EE360C: Algorithms
Course Logistics

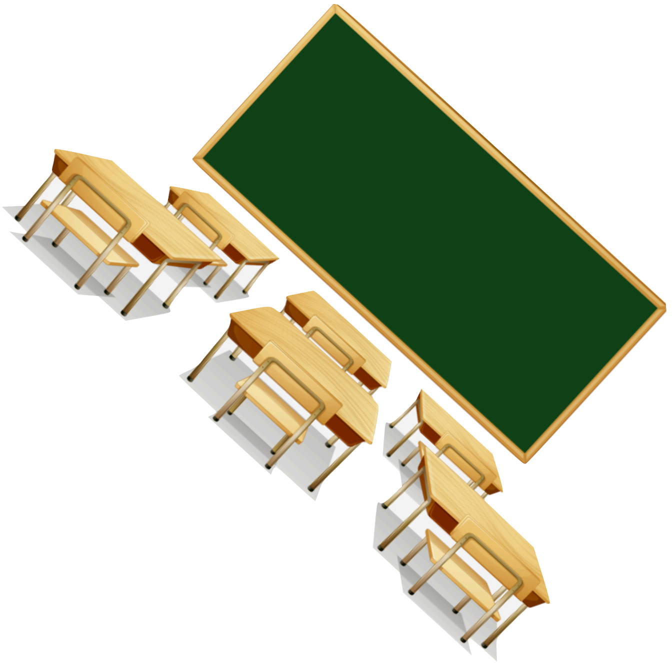
Dr. David Soloveichik

Department of Electrical and Computer Engineering
University of Texas at Austin

Prerequisites

- **Discrete Math** and **EE312 Software Design and Implementation I**
- You should be very comfortable with basic proof techniques such as proof by induction, contradiction, etc, as well as basic mathematical objects such as sets, graphs, etc.
- You should be comfortable writing, compiling, and debugging programs of a moderate complexity (i.e., hundreds of lines of code). Course programming will be done in Java; lectures will not include instruction in any programming language, but preparation from EE312 should be sufficient for the course.

Tilted Classroom



Lectures have two parts:

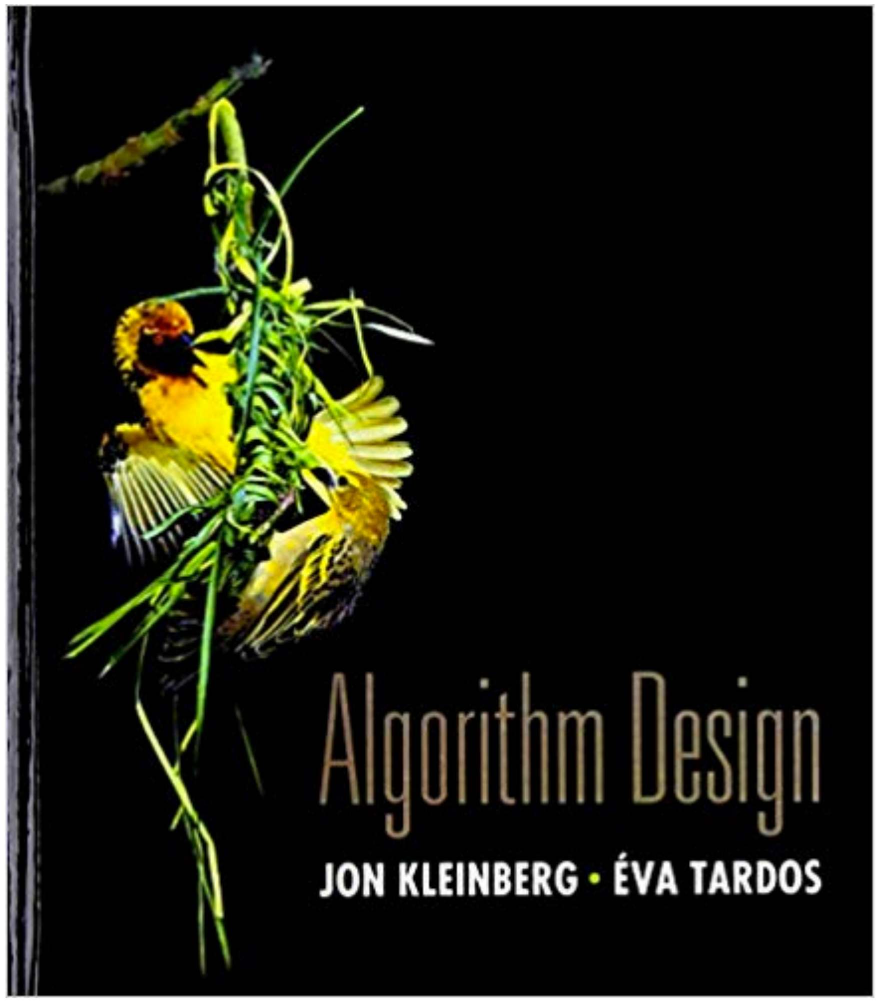
- **Pre-recorded background** (~45 mins):
  - Watch on your own time (asynchronous)
  - Submit question / comment for completion grade ("Background Beans")

