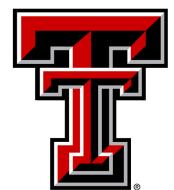


Introduction to Theory of Automata

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TEXAS TECH
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Outline

- Why study Automata?
- The course overview and schedule
- Administrivia

Why

- What is automata?

+ Automata (2014)

Autómata (*original title*)

R | 1h 49min | Action, Drama, Sci-Fi | 17 October 2014 (Bulgaria)



2:24 | Trailer

2 VIDEOS | 92 IMAGES

Human race is at edge of the end. Robot race is at edge of the beginning.

Director: Gabe Ibáñez

Writers: Gabe Ibáñez, Igor Legarreta | 1 more credit »

Stars: Antonio Banderas, Birgitte Hjort Sørensen, Dylan McDermott | See full cast & crew »

Why

- What is automata?



NieR: Automata tells the story of androids 2B, 9S and A2 and their battle to reclaim the machine-driven dystopia overrun by powerful machines.

Humanity has been driven from the Earth by mechanical beings from another world. In a final effort to take back the planet, the human resistance sends a force of android soldiers to destroy the invaders. Now, a war between machines and androids rages on... A war that could soon unveil a long-forgotten truth of the world.

Why

- What is automata?

Dictionary

Search for a word



au·tom·a·ton

/ô'tämədən, ô'tämə, tän/

noun

plural noun: **automata**

a moving mechanical device made in imitation of a human being.

- a machine that performs a function according to a predetermined set of coded instructions, especially one capable of a range of programmed responses to different circumstances.
- used in similes and comparisons to refer to a person who seems to act in a mechanical or unemotional way.

"she went about her preparations like an automaton"



Translations, word origin, and more definitions

Why

- What is automata?

≈ robot, humanoid, computer, android, mechanism

Why

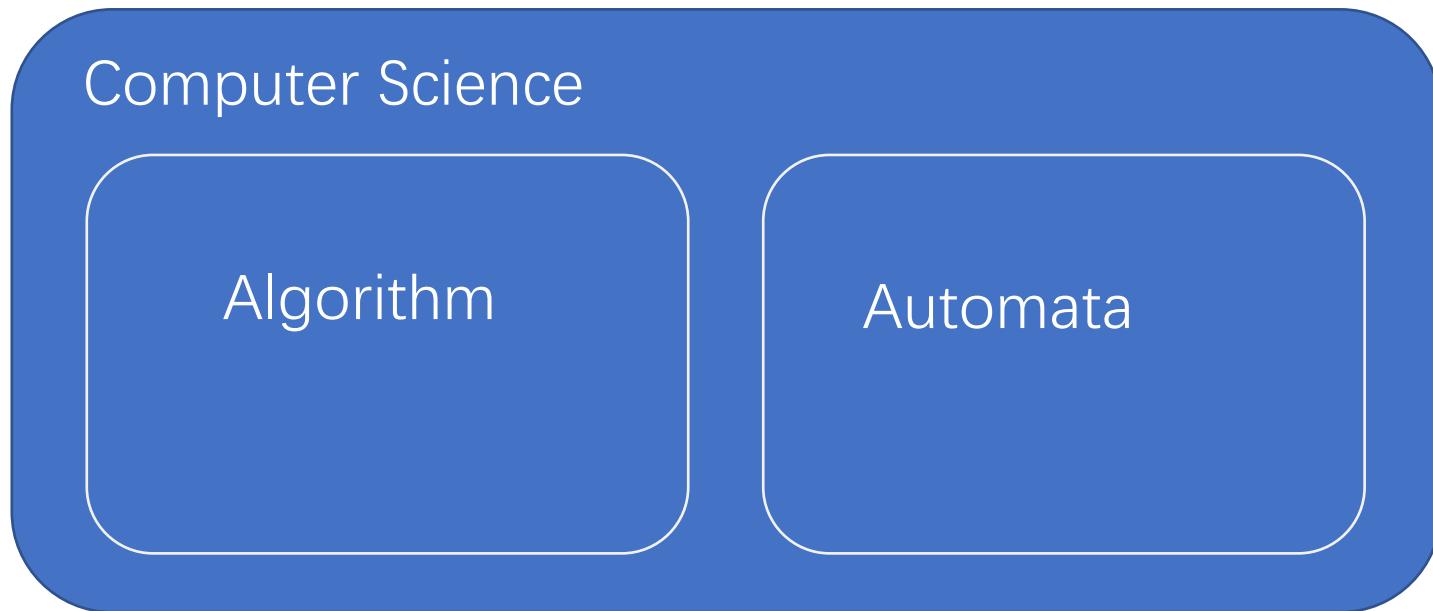
- What is automata?

