COS126 Regular Expressions, DFAs (Booksite §7.2, 7.3)

See also the online chapter in the lecture page Reading column.

Part 1

Consider the regular expression `((C|D|M|N|P|T)A)*`

- Is PAPA generated by this RE? Is MAMAN? Is NAPA? Is TAMPA?

- What two country names can be generated?

Part 2 — RElay Race

Write regular expressions for the following languages.

1. all binary strings

2. all non-empty binary strings

3. all binary strings beginning and ending with 1

4. all binary strings ending with 00 (divisible by 4)

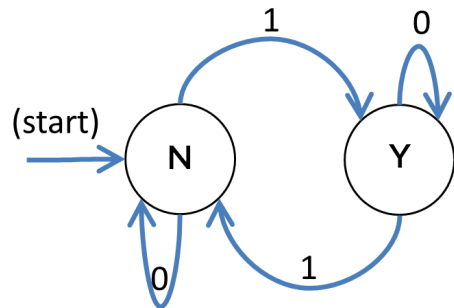5. all binary strings with at least three 1s

Part 3

What does `(0*10*10*)*` generate? (Describe this set of strings in English)

Bonus

Hard bonus: can we generate set of all binary integers divisible by 3?

Part 4

- Is 01101 accepted by this DFA? Is 11?

- What is an English description for the set of all strings it accepts?

- (Optional) What is a Regular Expression description for the set of all strings it accepts?

Part 5

Write 5 DFAs that accept the 5 languages from Part 2:

1. all binary strings

2. all non-empty binary strings

3. all binary strings beginning and ending with 1

4. all binary strings ending with 00 (divisible by 4)

5. all binary strings with at least three 1s

Bonus

Write a DFA that accepts the set of all Java double literals. Use the RE

`(\+|-)([0-9]+(|\.[0-9]*)|\.[0-9]+)(|(E|e)(\+|-)[0-9]+)`

Recommended RE/DFA exercises from the exam archive: Fall 2009, Exam 2, question 2; Spring 2013, Exam 2, question 4