- **In-Class Discussion**:
  - Additional content, answer questions, solve problems, motivate next lecture, etc.
  - Not a review of pre-recorded background; necessary part of class

Transition to my Office Hours immediately after class

Textbook

J. Kleinberg and E. Tardos. *Algorithm Design*. Addison Wesley, 2005.



International edition (cheaper)

Optional recommended texts

“CLRS”

- T. H. Cormen, C. E. Leiserson, R. H. Rivest, and C. Stein. *Introduction to Algorithms*. McGraw-Hill, 2009 (Third Edition).

Testing

- 60% of final grade: 5 tests throughout the semester, lowest dropped
- 17% of final grade: final exam
- Tests during class time; final exam during exam period.

- Lots of practice problems and solutions throughout class, **but it's your responsibility to do them**
- Solutions will be made available for every test

Programming Assignments

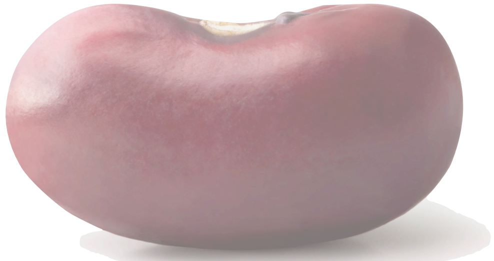
- 20% of final grade: 3 programming assignments (each worth 6.67% of your final grade).
- Required to be in Java (starter code and grader in Java)
- **Collaboration:**
  You can discuss with other students only at a conceptual level. Do not write or program while talking to a fellow student. Do not post your code publicly. Do not cheat with ChatGPT, etc.

You are encouraged to use books, your friends, the internet, ChatGPT, etc, to get solution ideas, but you may not copy/transcribe/transliterate code: get the idea, close the other resource, and then (**after enough time that the idea is in your long-term, not short-term, memory**) generate the code based on your own understanding. It is your responsibility to understand everything that you turn in. We reserve the right to ask you to explain any part of your homework assignment. If you are not able to explain what it means and why you chose it, that is presumed evidence of copying/cheating.

(This collaboration policy is adopted from Michael Ernst of University of Washington, and is used with permission)

Class Participation

- 3% of final grade
- “**Background Beans”**: Submit question / comment for every pre-recorded background video before class on Canvas.
- You get full credit just for submitting something reasonable. Expected length: a sentence to a paragraph.
- **I will choose a few randomly in class and ask you to read it out loud. Have your question / comment ready to go.**

