Math 266 Fall 2009

Homework 2

Due Friday, September 18

SEA: Ch 1.4 # 7dhi, 6b, 8, 9a
Ch 1.5 # 3dh, 7a, 11
Ch 1.3 # 7, 10
Ch 1.6 # 1dh, 2a, 4, 5bde
Ch 1.7 # 3

Problem A:

The -d- system is a formal system with alphabet **d** and **-** (hyphen).
The system has infinitely many axioms, but all of the same form:
*x***d***x* is an axiom, whenever *x* is a string of at least two hypens.
(note that *x* must stand for the same string of hyphens in both places).
For example, when *x* is **--**, then **--d--** is an axiom.
There is one rule:
From *x***d***y*, produce *x***d***yx*, where *x* and *y* consist only of hyphens.
For example, from **--d--**, produce **--d----**

Determine which strings can be produced in this system, by finding an interpretation for the symbols which make it easy to tell if a string can be produced.

Suppose we extend the system with a new symbol **c** and add a new rule:
From *x***d***xy*, produce **c***xy*. where *x* and *y* are (nonempty) hyphen strings.

Describe the new strings which are produced.

Bonus: Is the string **c** followed by 2^{41}-1 hyphens producible?