CPSC 421/501 Sept 14, 2021

This week office hours begin today: IN FLUX

Tuesday, Sept 14: (1 hour)

Amir (TA) 11 am (like fixed)

Joel (me) 4:30 - 6 pm

(Instructor)

TODAY

Wed: Amir (TA)

Hassan (TA)

Fri: Hassan (TA)

1 hour, see Canvas Zoom page

CPSC 421/501 Sept 14, 2021

My favourites:

- Love the T-shirt quotes.
  501 should have a merch store.
- Will you be counting occupancy occupancy by handing out candy every week?
- Dislike: Too many proofs
- Immitation Game & Turing's actual work

- Dislike too much memorization

  [Mention note sheets for the exam]

- Like: paradoxes, logic, unsolvable problems

- Want: power point complexity

  [Mention: minesweeper]

- Latex is hard to use

  [LaTeX not required, but...]

- Want emphasized: DFA, TM

- Themself ← singular

(1) them - self

δεμ · σέλφ ← accent

them

not

ϑ = think

mi nel ~~mell~~

mao

α

β

γ

δ

ε

Them·self

δ ε μ σ έ λ φ

tells you which syllable is accented

thelta — espilon — mi — phi fi

OR

δ ε μ·σ α ί λ φ

Learned

1 syllabel

Learned

2 syllabels } corrected after class

2 words

One response I liked a lot!

Name/field study/research: [redacted]

Why are you taking this course: credit

Topics you'd like emphasized: generic playground function λ)

Liked and disliked in past courses?

too much busywork

flexibility of pirating textbook

latex :(

Any comments/questions so far? λ?

TODAY or Tuesday:

The point of this course

Paradoxes:

Gödel sentence:

- Pigeon Hole principle

" " co-principle

[for finite sets for now]

- Profs and Ice Cream
  Progs and Inputs
  Cantor's Theorem

www.cs.ubc.ca/~jf/courses.~

Joel Friedman

Computer Science UBC

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Gödel sentence!

S: "There is no proof that (this statement) is true."

(this statement) = S

What if S is true?

— then there is no proof that S is true, but S is true

What if S is false?

S is false, but there is a proof that S is true.

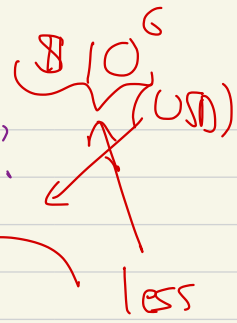
then either ()

S is true & false

OR

S is false, but there is a proof that S is true (inconsistent )

- The point of this course:



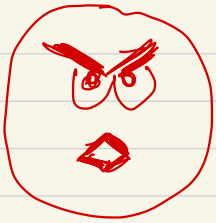
(1) What does "P vs NP" problem mean? Ch 3, Ch 7

(2) How to solve "P vs NP" Ch 1, ~~Ch 2~~ regular languages

End: Circuit complexity

(3) How not solve P vs. NP...

Ch 6 Gill-Baker-Solowey Thm



prof

pigeon

bird

sanctuary

Office hours (Zoom this week) begin today:

Tues, Sept 14:

Amir (TA) 11:00 am

Joel (Instructor) 4:30 - 6:00 pm

via Canvas

Wednesday & Friday ← for now

Amir, Hassan (TA)

check Canvas Zoom page

Pigeon Hole Principle

Complexity Theory:

Opposite to

Pigeon Hole co-Principle

co-"Pigeon Hole Principle"

=

Pigeon Hole Principle:

If you have 10 birds +

9 bird sanctuaries

{birds} ⟶ {bird sanctuaries}

size 10 ⟶ size 9

" n ⟶ " n-1

for any $n \in \mathbb{N}$ on [Sip] n

{1, 2, 3, 4, ...}

Ours:

{birds} ⟶ {bird sanctuaries}

size 8 ⟶ size 9

Thm: Let $f : S \to T$ be a {function / map / morphism} of sets s.t.

$$|S| < |T|$$

then f is not {surjective / onto}

i.e.

$$\exists\, t \in T \quad \text{s.t.} \quad t \notin \text{Image}(f)$$

there exists an element, t, of T such that $\dots$

[Appendix of Chap 0 [Sip]]

Remi $|S| < |T|$

also works for infinite sets...

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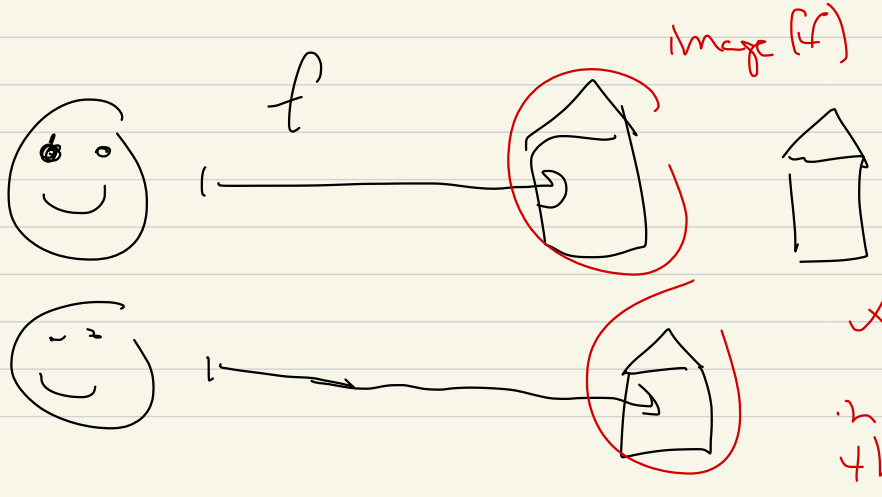
Image(f)

$f : S \to T$

sets

$= \{ t \in T \mid \text{for some } s \in S \text{ s.t. } t = f(s) \}$



$|S| < |T|$ mean?

ASCII strings:

Def Say that a set A is an *alphabet* if $A \neq \emptyset$ but A is finite.

(or $0 < |A|$ finite)

or $|A| = |\mathbb{N}| = \{1, 2, 3, \ldots\}$

A {word / string} (Sip) over an alphabet, A, is a finite sequence of elements of A

=

Example If A = {a, b}

symbols / letters [Sip]

then

A^* = {set of strings over A}

$= \{ \varepsilon, (a), (b), (a,a), (a,b), (b,a), (b,b), (a,a,a), (a,a,b), \ldots \}$

ε = empty string:

A^k = strings of length k

$A^0 = \{ \varepsilon \}$

$A^1 = \{ (a), (b) \} = \{ a, b \}$

$A^2 =$

$$\{ (a,a), (a,b), (b,a), (b,b) \}$$

$$= \{ aa, ab, ba, bb \}$$

drop the ( ) for sequence

drop the ,

$$A^* = A^0 \cup A^1 \cup A^2 \cup \ldots$$

ASCII = an alphabet of

256 { characters, symbols, letters }

Program $\in$ ASCII*

Input $\in$ ASCII*

No class Thursday