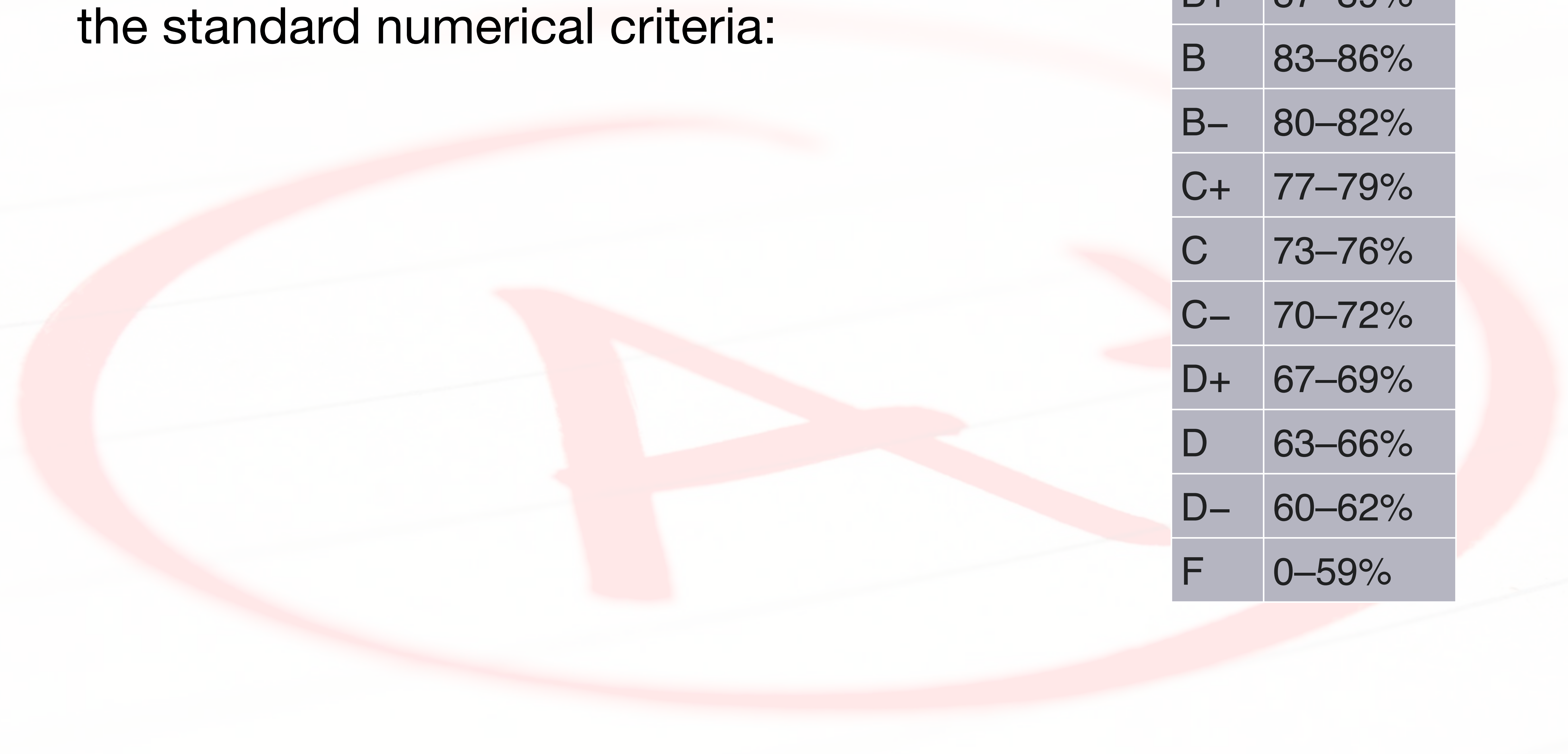


Grading Scale

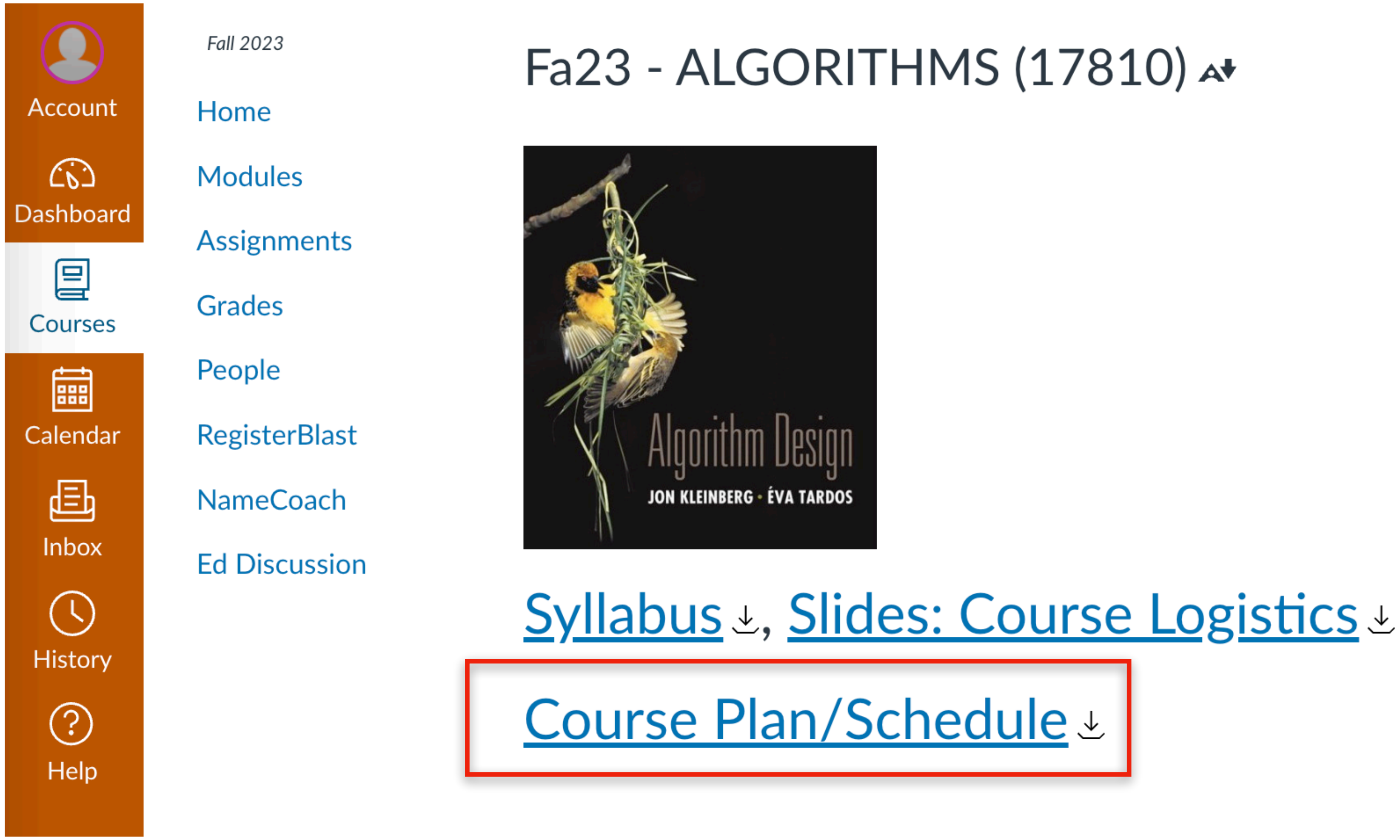
Tests will be graded on a curve

The **final grades** will be assigned based on the standard numerical criteria:

