## CSCI 538—Computability

Lecture 1

Textbook: Introduction to Theory of Computation by Mike Sipser

## 0. About CS538

- Course home page: http://www.cs.montana.edu/bhz/classes/fall-2017/csci538, or http://www.cs.montana.edu/courses/538
- We will cover computability theory, NP-completeness, and some computational complexity topics.
- Evaluation: 2 in-class tests (40%), 4 assignments (40%) and project (20%)
- Evaluation: 2 in-class tests (20%), 3 assignments (30%), project (20%) and final exam (30%)
- **Project**: Each student picks a research paper (related to algorithms and complexity), studies it and presents it to the class (with sufficient details). Check previous year's projects at http://www.cs.montana.edu/bhz/classes/fall-2015/csci538/ for some hints.
- To pass the course, you must get at least 30 out of 100 in the final exam (if we choose to apply option 2).
- While using web materials is fine, you MUST perform all the work by yourself and give the corresponding references.

## 1. Overview

- Basic concepts (for those who did not take CSCI 338—read Chapter 0)
- Turing machines, decidability/undecidability, **primitive recursive functions**
- Time complexity, NP, NP-completeness, intractable problems, *Turing reducibility*
- Computational complexity topics, space complexity
- Approximation algorithms and inapproximability. FPT algorithms and intractability