CSC 4890 – Introduction to the Theory of Computation
Fall 2023
Louisiana State University
School of Electrical Engineering and of Computer Science
Division of Compute Science and Engineering

Instructor: Professor Evangelos Triantaphyllou
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Classroom: 215 Williams
Meeting Time: Tuesday & Thursday: 1:30 − 2:50 PM
Office hours: **Due to the current COVID-19 situation no meeting inside my office will take place, only outside it via appointment. Please use the e-mail address given above to contact me.**
Homework Grader and TA: Surya Padmini Konujula. E-mail: skonuj1@lsu.edu
Textbook **(to be read all the time along with class notes)**:
Introduction to the Theory of Computation, by Michael Sipser, 2nd edition, PWS Publishing Company.

Prerequisite:
CSC 2259: Introduction to Discrete Structures (3) or approval by Professor Triantaphyllou.
You need to be proficient in making proofs of abstract mathematical relations. Knowledge of a programming language to write simple programs as part of small projects (any general programming language is fine).

GOAL:
The main goal of this course is to introduce the students to some fundamental theoretical issues that govern key developments in computer science and may also play a key role in future developments. Mastering the concepts listed next.

MAIN TOPICS:
- Finite Automata and Regular Languages
  - Deterministic and nondeterministic finite automata
  - Finite automata and regular expressions
  - Properties of regular languages
- Context-Free Languages
  - Context-free grammars
  - Pushdown automata
- Computation, Undecidability, and Intractability (as time permits)
  - Turing machines and computers

GRADING:	**Regular homework assignments:**	**30%**
	(HWs will be given at the end of a teaching unit, i.e., approximately every 1-3 weeks)	
	Small projects:	**20%**
	(Projects may involve writing simple programs, in any general programming language, to further enhance the learning experience of the subject matter.)	
	One midterm exam:	**20%**
	Final Exam:	**30%**
Total points:		**100%**

NOTE: All the assignments are INDIVIDUAL

COMMENTS:
[1]: The Grading Scale:

SCORE	GRADE
100, 99, 98	A+
97, 96, 95, 94, 93	A
92, 91, 90	A-
89, 88, 87	B+
86, 85, 84, 83	B
82, 81, 80	B-
79, 78, 77	C+
76, 75, 74, 73	C
72, 71, 70	C-
69, 68, 67	D+
66, 65, 64, 63	D
62, 61, 60	D-
59, or less	F

An F grade (Fail) will be earned for 59 or fewer points. A D grade is not a passing grade for graduate students.

[2]:   The instructor's presentations will be highly interactive with lots Q&A. Asking or answering questions has no impact on your grade. It is absolutely on a voluntary basis. However, make any effort to attend the lectures as there can be more learning opportunities this way. **Always feel free to ask questions during the lectures.**

[4]:   **No grade curving will take place under any condition.**

[5]:   **Some key dates are as follows (based on LSU's Academic Calendar for 2023-2024):**

August 21, 2023,	Monday:	Classes begin
August 30, 2023,	Wednesday:	Final date for dropping courses without receiving a "W"
August 31, 2023,	Thursday:	Final date for adding courses
September 4, 2023,	Monday:	Labor Day Holiday
October 5-6, 2023,	(Thur. – Frid.):	Fall Holiday
October 17, 2023,	Tuesday:	Mid-semester grades are due (by 9:00 am)
October 22, 2023,	Sunday:	Course scheduling for spring semester begins
November 3, 2023,	Friday:	Final day for dropping courses, 4:30 p.m., deadline
November 22, 2023,	Wednesday:	Thanksgiving Holiday begins, 12:30 p.m.
Nov 29 to Dec 3, 2023,	(Wed. – Sun.):	Concentrated Study Period
December 2, 2023,	Saturday:	Classes end, 10:00 p.m.
December 4, 2023,	Monday:	Our Final Exam (3:00 – 5:00 p.m.)
December 12-13, 2023	(Tue. & Wed.):	Final grades are due (9:00 a.m. deadline)
December 15, 2023,	Friday:	Commencement Day
January 16, 2024,	**Tuesday:**	**Spring Semester 2024 begins!**

Policy Statement Regarding Cheating / Academic Misconduct

A student caught cheating, plagiarizing or violating <u>any of the guidelines</u> described in this Policy Statement will be reported as a case of academic misconduct to the Dean of the Office of Student Advocacy and Accountability (SAA) at LSU.

LSU's Code of Student Conduct, Section 10.1 Academic Misconduct, governs all the work in this course (please check all the materials at: **https://www.lsu.edu/saa/students/codeofconduct.php**). Unless indicated otherwise, all written work that is handed in must be done only by the individual whose name appears on the document. Regarding student cooperation on the homework assignments, you are encouraged to discuss with other students the homework problems in general terms; however, what you submit must be your own answers. Your instructor and teaching assistant(s) (if TAs have been assigned to this course) are authorized and best qualified to give you help on all work (help will not be given if it provides an unfair advantage). Students are strongly encouraged to carefully study the contents of LSU's Code of Student Conduct on plagiarism and other related issues of academic misconduct. **<u>Thus, you are strongly advised to visit the website of LSU's Office of Student Advocacy and Accountability (SAA) at:</u> https://www.lsu.edu/saa/**

For specific information on LSU's definition of **what constitutes academic misconduct**, please visit the following website: **https://www.lsu.edu/deanofstudents/files/lsu-code-of-conduct.pdf**

For some other related concepts of what constitutes plagiarism, visit the following website:
http://homeworktips.about.com/od/citationsandbibliography/a/What-Is-Plagiarism.htm

While you are doing your assignments, **if you use material created by others and found on the web, you must indicate so very clearly.** You must list the source of that material and clearly show which part of your assignment is based on such material from the Web. **<u>Failure to do so will be considered academic misconduct and will be reported.</u>**

Some instructions while preparing HWs and Projects

1) *Make sure that you understand a given problem before you attempt to answer it. Carefully review the theory covered. Do so by checking the lecture recording (if available), your notes, and ALWAYS read the textbook.*

2) *You must solve __all__ the problems in a given HW or project by __YOURSELF__.*

3) *Pay extra attention in the __organization__ of your answers. Solutions should not be mixed up with scratch material in deriving them.*

4) *Present and staple your solutions __sequentially__. Scan them by using a scanner or create a PDF file otherwise if possible (no photos please!) and submit them via Moodle.*

5) *Make sure that your English is correct, clear and easy to read. Although this is not a composition course, it is very important that you present your solutions in a highly professional and scientific manner.*

6) *If you get confused, do not worry. Just relax, organize your thoughts, and try to see the problem from a simple, but still accurate, point of view.*

7) *You should have no doubt that __you__ (assuming you have studied adequately) are capable of answering all the problems in the HWs and projects!*

A hint...
Next is the first problem which would have been given to you in the midterm and final exams (but we will do not have such exams this time) along with the correct answer. It is usually assigned 5 points.

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PROBLEM 1: (5 points)
What is the single most important step in solving any science / engineering problem?

Answer: To define the problem __correctly__ and __enjoy__ the solution process.

(You must underline the right words to earn all 5 points.)