A	93–100%
A–	90–92%
B+	87–89%
B	83–86%
B–	80–82%
C+	77–79%
C	73–76%
C–	70–72%
D+	67–69%
D	63–66%
D–	60–62%
F	0–59%



Tentative Course Plan



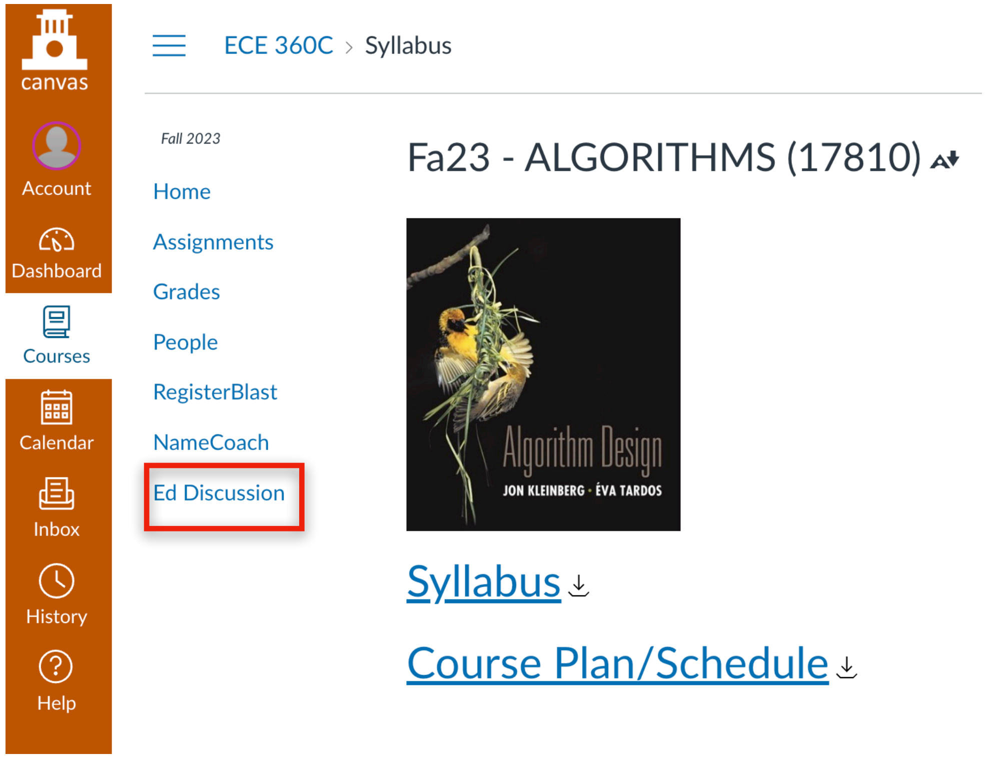
Fa23 - ALGORITHMS (17810)

