Introduction to CS II
Data Structures

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Welcome!

- The main focus of CS112 is on the design, analysis and implementation of fundamental data structures used throughout computer science.
  - These include linked lists, stacks, queues, trees, hash tables, graphs, as well as specialized methods for searching and sorting.
Programming Language

- All of our implementations will be done in the object-oriented programming language C++
  - In particular, we are to make use of features such as dynamic memory allocation, pointers, and recursion, which are taught at the end of CS111
Important Course Information

- Lecture Times: 10:00-11:00
- Classroom: CAS 226
- Course Homepage: [http://www.cs.bu.edu/~hwxi/academic/courses/CS112.html](http://www.cs.bu.edu/~hwxi/academic/courses/CS112.html)
- Instructor: Hongwei Xi / TA: Dengping Zhu
- Office Hours:
  - Instructor: Monday 1-2:30 and Friday 11-12:30
  - TA: TBA
- Grades Calculation:

  40% (homework) + 20% (midterm) + 25% (final) + 15% (attendance + participation)

  A: 85% or above        B: 75% or above
  C: 65% or above        D: 50% or above
The Emphasis in Teaching (I)

- Developing elegant and efficient code from an abstract specification;
- Literate programming (writing programs that can be read by humans as well as machines);
- Developing a toolbox of advanced data structures for use in your future programming tasks, and an awareness of various design patterns that recur frequently in advanced programming;
- Critical thinking about programs and the programming process, which involves:
The Emphasis in Teaching (II)

- Thinking about the best way to plan out the design using object-oriented design and appropriate features of C++;
- Methodical and efficient development of the implementation using step-wise refinement and incremental testing and debugging (using appropriate debugging tools);
- Being able to convince yourself of the correctness of the implementation by mathematical reasoning;
- Analyzing the running time (efficiency) of programs by inspection and mathematical reasoning; and
- Evaluating the efficiency and correctness of programs empirically, by using various tools in properly designed experiments.
What is this course like?

- It requires that you do a significant amount of programming
  - You are expected to read the documentation and learn some essential debugging skills
  - You are to be given about 6 homework assignments, all of which involve certain amount of programming
What is this course like?

- It proceeds in a fast pace
  - You are expected to read the text that we may not have time to cover in class
  - You are expected to try programming examples that we may not have time to explain in class
  - You may need to take notes on the materials we cover that are not in the textbook, though I will minimize the need for note-taking by providing you with proper handouts.
What is this course like?

- You are to have a rapid exposure to many fundamental concepts in algorithms and data structures
- You are also expected to gain a great deal more understanding of programming, which can be really helpful for you to pursue other subjects in computer science
- Above all, I hope that you will find a great deal more fun in programming
Warnings

- This is likely to be a challenging course for you as many new and unfamiliar concepts are to be introduced rapidly
  - You may need to give some time for certain concepts to “sink in”
  - You may find that some programming assignments are difficult and demanding
  - Please ask for help if you need it: ask it sooner rather than later
Pleas

- It is the first time for me to teach this course, and
- I am likely to be a bit overly ambitious, and
- I am certain to make (quite a few) mistakes, but
- I will do my best to make the course run as smoothly as possible
- Please be patient and ask (a lot of) questions!
Academic Integrity

- Strict adherence to the university guidelines
  - All work you turn in must be solely your own unless specified otherwise
  - You are allowed to discuss problems with your classmates but you need to write your own code and solutions
  - Please always remember that every student deserves a chance to achieve a fair grade
The End

Questions?