README

This repository is for class materials for Computational Topology, Spring 2018, taught by Prof. Fasy.

What is in this repository?

The folders in this repository contain all materials for this class.

- board_pics: Photos of the board during lecture.
- handouts: Handouts distributed during lecture.
- hw: The LaTex files with the homework assignments, as well as a template for your submissions.

The schedule is at the bottom of this Markdown file.

When and Where?

When? TH 12:15 - 13:30
Where? Roberts 412

How do I contact you?

brittany.fasy@montana.edu

Office hours: T,H 16:10 - 17:00

Accessing this Repo

The repository is set as public, so you can access all course materials easily. I suggest creating a fork, so that you can use your fork to maintain your own materials for this class. See the resources below for forking directions.

To clone this repo:

```
$ git clone https://brittany@bitbucket.org/brittany/comptop-s18.git
```

Discussions and Questions

Group discussions, questions, and announcements will be through the TDA @ MSU slack group. Please subscribe to the 535-sp18 channel.

Course Outcomes and Objectives

By the end of this course, a student:

- will be able to articulate, both orally and in writing, mathematical proofs.
- will demonstrate teamwork skills.
- will demonstrate ability to present and to critique applications of research in computational topology.
- will recognize potential applications of TDA.

Grading

Your grade for this class will be determined by:

- 45% Homework
- 35% Group Project
- 25% Resubmissions and Quizzes

A grade above an 85 will earn at least an A-, above a 70 will earn at least a B-, and at least 50 is needed to pass.

Policy on Assignments

All assignments must be submitted by 23:59 on the due date. Late assignments will only be accepted if grading has not yet started.

For descriptive assignments and reports, the submission should be typeset in LaTex, and submitted as a PDF. For code assignments, well organized source code with clear comments should be submitted.

Policy on Collaboration

Collaboration is encouraged on all aspects of the class, except where explicitly forbidden. Note:

- All collaboration (who and what) must be clearly indicated in writing on anything turned in.
- Homeworks may be solved collaboratively except as explicitly forbidden, but solutions must be written up **independently**. This is best done by writing your solutions when not in a group setting. Groups should be small enough that each member plays a significant role.
- For the project, every collaborator must contribute significantly. How the work is divided is at the discretion of the group.

Policy on Academic Integrity

The integrity of the academic process requires that credit be given where credit is due. Accordingly, it is academic misconduct to present the ideas or works of another as one's own work, or to permit another to present one's work without customary and proper acknowledgment of authorship. Students may collaborate with other students only as expressly permitted by the instructor. Students are responsible for the honest completion and representation of their work, the appropriate citation of sources and the respect and recognition of others' academic endeavors.

Plagiarism will not be tolerated in this course. According to the Meriam-Webster dictionary, plagiarism is `the act of using another person's words or ideas without giving credit to that person.' Proper credit means describing all

outside resources (conversations, websites, etc.), and explaining the extent to which the resource was used. Penalties for plagiarism at MSU include (but are not limited to) failing the assignment, failing the class, or having your degree revoked. This is serious, so do not plagiarize. Even inadvertent or unintentional misuse or appropriation of another's work (such as relying heavily on source material that is not expressly acknowledged) is considered plagiarism.

By participating in this class, you agree to abide by the Student Code of Conduct. This includes the following academic expectations:

- be prompt and regular in attending classes;
- be well-prepared for classes;
- submit required assignments in a timely manner;
- take exams when scheduled, unless rescheduled under 310.01;
- act in a respectful manner toward other students and the instructor and in a way that does not detract from the learning experience; and
- make and keep appointments when necessary to meet with the instructor.

Policy on Class Attendance

Class attendance is required. If a student must miss a class, please notify the instructor at least 24 hours in advance.

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Classroom Etiquette

Except for note taking and group work requiring a computer, please keep electronic devices off during class, they can be distractions to other students. Disruptions to the class will result in you being asked to leave the lecture and will negatively impact your grade.

Withdrawing

After 28 Februrary 2018, I will only support requests to withdraw from this course with a ``W'' grade if extraordinary personal circumstances exist. If you are considering withdrawing from this class, discussing this with me as early as possible is advised. Since this class involves a project, the decision to withdraw must be discussed with me, and with your group.

Special needs information

If you have a documented disability for which you are or may be requesting an accommodation(s), you are encouraged to contact me and Disabled Student Services as soon as possible.

Resources

Technical Resources

- Git Udacity Course
- Forking in Git
- Markdown
- Inkscape Can Tutorial
- Plagiarism Tutorial]
- Ott's 10 Tips

Main References

- Edelsbrunner and Harer, Computational Topology - Our course textbook.
- Munkres, Topology

Additional References

- Big-Oh, Intuitive Explanation
- CLRS, Introduction to Algorithms: this book is THE algorithms textbook.
- Master's Method
- Master's Method

Videos

- Carlsson Short

Schedule

Week 1 (9 January 2018)

- Topic: Introduction to Topology: Sets and Functions
- Suggested Reading: Munkres, Topology, Chapter 1
- HW-01 assigned. Due 1/16. Location: comptop-s18/hw/H-01/

Week 2 (16,18 January 2018)

- Topics: Analysis of Algortihms, Graphs, Topology and Neighborhoods
- Required Reading: EH, Computational Topology, Chapter 1
- Suggested Reading: Munkres, Topology, Chapter 2
- HW-02 assigned. Due 1/30. Location: comptop-s18/hw/H-02/
- **Due this week: H-01 (Tues)**

Week 3 (23,25 January 2018)

- Topics: Point Set Topology and Curves
- Required Reading: EH, Computational Topology, Section I.3

- Suggested Reading: Ault, Understanding Topology, Chapter 4; Sullivan, Curves of Finite Total Curvature
- *Due this week: Q-01 (Thurs)*

Week 4 (30 Jan / 1 Feb 2018)

- Topics: Surfaces
- Required Reading: EH, Computational Topology, Section II.1
- *Due this week: H-02 (Tues), P-0 (Tues)*

This syllabus was created, using wording from previous courses that I have taught, as well as David Millman's Spring 2018 Graphics course. Thanks, Dave!