Grading

- Take-home Midterm – 30%;
- Take-home Final – 30%.
- Problem Sets/Strategy Designs – 40%.

Homework Logistics

- Assignments will be due on Mondays at 11:59pm, and assigned at least one week prior to the due date. There will be five PSets, five "Strategy Designs", and one warmup PSet.
- Handwritten solutions will not be accepted. You may use the provided LaTeX templates, or any other template/online LaTeX editor. Assignments must be submitted to codePost.
- Some assignments will feature extra credit. Extra credit will not add to the assignment score, but will contribute heavily to "participation." Extra credit submissions which are clear but incomplete will generally get partial marks. Extra credit submissions which are unclear or difficult to evaluate may not always receive partial marks. Some extra credits are very challenging, and can be useful to gauge whether you want to pursue an IW in this area.
- You should make best efforts to anonymize your submission (e.g. do not put your name in the document body or title). But there are no repercussions if you forget.

Collaboration Policy

- You should not consult collaborators or references *while writing* your solutions.
- Unless otherwise specified, you **may** collaborate with any number of other students in the class, or consult any outside references to *develop* your solutions. You may brainstorm, write on a whiteboard, and even completely solve the problem with others. You may even learn a complete solution during office hours with the course staff. **But you should write up your own solutions without collaboration**.
- Exceptions to the policy above: If somehow you wind up with solutions written by the course staff, you may not consult this source. Outside of official channels like office hours or Ed, you should not get help from someone who is not currently enrolled in the class.
- You should feel free to ask any clarifying questions regarding the collaboration policy.
- You should list all collaborators and external references used in your collaboration statement.
- A portion of each homework assignment may be designated as a *no-collaboration* portion, in which case you **may not** collaborate with other students or consult outside references. You **may** still discuss the problem with course staff. The purpose of these problems are to give you experience solving an entire problem start-to-finish on your own before the exams.

Exams

Take-home exams have similar format to PSets, but **you may not collaborate or consult outside references.** You may ask clarifying questions, but we will *not* provide hints/tips/guidance. The course staff may appear a bit robotic while answering questions about exams, because we are making a serious effort to stick strictly to a "no hints" policy.

Appeals

Graders sometimes make mistakes. When this happens, you can submit an appeal through codePost. In order to keep course logistics manageable, appeals must be submitted through codePost by the posted deadline — codePost will not accept late appeals. Your appeal must clearly and concisely state a concrete mistake that you believe the grader made. For example:

- "Grader said I didn't say X, but I did say X."
- "Grader feedback says only 'good job!', but they checked 15/20 on the rubric."
- "Grader was *extremely* subjectively harsh — multiple points were taken off for a typo."
- Asking for another set of eyes, or a vague complaint, will generally not succeed. A successful appeal should point to a concrete discrepancy between the rubric and the grader's evaluation.
- To be extra clear: if an appeal does not clearly highlight a concrete mistake or confusion by the grader, it will typically be politely without consideration.

Final Letter Grades

Below is as much detail as we are comfortable and able to share about how final letter grades are computed, as a function of your final numeric grade. We will post a link on Ed to a spreadsheet that will allow you to enter your grades on each assignment, and compute your final numeric grade (according to the policy outlined above).[a]

- Grades in this class are **not curved**, in the sense that your own numeric grades and final letter grades **do not depend on those of your classmates**.
- Individual assignments are not curved/rescaled/etc. Your final numeric grade is calculated as $.4 \cdot \text{PSetGrade} + .3 \cdot \text{MidtermGrade} + .3 \cdot \text{FinalExamGrade}$.
- The "cutoff" for a C- or better is 50%. This is a one-sided promise that you will definitely get a C- or better (which displays as a P for P/D/F) if your final numeric grade is at least 50% (it is not a two-sided promise that you won't get a C- or better if you're below 50%).
- We are not comfortable sharing precise (or approximate) "cutoffs" for each letter grade. We do not have preset precise cutoffs, as they may change slightly due to circumstances that arise during the semester. However, ballpark cutoffs stay similar from year-to-year, and we are comfortable comparing them to "typical US high school cutoffs" (e.g. A+:97-100, A:93-96.9, A-:90-93, B+:87-89.9, B:83-86.9, B-:80-82.9, C+:77-79.9, C:73-76.9, C-:70-72.9). The bullets below describe comparisons to these.
- The 445 cutoff for an A+ is *much higher* than the typical US high school cutoff. Specifically, you cannot earn an A+ just by getting perfect grades (or even > 100%, if for some reason that becomes possible). It is possible to get an A+ in 445, but we very (very, very) strongly suggest not changing your behavior in the course just to be in the running for a potential A+.
- The 445 cutoff for an A is comparable to the typical US high school cutoff (but not identical).
- The 445 cutoff for an A- is slightly lower than the typical US high school cutoff.
- The gaps between consecutive 445 cutoffs spread out as grades get closer to C-. For example, the gap between B+ and B is larger than the gap between A- and B+, etc.
- We will not further clarify what the terms 'comparable' and 'slightly' mean (or "how quickly" the cutoffs spread out, etc.).

