B501 THEORY OF COMPUTING

COURSE ADMIN

Communication

- The course hub is
  https://legacy.cs.indiana.edu/classes/b501-leiv

- Further links may be temporarily disabled pending revision.

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    and course related email.

- It will NEVER be used for posting scores or grades.
    ALWAYS DISREGARD all scores and grades offered by Canvas.

Instructors

- ***Daniel Leivant*** (`leivant@indiana.edu`)

  Professor of CS, Adjunct Professor of Mathematics

  Teaching M,W classes, grading exams

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- *M.N. Harshini*   (`hmn@iu.edu`),
    Advising and grading

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  Teaching F recitation, advising and grading

- ***M.N. Harshini*** (`hmn@iu.edu`),
  Advising and grading

Advising

- Office hours (for now all are at 3126 Luddy)

  ▸ M 10:30-11:15, Daniel Leivant

  ▸ W 10:30-11:15 Daniel Leivant

- Nivya's and Harshini's hours TBA.

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- Other times can be arranged when needed, possibly via zoom.
  Email to request.
  Immediate availability is not guaranteed!

TOPICS & SYLLABUS

Computation Theory is to CS what Physics is to Engineering

Three pillars of Computation Theory

1. *Models of Computing*:

   Their relations, unity, role of memory structure

2. *Computational Complexity*:

   Resources (time, size), feasibility

3. *Computability Theory*:

   Boundaries of computations.

Structure of the course

- 1: ***Data:***

  Sets, mappings, size, inductive data, languages

  ($\sim$ 3 weeks)

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- 6: Computational ***complexity.***

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Syllabus (first 8 weeks)

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WK01 PART 1: DATA
M aug 21 text/sets
W aug 23 sets, relations, equivalence, order

WK02
M aug 28 maps, size
W aug 28 induction

WK03
XXX  M sep 4 LABOR DAY
W sep 6 recursion, PR functions

WK04
M sep 11 problems, languages
W sep 13 language operations, regular languages
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WK05
M sep 18 DFAs, clipping
W sep 20 DFA development

WK06
M sep 25  Residues, myhill-nerode, minimaization
W sep 27 NFAs, Kleene's Theorem, stability of regularity.

WK07
M oct 2 Configurations, 2DFA, LBA
W oct 4 Turing machines [+ universal TM]

WK08
M oct 9  CFGs, closure properties,
W oct 11 derivations, dual clipping

W oct 18 MIDTERM 1: weeks 1-7
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