Syllabus, Slides: Course Logistics

Course Plan/Schedule

Ed Discussion

- The best way to ask me/TAs questions is through the discussion boards on **Ed Discussion** (new this year)
- Other students can answer your question, or benefit from the answer



- **Does not count for Background Beans, which is separate**

Teaching Assistants: Graduate

Brian Vo
brianhvo@utexas.edu

Preston Glenn
preston.glenn@outlook.com
(programming assignments)

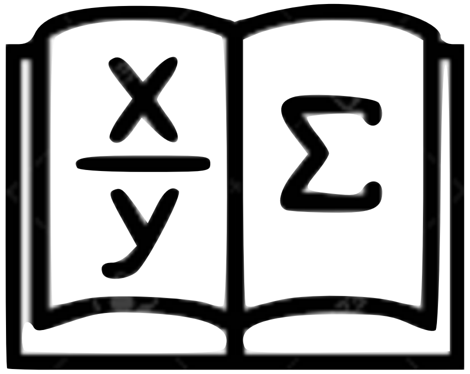
Teaching Assistants: Undergraduate

Nidhi Dubagunta
nidhi.dubagunta@utexas.edu

Fu-Yao (Jefferson) Yu
fu.yao.yu@utexas.edu

This is a **math class**

Programming assignments are used to help you understand the algorithms by implementing them



