CS 360
Fall 2021
The Nine Great Ideas of CS 360

Jeffrey Shallit
School of Computer Science
University of Waterloo
shallit@uwaterloo.ca
https://cs.uwaterloo.ca/~shallit
1. A real computer can be modeled by a mathematical object: a theoretical computer.

2. A formal language is a set of strings, and can represent a computational problem.

3. A formal language can be described in many different ways that ultimately prove to be identical.

4. Simulation: the relative power of computing models can be based on the ease with which one model can simulate another.
5. Robustness of a computational model: minor changes should not affect computational power.

6. The Church-Turing thesis: anything that can be computed can be computed by a Turing machine.

7. Nondeterminism: languages can be described by the existence or nonexistence of computational paths.

8. Unsolvability: for some computational problems there is no corresponding algorithm that will unerringly solve them.

9. Resource-bounded computation: putting limits on time and space restricts the class of problems that can be solved.