≈ robot, humanoid, computer, android, mechanism

But, then, what do we learn?

Why

- What is automata?



The potential and limitation of algorithms

Why

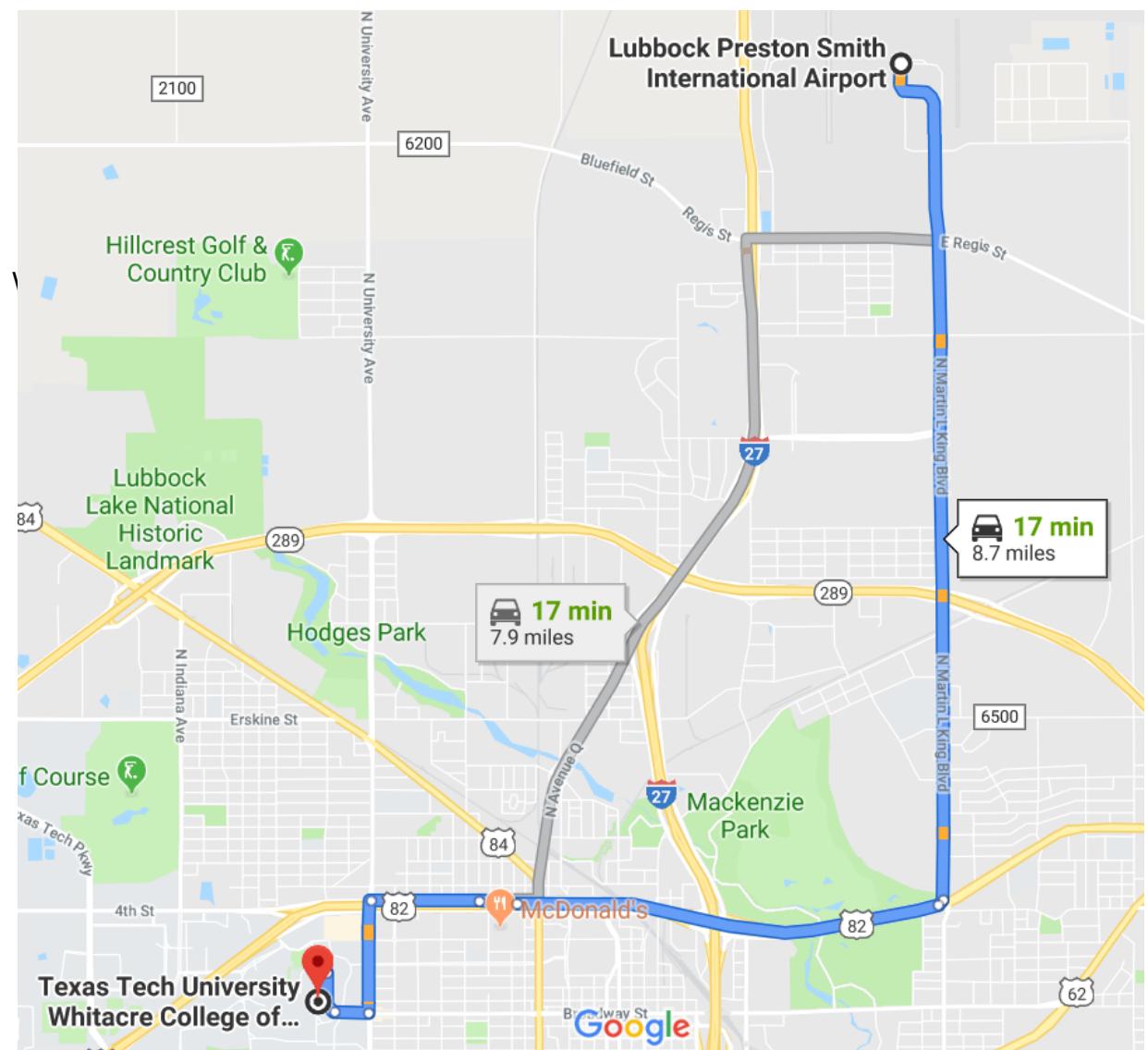
- What is automata?

If we want to know what we can or cannot do with algorithm, we have to define what is algorithm

Why

- What is automata?

