

Survey

- The course deals with abstract models of computers and their properties.
- This approach avoids many details of actual computers.
- In this way we prove general results that hold for any computer satisfying the assumptions of the model.
- To do this we first have to define formally what a computer is and what is a language.
- The course considers three kinds of abstract computers and three kinds of languages.
 - First is the finite automaton. It has a fixed finite amount of memory.
 - Next is the push-down automaton. It has infinite memory but only accessible in a last-in first-out manner.
 - Finally is the Turing machine, which has an infinite amount of memory accessible in an arbitrary manner.
- Each model has its advantages and its areas of application.
- What holds for an abstract computer model holds for any computer in its class. It is easier to study this abstractly.
- One can show that certain problems are unsolvable on any computer. An amazing result.
- To do this we have to formally define exactly what is a computer.
- For example, is a radio a computer? Is a watch a computer?
- This material will stretch your mind in new ways.
- This material also has many applications, for example,
 - string processing
 - hardware design
 - biology, bioinformatics.
 - DNA processing
 - parsing and compiling of computer languages
 - unsolvability results
 - Such results help you to avoid wasting effort trying to do something that is impossible
- The course requires the ability to think abstractly
- Comments by a former student about the usefulness of this course