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[a]We will have this spreadsheet prepared by spring break. In case we forget to upload by spring break, you can remind us.

Floors

The "generic rubric" in the cheatsheet notes that every problem is graded separately on progress and presentation. The generic rubric also notes that presentation scores are agnostic to progress scores (if the grader can clearly figure out the content of the solution, the solution will get full marks). Therefore, if you are truly stuck on a problem, and do not have concrete thoughts to share, you can write "I don't know" (or leave the problem blank, or write any other brief thoughts that convey the same message), and this will earn full presentation marks. If you have *concrete* partial progress, you are encouraged to write it clearly for partial credit.

Please note, however, that if you write something that is hard to evaluate (perhaps because it claims to accomplish significantly more than it accomplishes, and/or is written in an extremely rushed fashion that makes it hard to evaluate, and/or happens to have fantastic language structure but very incorrect logical strucure), you will likely receive a low (possibly zero) presentation score (and may still receive a low or zero progress score). Still, if you have any (even small) *concrete* partial progress, you are encouraged to write it clearly for partial credit.

Late Policy

No late midterms or finals will be accepted. For PSets, you may use up to 4 late days throughout the semester, and these are intended to cover events such as unexpected illness, out-of-town events, etc. (but you are free to use them for any reason without justification). **You may use only up to 2 late days on a single assignment**, and only an integer number of late days. **Outside of this policy, late submissions will incur a substantial penalty**, and we generally intend to stick to this policy verbatim.[a]

You may not use late days on Strategy Designs (due to the logistics of managing team submissions and running the entire class's code at once). The Strategy Designs are intended to consume time/energy comparable to one (hard) problem on one PSet, and not comparable to an entire PSet. Please think of the Strategy Designs as due the Friday after the corresponding PSet (because this is the suggested amount of time to spend on them), except we have given everyone three free late days (because we cannot manage the logistics of individual late days for group assignments).[b]

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[a]Under *truly exceptional circumstances*, you should email the course instructors and we will make accommodations.

[b]Still, if you have *truly exceptional circumstances* near an SD deadline, and the free 3-day extension does not address your circumstances, you should email the course instructors and we will make accommodations.

Participation

Your tentative final grade is computed based only on exams, PSets, and Strategy Designs. However, the course staff understands that sometimes this numerical grade is not perfectly representative of your performance, and your final grade will also consider "participation" to a small extent. There is no such thing as "negative participation" which can hurt your grade — participation can only help (by giving you a small bump to your final grade). There is no formula for participation bumps. To be clear, **We do not suggest "participating" solely for the sake of improving your grade** (if you only care about your grade, there are significantly more time-efficient ways to get a higher grade). That being said, we do think you will get more out of the course if you choose to "participate". Below is a non-exhaustive list of what is considered participation.

- Solving extra credit problems.
- Performing "above and beyond" on the open-ended Strategy Design Assignments.
- Participating in lecture in a manner which benefits your classmates (i.e. by answering questions, or asking insightful questions).
- Participating in precept in a manner which benefits your classmates.
- Participating on Ed in a manner which benefits your classmates.
- Participating in office hours in a manner which benefits your classmates.

For contrast, here are some non-examples of participation:

- Attending lecture (please attend lecture anyway!).
- Attending precept (please attend precept insofar as you find it valuable).
- Attending office hours (please attend office hours insofar as you find them valuable).
- Being kind to the course staff (please be kind to the course staff anyway!).
- Optimizing statistics displayed to instructors on Ed.

Policy on Large Language Models

Recent advancements in large language models (LLMs), such as ChatGPT, motivate explicit policies in some courses. Because LLMs are currently terrible at math, our policy is fairly simple:

- The entire course policy is LLM-agnostic (that is, no grader will ever evaluate your solution differently because they suspect it was generated by an LLM, and every aspect of course policy can be explained without the terms 'LLM' or 'ChatGPT').
- LLMs should be treated like any other online tool. You are free to use an LLM however you like in this course, as long as you acknowledge it on your collaboration statement.[a]
- Like with any other online tool, you are ultimately responsible for whatever you submit.

The following examples are ways you are allowed to use LLMs in this course (because they are orthogonal to pedagogy of the course), and are neither encouraged nor discouraged from trying.

