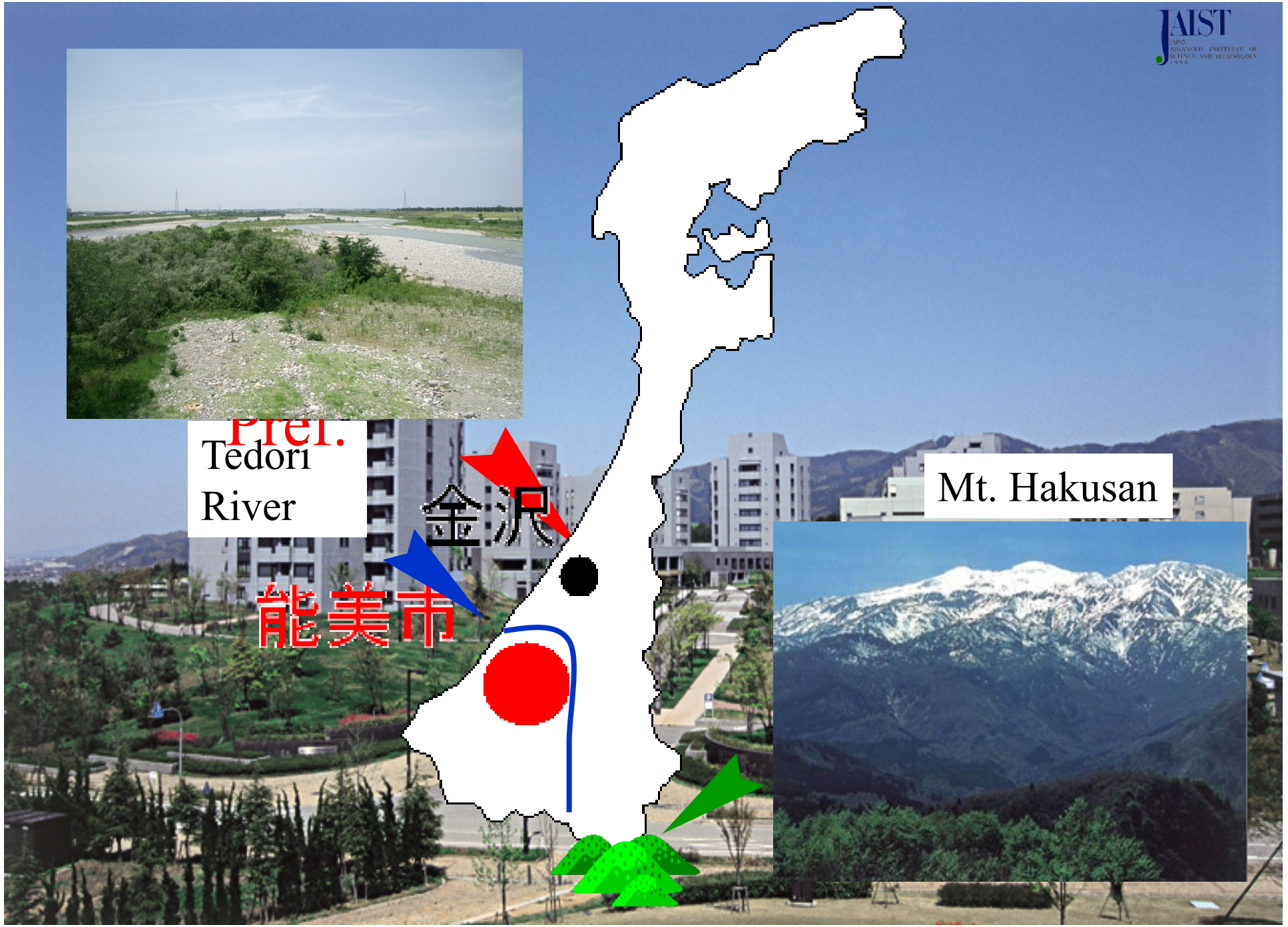
Introduction to Algorithms and Data Structures

Lesson 0: Introduction

Professor Ryuhei Uehara,
School of Information Science, JAIST, Japan.
uehara@jaist.ac.jp
http://www.jaist.ac.jp/~uehara


Pref.
Tedori River
金沢
能美市
Mt. Hakusan

Last week

Spring!

JAIST is a special university in Japan

(my personal opinion)

No undergraduate students

- University on strong research
  - 3 supercomputers are available and free for use
  - Internet connection is **strong**
  - Library is available 24 hours per day and 365 days per year
- 4 semesters: Each lecture is done in 2 months (twice a week ×15 times)
- Students and professors are “close”
  - 400 faculty members and 1000 students in total?
- 54% students are coming from outside of Japan

Affiliation:

JAIST School of Information Science

Professor

DBLP Info.:

Erdös number＝2
(with Pavol Hell)

Director of JAIST Gallery
(with more than 10000 puzzles)

I'd like to give some talks in the last day…?