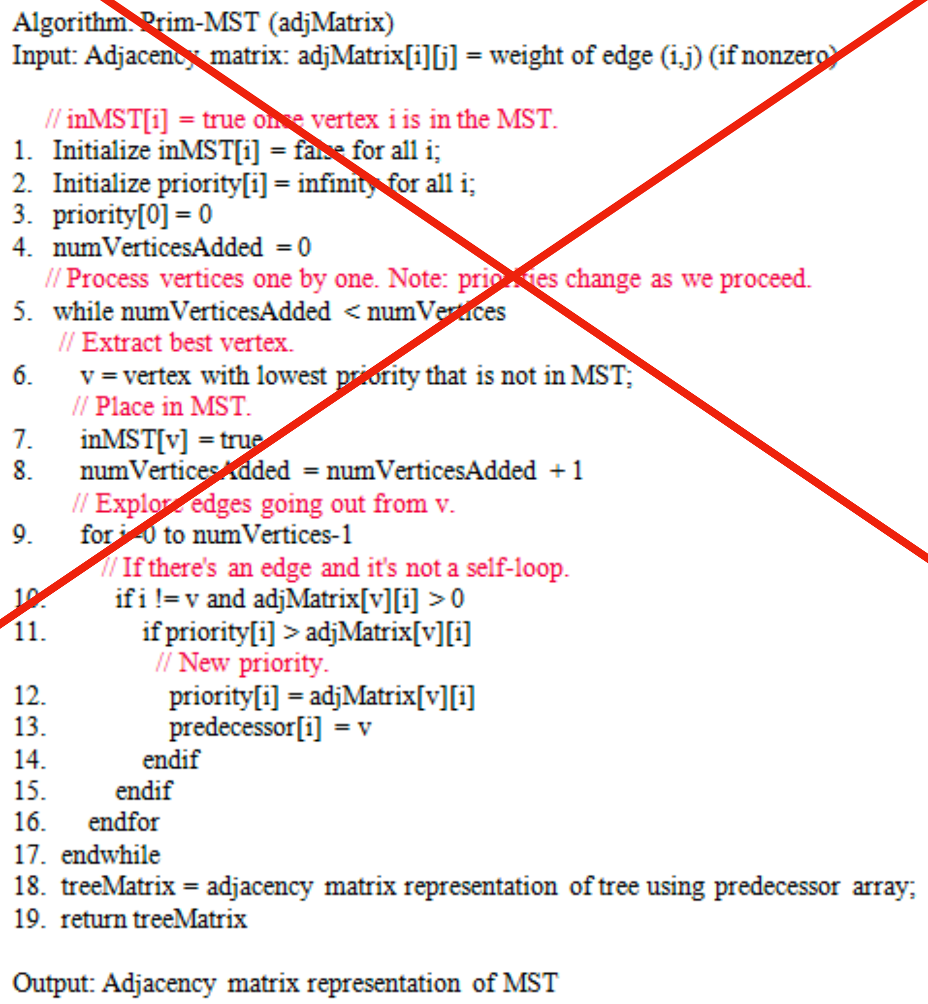
Common Misconceptions about the Class

1. ~~If I memorize everything in the lectures (and the book), I will ace the exams!~~

2. ~~I will skip the lectures, but study a ton of algorithms problems on the web, and I will ace the exams!~~

Common Misconceptions about the Class

3. I have to write detailed pseudocode to describe my algorithms on the tests, making sure to not have off-by-one errors!



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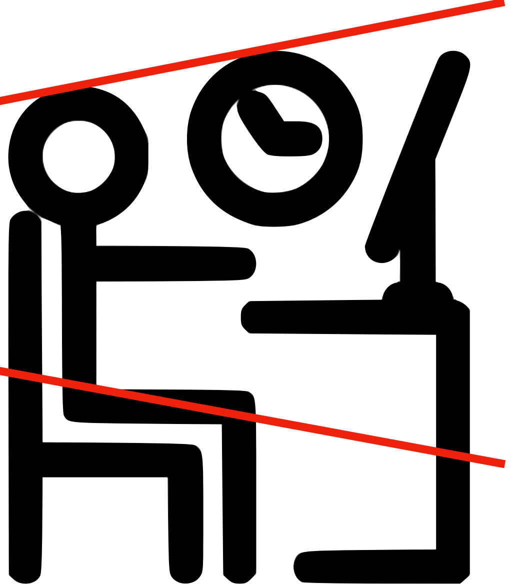
Algorithm: Prim-MST (adjMatrix)
Input: Adjacency matrix: adjMatrix[i][j] = weight of edge (i,j) (if nonzero)

  // inMST[i] = true once vertex i is in the MST.
Initialize inMST[i] = false for all i;
Initialize priority[i] = infinity for all i;
priority[0] = 0
numVerticesAdded = 0
  // Process vertices one by one. Note: priorities change as we proceed.
while numVerticesAdded < numVertices
    // Extract best vertex.
    v = vertex with lowest priority that is not in MST;
    // Place in MST.
    inMST[v] = true
    numVerticesAdded = numVerticesAdded + 1
    // Explore edges going out from v.
    for i=0 to numVertices-1
        // If there's an edge and it's not a self-loop.
        if i != v and adjMatrix[v][i] > 0
            if priority[i] > adjMatrix[v][i]
                // New priority.
                priority[i] = adjMatrix[v][i]
                predecessor[i] = v
            endif
        endif
    endfor
endwhile
treeMatrix = adjacency matrix representation of tree using predecessor array;
return treeMatrix

Output: Adjacency matrix representation of MST
```

Common Misconceptions about the Class

4. ~~I impose on the professor’s time if I attend office hours and ask questions. (The professor will deem my questions not worthy.)~~



5. ~~The professors enjoy making the exams super-hard and watch the students suffer in agony. (It makes them feel powerful, and compensates for their inadequacies in other spheres of life.)~~