CS6320, Spring 2018
Dr. Mithun Balakrishna
Homework 1
Due Wednesday, February 7th, 2018 11:59pm

A. Submission Instructions:

- Submit your solutions via eLearning.
- Please submit a single zip file with the following files:
  - For programming questions:
    - Source code file(s) in C/C++, Java, or Python. For using any other programming language, please get prior approval from the TA.
    - A ReadMe file with instructions on how to compile/run the code.
  - For all other questions, a PDF/Doc/PS/Image file with the solutions.
- Late Submission Penalty:
  - up to 2 hours late — 10% deduction
  - 2 - 4 hours late — 20% deduction
  - 4 - 12 hours late — 35% deduction
  - 12 - 24 hours late — 50% deduction
  - 24 - 48 hours late — 75% deduction
  - more than 48 hours late — 100% deduction (zero credit)

B. Problems:

1. Regular Expressions (50 points)

Write regular expressions for the following. You may use either Perl/Python notation, but make sure to say which one you are using. By "word", I mean an alphabetic string separated from other words by whitespace, any relevant punctuation, line breaks, and so forth.

1. the set of all alphabetic strings

   Examples:

   why the?
   No, the guppies did. Actually, one guppy!

2. the set of all lower case alphabetic strings ending in a b

   Examples:

   Many programming languages provide regex capabilities, built-in, or via libraries.

Please use tab.

3. the set of all strings from the alphabet {“a”, “b”} such that each “a” is immediately preceded by and immediately followed by a “b”

   Examples:

   The use of babble helps.

   Tab is not bob's bbabled bass.

4. all strings that start at the beginning of the line with an integer and that end at the end of the line with a word

   Examples:

   1 Complete you homework!
   1 Complete you homework
   2nd you can play.
   2nd you can play
   2 nd you can play
   Third you can eat.

2. Money! (50 points)

Create a **deterministic FSA** for English money expressions. You should handle amounts up to $100,000, and make sure that “cent” and “dollar” have the proper plural endings when appropriate. Formulate the problem precisely, making only those distinctions necessary to ensure a valid solution. Draw a diagram of the complete state space.

Note: Slide 15 in “3 - Regular Exp and Automata.pdf” has a non-deterministic FSA that can be used as a reference.