Specialist of Theoretical Computer Science

- Algorithms
  - Graph Algorithms
- Computational Complexity
  - of Puzzles and Games…
  - Recreational Mathematics
- Computational Geometry
  - Computational Origami

refine by author

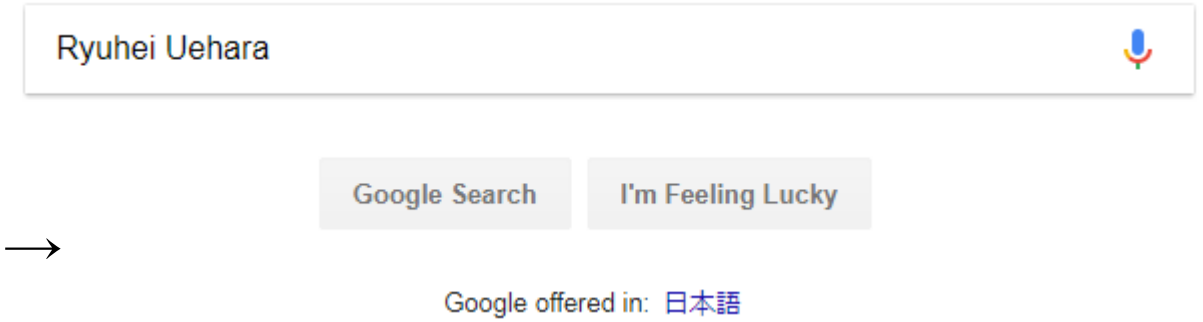
Ryuhei Uehara (158)
Erik D. Demaine (39)
Takeaki Uno (27)
Yota Otachi (27)
Yushi Uno (26)
Martin L. Demaine (22)
Toshiki Saitoh (19)
Takehiro Ito (17)
Yoshio Okamoto (16)
Takashi Horiyama (13)
127 more options

refine by venue

CCCG (18)
ISAAC (14)
WALCOM (12)
Theor. Comput. Sci. (12)
CoRR (11)
IEICE Transactions (9)
TAMC (7)
Bulletin of the EATCS (6)
FUN (4)
Discrete Applied Mathematics (4)
37 more options

Some information and materials

- http://www.jaist.ac.jp/~uehara/course/2019/myanmar/
  - Please check it at least once ☺
  - You can find the page by google;



→ Courses →

> Short Lectures in University of Information Technology, Yangon, Myanmar.
> From January 28 (Monday) to February 1 (Friday) 2019: Introduction to Algorithms and Data Structures.

http://www.jaist.ac.jp/~uehara/class/2019/Myanmar/index.html

Introduction to Algorithms and Data Structures

Course goal

To understand the meaning and importance of algorithms.

Course content

A formal procedure for solving a problem is called an ``algorithm'' and a way of storing data in a computer is called a data structure. There may be a number of combinations of algorithms and data structures for a problem, in general. It is important to evaluate them by computation time and space requirement to choose the best combination. It is not sufficient to understand conventional algorithms, but it is more meaningful to master how to design algorithms. In this lecture, a general but basic scheme for algorithm design through validation of correctness of algorithms and investigation of improvement of algorithm efficiency is explained.

References

- Introduction to Algorithms, Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, and Clifford Stein, MIT Press, 2009.
- First Course in Algorithms through Puzzles (Tentative), Ryuhei Uehara, in printing, 2019. (This book is now under consideration for publish. Please use this part of copy in your personal use, and do not distribute on the net.)

Tentative Schedule

0. Intruduction to Introduction to Algorithms
1. Foundation of Algorithms (1): Basic model
2. Foundation of Algorithms (2): Simple basic algorithms

Tentative Schedule

0. Intruduction to Introduction to Algorithms
1. Foundation of Algorithms (1): Basic model
2. Foundation of Algorithms (2): Simple basic algorithms
3. Searching (1): Sequential search
4. Searching (2): Block search
5. Searching (3): Binary Search and Hash method
6. Fundation of Algorithms (3): Big-O notation
7. Data Structure (1): Data structures for search algorithms
8. Data Structure (2): Operations on linked lists
9. Data Structure (3): Stack, Queue, and Heap
10. Sorting (1): Bubble sort and Insertion sort
11. Sorting (2): Heap sort and Merge Sort
12. Sorting (3): Quick sort, complexity of sort algorithms, and counting sort
13. Data Structure (4): Data structures for graphs
14. Graph Algorithms (1): Breadth-first search and Depth-first search
15. Data Structure (5): Dynamic Search Tree and its balancing
16. Super Apllication: Computational Origami

If you have any requests, please feel free to tell or email to me. I'll prepare from the past talks