If we want to know what we can or cannot do



Why

- What is automata?

If we want to know what we can or cannot do with algorithm, we have to define what is algorithm

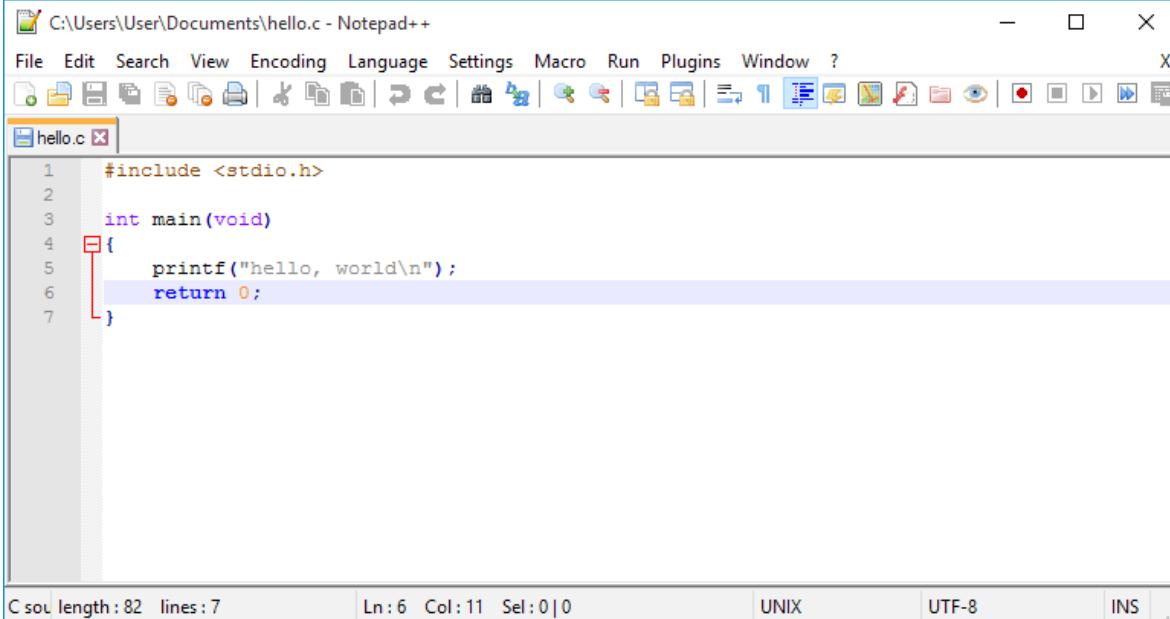
What do you think is an algorithm?

Why

- What is automata?

If we want to know what we can or cannot do with algorithm, we have to define what is algorithm

What do you think is an algorithm?



A screenshot of the Notepad++ text editor. The title bar shows "C:\Users\User\Documents\hello.c - Notepad++". The menu bar includes File, Edit, Search, View, Encoding, Language, Settings, Macro, Run, Plugins, Window, and Help. The toolbar below the menu has various icons for file operations like Open, Save, Print, and Find. The main code editor window displays the following C code:

```
1 #include <stdio.h>
2
3 int main(void)
4 {
5     printf("hello, world\n");
6     return 0;
7 }
```

The status bar at the bottom shows "C sou length : 82 lines : 7 Ln : 6 Col : 11 Sel : 0 | 0 UNIX UTF-8 INS".

What do you think it looks like?

Why

- What is automata?

If we want to know what we can or cannot do with algorithm, we have to define what is algorithm

What do you think is an algorithm?

