CSC10004: Data Structure and Algorithms

Lecture 0: Introduction

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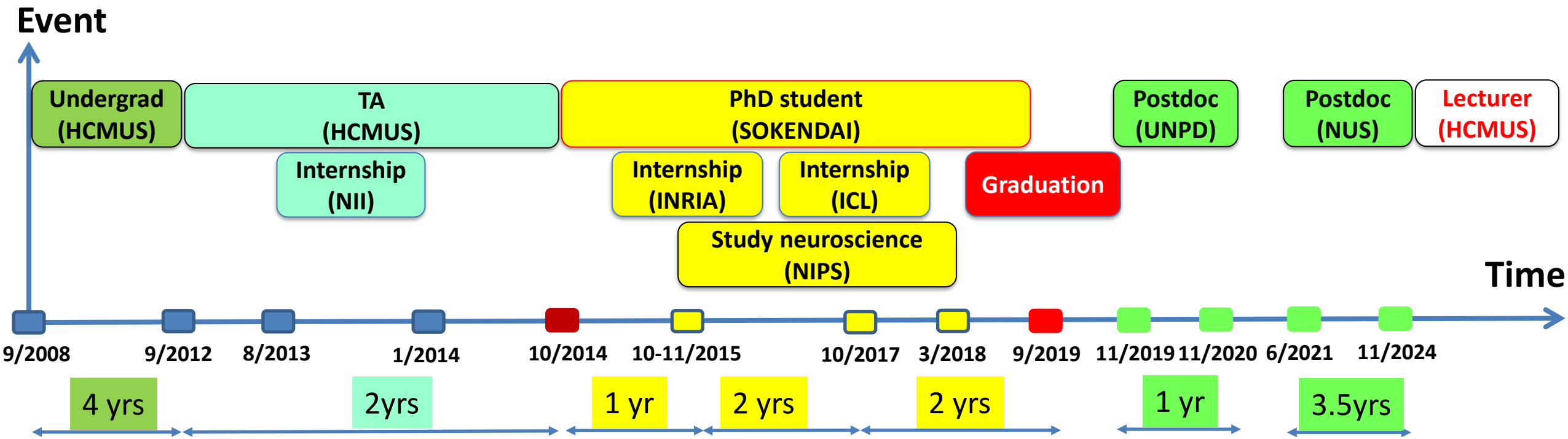
Education – Employment history



HCMUS	University of Science, Ho Chi Minh, Vietnam
NII	National Institute of Informatics, Tokyo, Japan
INRIA	French Institute for Research in Computer Science and Automation, Rennes, France
ICL	Imperial College London, London, UK
NIPS	National Institute of Physiology Science, Aichi, Japan
UNPD	University of Padova, Padova, Italy
NUS	National University of Singapore, Singapore

Outlines

- Course information
- Course topics
- Grading
- Course requirements
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Objectives

- Equip yourself with introductory knowledge and essential skills regarding data structures and algorithms.
- Learn methods to evaluate and estimate the complexity of common algorithms.
- Use data structures well in applications

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Course topics

0. Introduction
1. Algorithm complexity analysis
2. Recurrences
3. Search
4. Sorting
5. Linked list
6. Stack, and Queue, Priority queue
7. Tree
    1. Binary search tree (BST)
    2. AVL tree
8. Graph
    1. Graph representation
    2. Graph search
9. Hashing
10. Algorithm designs
    1. Greedy algorithm
    2. Divide-and-Conquer
    3. Dynamic programming

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- Participation: 10%. Quizzes will be given randomly during the lectures.
- Mid-term test: 10%
- Lab: 40%
- Final test: 40%
- Bonus: 10%. Activities in class and disciplines.

- Cheating: getting 0 for the final result.

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General rules (1/2)

- Do not disturb others in class.
- To be on time and actively participate in class activities.
- There are some quizzes during the course.
- Keep your phone in silent mode.

General rules (2/2)

- Students must strictly adhere to the regulations and rules of the Faculty and the University.
- Students will be barred from taking the final exam if they were absent more than **3 times** in total for theoretical classes.
- In cases of dishonesty during assignments or exams, students will face all disciplinary actions from the Faculty/University and will receive a score of **0** for THE COURSE.

Chatbot policy

- With the advent of AI-driven chatbots like ChatGPT, Gemini, and others, there's a new dimension to the academic resources available to students. These tools can be instrumental in fostering understanding, but they come with their own set of guidelines for responsible use:
  - Using chatbots for enhancing clarity on a topic or concept is acceptable.
  - Directly copying and pasting responses or solutions from these chatbots without a genuine understanding is deemed a severe breach of academic integrity.
  - Should you take assistance from chatbots, it is imperative to explicitly acknowledge it in your submission.
- Non-compliance with the above directives, akin to other forms of academic misconduct, will be treated with utmost seriousness, resulting in consequences as outlined above.

Lab Sessions

- Follow the guidance of the teachers.
- Do not hesitate to ask questions.
- Try your best to get as much experience as you can.
- Language: C++.
- IDE: Visual Studio.

Other notes

- Use official email always.
- Read textbooks more than the requirements.
- Get the knowledge from the videos suggested by the instructors.

Outline

- Course objectives
- Course content
- Student duties
- Grade evaluation
- References

References

- Knuth, Donald Ervin. *The art of computer programming*. Vol. 3. Pearson Education, 1997.
- Cormen, Thomas H., Charles E. Leiserson, Ronald L. Rivest, and Clifford Stein. *Introduction to algorithms*. MIT press, 2022.
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- Motwani, Rajeev. *Randomized Algorithms*. Cambridge University Press, 1995.
- Jon Kleinberg and Eva Tardos. *Algorithm Design*. 1st Edition, 2005, Pearson.