- If you find LLMs useful for explaining text to you, you are allowed to use LLMs for this.
- If you find LLMs useful for touching up text that you write, this is an acceptable use of LLMs in this course. If you choose to do this, please note that **you are ultimately responsible for any text you submit**. If an LLM changes your text in a way that alters the logical flow to something that is now incorrect, we will grade whatever you submit.
- If you find LLMs useful for converting text into LaTeX, this is an acceptable use of LLMs in this course. Again, **you are ultimately responsible for any text you submit**. If an LLM produces LaTeX that differs in meaning from your text, will grade whatever you submit.
- If you find LLMs useful for converting your pseudocode into Java for the Strategy Designs, this is an acceptable use of LLMs in this course. Again, please note that **you are ultimately responsible for any code you submit**. If an LLM produces Java that differs from your pseudocode, we will grade whatever Java you submit.[b]

The following is a way you are allowed to use LLMs, but are *strongly discouraged* from trying:

- Asking an LLM to solve a PSet problem. The following bullets elaborate.
- Solutions that get the language flow perfect but have incorrect technical content (i.e. put connecting phrases in all the right places, but use undefined terms or use terms incorrectly) are very difficult for graders to evaluate. Such solutions would get a 0/16 on progress and 0/4 on presentation. In our experience, all LLM-generated solutions fit this profile.[c] That is, LLM-generated solutions are not treated differently than other solutions. However, LLM-generated solutions tend to fit a profile that both makes no progress and is difficult to evaluate.
- It is always possible that you get lucky and sneak a solution like this (perhaps LLM-generated, perhaps not) past a grader, but our best guess is that it will negatively impact your grade to submit an LLM-generated solution instead of a blank one (because it will cost you the "well-presented points").

Summary: The entire course policy is LLM-agnostic (but if unforeseen issues arise, this may change). If you find that LLMs are helpful for tasks orthogonal to the pedagogy of the course, you are free to use them for these purposes (and you are even free/encouraged to share your success on Ed so that other students can benefit too). You are strongly discouraged from using LLMs to undermine the pedagogy of the course because it will negatively impact both your grade and the course staff, although it is not a violation of course policy to do so. If you have a creative use case of LLMs in mind, you are free to ask the course staff for our opinion.

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[a]The course staff reserves the flexibility to change this, in case LLMs become significantly better at math during the course, or in case we discover a novel use of LLMs that undermine the pedagogy of the course, or in case there is a flood of potentially LLM-generated solutions that DDoS the course staff but ultimately receive 0 points.

[b]**Note:** You should *not* expect to see a liberal policy like this in a programming-focused course, where one explicit goal of the course is to teach you proper Java syntax. However, the purpose of our Strategy Designs is to produce good pseudocode, and not how to turn that pseudocode into Java.

[c]In one case, the LLM solution happened to kind of mention one idea kind of related to part of a correct answer, so we may have generously given it 2/16 on progress and 0/4 on presentation.

Unsolicited Thoughts

(The thoughts below are not instantiating or clarifying a course policy, but may help you interact with the course better).

Thoughts on grades. The purpose of grading is to give you as objective feedback as possible on the solutions you submit, and the purpose of feedback is to guide you towards producing stronger solutions. Still, we understand that it can sometimes feel like your numeric scores are not representative of your ability towards the material. In case you find yourself feeling this way throughout the course, and also feel unsure how to process graders' feedback towards improving your scores,[a] please (a) note that it is not (at all) uncommon to initially feel this way, and even to feel frustrated by it, but ultimately "figure it out",[b] and (b) reach out to the course staff for guidance — we are very happy to help you figure out how to spend your effort productively.[c]

What should you do if you looooove this stuff? If you looooove this stuff, and want to know what it would look like to pursue advanced research in Economics and Computation, we **strongly suggest trying the extra credits!** To elaborate a bit, "trying" does mean (possibly significantly) more time on an extra credit problem than you do on a PSet, but it does not necessarily mean finding a solution (or even necessarily much concrete progress). These problems give a taste of the style of research questions asked, and also give a taste of what "the struggle" of theoretical research feels like. If you enjoy the struggle of the extra credits (independent of whether you eventually solve it), you'll likely enjoy the struggle of theoretical research too.
We do grade the extra credits extra-objectively (and the instructors grade these ourselves), so that you get very clear feedback on what's expected of top-level research. It's (very) normal to receive low scores on an extra credit after significant effort, but they'll come with enthusiastic comments about how to improve next time. If this process sounds fun to you, give it a shot!

If you looooove some of the themes in the course, but not necessarily the theoretical aspects, you can also reach out to the course staff to ask for pointers to further material, or just to discuss the topics in general.

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[a] Graders really try their best to provide useful feedback, but we understand that this may not always be successful.

[b] For example, the instructors like to think of ourselves as having high ability towards the course material. Still, initial versions of lecture notes were not typically well-explained, and may not have received high scores if submitted as PSet assignments. It took a lot of effort (and some frustration) to produce high-quality lecture notes. Also, all instructors had a long journey towards feeling competent in the course material, and those journeys included periodic frustration along the way.

[c] Because the course is so large, we may first try routing you towards your preceptor, or the "No PSets" office hours. But it is definitely fine to reach out, and in case the scalable resources aren't working for you, we will try our best to find members of the course staff (possibly the instructors themselves) who can meet 1-1.