

CS3311 Homework 4  
(shortened version)

Due date: Wednesday, September 28, 2016, in class

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The answers must be the original work of the author. While discussion with others is permitted and encouraged, the final work should be done individually. You are not allowed to work in groups. You are allowed to build on the material supplied in the class. Any other source must be specified clearly.

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1. (100 points, 15+10 points each)

For each of the following languages:

- (i) Construct a regular expression that describes the language, and
- (ii) Build a DFA that accepts the described language. Explain how the machine works.  
**No points will be given to machines without accompanying “comments”.**

(a) The empty set (over  $\{a, b\}$ ).

(b) The empty string (over  $\{a, b\}$ ).

(c) The strings that begin with a, and do not contain ‘bc’ over  $\{a, b, c\}$ .

(d)  $\{w \mid w \in \{a, b\}^*, w \text{ starts and ends with the same symbol, and } w \neq \lambda\}$