CSIS 2226: Foundations of CS

Course Overview

CSIS 2226: Foundations of CS

- A few things first:
  - Hand out syllabus
  - Brief introductions
  - What's the course all about

Days / times / locations / etc

- Course meets:
  - MWF 12:45-2:00
  - F212 on MW; and CC103 on F
- Office Hours (K-140):
  - Mondays/Wednesdays: 3:35-4:35
  - Will schedule alternate times if you need me to

Communication outside of class

- If you need to contact me about the course outside of class time:
  - E-mail: log into Blackboard and use the e-mail there
  - Phone: 609-626-3526
- If you need to contact me about something other than this course
  - E-mail: cicirelv@stockton.edu

Course Objectives

- Gaining knowledge of applied discrete mathematics including the field's terminology and methods, and in particular in relationship to computer science
- Learning the fundamental principles and theories of discrete mathematics and how they apply to computer science and information systems
- Learning to apply topics of discrete mathematics to solving computer science problems

Pre-requisites

- MATH 2225 with a grade of C or better
- Exception to pre-req:
  - Students who have completed MATH 3325 are also fine

This is a 2nd course on Discrete Math

- CSIS 2226 is referred to by some informally as “Discrete 2”
- The course will cover:
  - A review of some topics from Discrete 1
  - Coverage of additional topics of Discrete Math
  - Emphasis placed on computer science applications

ISETL: Interactive Set Language

- ISETL:
  - A relatively small programming language
  - Entire ISETL system can fit on (and run from) a floppy disk (if anyone still uses them)
- “Interactive”
  - ISETL is not a compiled language
  - System interprets one statement at a time as you type them
- “Set”
  - “Set” as in the discrete math concept
  - Fundamental type of data in ISETL is the Set
- “Language”
  - Well…. in the programming sense

Prolog: **Pro**gramming in **Log**ic

- Prolog:
  - A mathematically-oriented programming language
  - Considered by some as a “traditional A.I. language”
  - Name means “programming in logic”
- A Prolog program consist of:
  - A set of **facts** and a set of **rules** encoded as Horn clauses in First Order Logic
  - We call this a knowledge-base
- Running a Prolog program consists of:
  - Posing a query statement (specified in first order logic)
  - Prolog then performs automated theorem proving using the knowledge-base to prove or disprove your query statement.

Required Textbook

- Discrete Mathematics and Its Applications (Rosen, 6th Edition)
- Other recent editions are **probably** O.K.
  - I have a listing that supposedly maps problem numbers, etc between recent editions
  - If you used an earlier edition in Discrete 1, don't buy a new book (assuming you still have it)
  - If you don't still have it, get the 6th edition

Fridays in the lab CC103

- On Fridays, we'll meet in CC103
- Bring an easily transportable storage device with you (e.g., a flash drive)
  - I recommend keeping a copy of ISETL and Prolog on it (once I tell you where to obtain it)
- In addition to ISETL and Prolog, I may introduce other useful tools of mathematics for CS in the lab

Blackboard (formerly known as WebCT)

- I will be using Blackboard to:
  - Communicate with you electronically
  - Collect some **homework** assignments
  - Provide you with useful items
- You can access it through the Go Portal
- You can also bypass the portal through: http://skimmer.stockton.edu

Grading

- Exam 1: 12%
- Exam 2: 12%
- Exam 3: 12%
- Problem Sets / Homework: 60%
- Participation: 4%

- 90 or better: A
- 80 or better: at least B
- 70 or better: at least C
- 60 or better: at least D
- 0 or better: at least F ;)
- “at least”
  - There are + and – grades that I might use
  - There’s also the possibility that I might adjust the grade boundaries to give you next higher letter

Exams

- Not cumulative
- Closed Book
- Allowed 1 sheet of notes
- Allowed (and recommended) a calculator
  - Note: No cell phones or other communications devices for calculator purposes

Homework / Problem Sets

- Largest part of your grade (60%)
- Most individual
- A few in small groups
- What?
  - Sets of problems (this is essentially a math course after all)
    - E.g., problems from the textbook
    - Other similar problems
  - Small bits of programming in ISETL or Prolog or some other system to be announced
  - Other computer exercises in other tools as assigned

Duedates and late policy

- If due on paper (e.g., most problem sets)
  - Will be due in class at the beginning of class
- If due electronically
  - Will be due by midnight on day due via Blackboard
- Late penalty:
  - 50% if less than one week late
  - 0 if more than one week late
  - Waived first time late if less than one week late

Makeup Exams and Incompletes

- Makeup Exams:
  - There won't be any, except for:
    - Documented medical excuses (provide doctor's note upon return
    - Other appropriately documented institutional excuses
      - In most cases, this will require documentation before hand (e.g., if you play sports, you should know when your games on before they happen)
- Incomplete Grades
  - Highly unlikely there will ever be one with my incomplete policy (see syllabus)

Schedule of Topics

- Last page of syllabus
  - Subject (and likely) to change
  - Just an approximation
- Will warn you a week or so ahead of time if Exam dates change

Course Topics

- Topic 1: (review topic)
  - A review of logic, sets, functions from Discrete 1 (parts of Chapters 1 and 2)
  - Mostly a review to prepare you for later topics
  - Will highlight CS applications as we review
- Topic 2: (new topic)
  - Combinatorial Optimization (not in book)
- Topic 3: (new topic)
  - Boolean algebra, logic gates, and circuits
  - Chapter 11 (we're obviously jumping around in the book

Course Topics

- Topic 4: (part review, part new)
  - Review of discrete probability (chapter 6)
  - Bayes Theorem (new? Or review?) (chapter 6)
  - CS application to classification systems (e.g., Bayesian Spam Filters) (chapter 6)
- Topic 5: (new for most of you)
  - Algorithms, Growth of Functions, and Complexity of Algorithms (Chapter 3)

Course Topics

- Topic 6: (mostly new, but part review)
  - Review of induction and recursion (chapter 4)
  - Recursive algorithms (chapter 4)
  - Program correctness (chapter 4)
- Topic 7: (new topic)
  - Relations and closures (chapter 8)
  - Application to database queries

Course Topics

- Topic 8: (new topic)
  - Graphs (chapter 9)
  - Both theory and applications
- Topic 9: (new topic)
  - Trees (chapter 10)
  - Both theory and applications

Do you need the book with you?

- You will definitely need it for homework purposes
- Could be useful to have with you in class, but not requiring you to bring it with you
  - i.e., if we do any problems from the book in class, I'll have the details either projected or on paper