programming languages for the implementation of various data structures and algorithms.

Course Delivery:

- Online Lecture mode includes lectures, seminars, quiz, discussion, research, case study, small tests, assignments, online field trip(s), in-class activities, revision and final exam.
- Face-to-face Lecture mode includes lectures, seminars, quiz, discussion, research, case study, small tests, assignments, on-site field trip(s), in-class and after-class activities, revision and final exam.

The following course will be taught in English. There will also be guest speakers and optional field trips available for students who would like to enhance their learning experience. All courses and others sessions will be run during weekdays.

Topics and Course Schedule:

Topic	Activities
Orientation	
Introduction: Analysis of Algorithms	Lecture; Tutorial
Array-Based Lists	Lecture; Tutorial
Linked Lists **Balanced Trees, Search Tree Algorithms**	Lecture; Tutorial

Graph ADT, Graph Algorithms (1) **Skiplists**	Lecture; Tutorial
Graph Algorithms (2)	Lecture; Tutorial
Seminar	
Hashing, Heaps	Lecture; Tutorial
Red–Black Trees **Generic ADTs in C**	Lecture; Tutorial
Seminar	
Sorting Algorithms **Sorting (1)**	Lecture; Tutorial
Sorting Algorithms **Sorting (2)**	Lecture; Tutorial
LABS	Lecture; Tutorial
Deeper understanding of text processing algorithms	Lecture; Tutorial
Course Review	Lecture; Tutorial
Research and exercises	Lecture; Tutorial
Revision	
Final exam	

Assessments:

Assignment	30%
Quiz	30%
Case Research	10%
Final exam	30%

Grade Descriptors:

HD	High Distinction	85-100
D	Distinction	75-84
Cr	Credit	65-74
P	Pass	50-64
F	Fail	0-49

High Distinction 85-100

Treatment of material evidences an advanced synthesis of ideas

Demonstration of initiative, complex understanding and analysis

Work is well-written and stylistically sophisticated, including appropriate referencing, clarity, and some creativity where appropriate

All criteria addressed to a high level

Distinction 75-84

Treatment of material evidences an advanced understanding of ideas

Demonstration of initiative, complex understanding and analysis

Work is well-written and stylistically strong

All criteria addressed strongly

Credit 65-74

Treatment of material displays a good understanding of ideas

Work is well-written and stylistically sound, with a minimum of syntactical errors

All criteria addressed clearly

Pass 50-64

Treatment of material indicates a satisfactory understanding of ideas

Work is adequately written, with some syntactical errors

Most criteria addressed adequately

Fail 0-49

Treatment of ideas indicates an inadequate understanding of ideas

Written style inappropriate to task; major problems with expression

Most criteria not clearly or adequately addressed

Academic Integrity

Students are expected to uphold the university's academic honesty principles which are an integral part of the university's core values and principles. If a student fails to observe the acceptable standards of academic honesty, they could attract penalties and even disqualification from the course in more serious circumstances. Students are responsible for knowing and observing accepted principles of research, writing and any other task which they are required to complete.

Academic dishonesty or cheating includes acts of plagiarism, misrepresentation, fabrication, failure to reference materials used properly and forgery. These may include, but are not limited to: claiming the work of others as your own, deliberately applying false and inaccurate information, copying the work of others in part or whole, allowing others in the course to copy your work in part or whole, failing to appropriately acknowledge the work of other scholars/authors through acceptable referencing standards, purchasing papers or writing papers for other students and submitting the same paper twice for the same subject.

This Academic Integrity policy applies to all students of the Zhejiang University in all programmes of study, including non-graduating students. It is to reinforce the University's commitment to maintain integrity and honesty in all academic activities of the University community.

Policy

- The foundation of good academic work is honesty. Maintaining academic integrity upholds the standards of the University.
- The responsibility for maintaining integrity in all the activities of the academic community lies with the students as well as the faculty and the University. Everyone in this community must work together to ensure that the values of truth, trust and justice are upheld.
- Academic dishonesty affects the University's reputation and devalues the degrees offered.
- The University will impose serious penalties on students who are found to have violated this Policy. The following penalties may be imposed:
    - Expulsion;

- Suspension;
- Zero mark/fail grade;
- Marking down;
- Re-doing/re-submitting of assignments or reports; and
- Verbal or written warning.