

CS6320, Spring 2019
Dr. Mithun Balakrishna
Homework 1
Due February 10th, 2019 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. Your Regular Expression should find the largest matching string. 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 that is gr8!
No, it is not gr8 at all!

2. the set of all alphabetic words

Examples:

why that is gr8!
No, it is not gr8 at all!

3. 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.

4. the set of all lower case alphabetic words ending in a b

Examples:

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

5. the set of all strings from the alphabet {"a", "b"} such that each "a" is immediately preceded by and immediately followed by at least one "b"

Examples:

The use of babble helps.

Tab is not bob's bbabled bass.

6. the set of all words from the alphabet {"a", "b"} such that each "a" is immediately preceded by and immediately followed by at least one "b"

Examples:

The use of babb helps.

Tab is not bob's bbabled bab.

7. the set of all strings from the alphabet {"a", "b"} that form the pattern $a^n b^m$ where $(n+m)$ is even; $n \geq 0$ and $m \geq 0$

Examples:

The use of baabble helps.

Tab is not bb in bob's baaabbbled bass.

2. Date Expressions (50 points)

Create a single regular expression and a **deterministic** FSA for English date expressions that comply with the following patterns:

- i. mm/dd/yyyy
- ii. dd/mm/yyyy
- iii. yyyy/mm/dd
- iv. mm/dd/yy
- v. dd/mm/yy
- vi. yy/mm/dd

“mm” can have the values: 01, 02, 03, 04, 05, 06, 07, 08, 09, 10, 11, 12

“dd” can have the values: 01, 02, 03, 04, 05, 06, 07, 08, 09, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31

“yy” can have the values: 00 to 99

“yyyy” can have the values: 1900 to 2000