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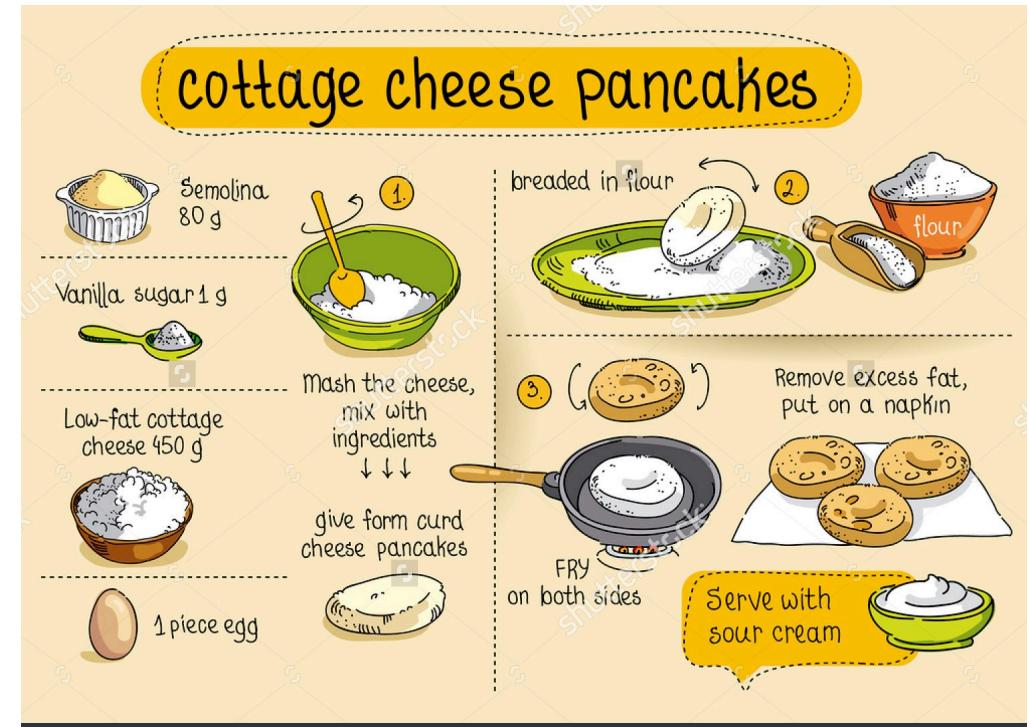


Why

- What is automata?

Algorithm is like a recipe

- It consists of finite number of instructions
- Each instruction is expressed by a finite number of symbols
- If it is carried out without error, it produces the same result in finite number of steps
- It demands no insight, intuition, or ingenuity, on the part of the one carrying out it



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IMAGE ID: 388963498
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In principle, we are able to execute the code by hand, the machine just does that for us

Why

- What is automata?

What has an algorithm to do with automata then?

Our most standard and ancient intuition on algorithm follows from a calculator (computing automaton)



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Whenever you design an algorithm, it is like designing a (virtual) machine

Exploring the possibilities of algorithms is like exploring the possibilities of machines

Why

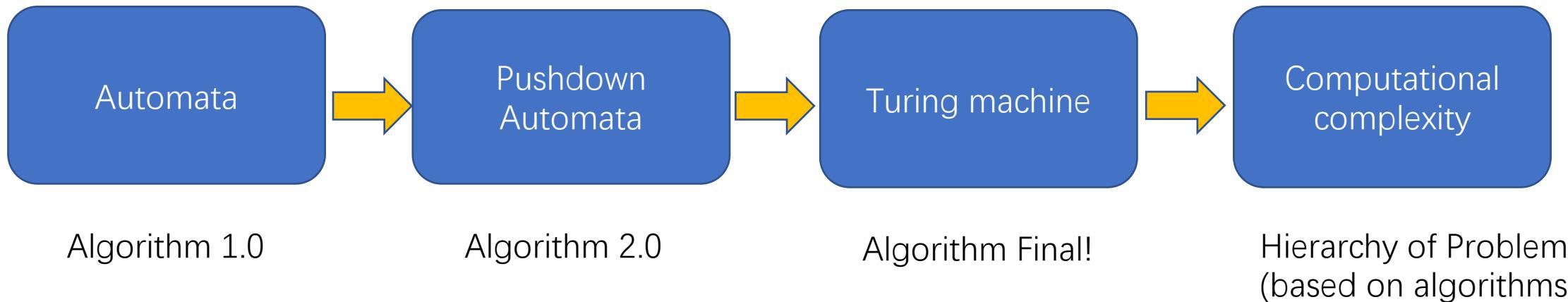
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Course Schedule

- Regular Language and Finite Automata
- Context free Language and Pushdown Automata
- Recursive, Recursively Enumerable Languages and Turing Machine
- Computational Complexity

Meet the TA

Course Assignment (Tentative)

- Two Tests – 60%
- Final exam (comprehensive) – 30%
- Homework – 10%
 - Homework policy on syllabus

Textbook

- ELEMENTS OF THE THEORY OF COMPUTATION (2nd Edition)
 - Harry R. Lewis and Christos H. Papadimitriou
- INTRODUCTION TO THE THEORY OF COMPUTATION
 - Michael Sipser

