Midterm Review

Hints for studying
Review of possible topics

Study Guide

- The best way to study for the midterm is to review the problem sets and labs
- Most questions will be very similar to problem set questions
- Exam will cover:
  - problem sets 1-4
  - labs 1-3
- Everything you need to know is in lecture notes
  - but it wouldn’t hurt to have read and understood the chapters from NTO

What to Expect

- No Ruby (programming)
  - you will not be asked to write any Ruby code
- Know Ruby (methods)
  - you will be asked “what does this expression print” or “describe the output of the following loop”
- Understand -- but don’t memorize -- Ruby methods
  - there will be a reference sheet based on the Wiki page attached to the exam
- There will probably be “match one from column A with one from column B” type of “literacy” question
- There will probably be one or more questions based on an FSA
  - e.g. what states does machine go through when it reads X?

Algorithms

- There will probably be questions about algorithms
  - I will show pseudo-code and/or Ruby
  - the descriptions will be taken from lecture slides -- no new algorithms introduced on the test
- Possible questions:
  - what is the value of X at location Y?
  - what does the program print?
- Algorithms to know:
  - GCD
  - matching-pairs
  - insertion sort
  - naive search
  - Boyer-Moore
“Big O” Notation

- You should understand why the algorithms scale as they do
  - insertion sort \( \mathcal{O}(n^2) \)
  - Boyer-Moore \( \mathcal{O}(n) \)  
    Ans: nested loops = \( n \times m \)
    single loop = \( n \)
  - naive search: ?
  - matching-pairs: ?

- GCD we didn’t talk about since it’s much harder to evaluate
  - depends on the magnitude of the numbers

Bioinformatics

- There won’t be any questions about DNA, cells, proteins, ...
- But there very well may be questions that use DNA or proteins for examples, e.g. the automaton questions might be for input strings made from A, T, C, and G
- There might be a question on the genetic code
  - e.g. “translate ATCAAC.... into protein”
  - if so the genetic code table will be included with the test