

COS 301 Fall 2009
Homework #2 Due Tuesday Oct 15

1. (1 pt) Text Ex. 3.1 and 3.2
2. (1 pt) Text Ex. 3.3
3. (2 pts) Explain why it is not possible to define a regular grammar for the language $\{a^n b^n\}$. Then write a regular grammar for the language $\{a^n b^n \mid 1 \leq n \leq 3\}$, and write a BNF grammar for the language $\{a^n b^n\}$
4. (1 pt) Given the alphabet $\Sigma = \{0,1\}$ what is an English description of the regular expression r ?
$$r = (1^* \mid 0 \mid 00)^* 000 (0 \mid 1)^*$$
5. (1 pt) With Σ and r from problem 2, which strings are valid?
a) 00001 b) 10010010010 c) 100010001111 d) 00000

For 6 and 7 it is easiest to start with the DFSA

6. (2 pts) For C-style comments `/* this is a comment */` write (a) a right-regular grammar, (b) a left-regular grammar, (c) a regular expression, and (d) a DFSA.
- 7 (2 pts) For numbers in scientific notation, as defined in HW1 write (a) a right-regular grammar, (b) a left-regular grammar, (c) a regular expression, (d) a DFSA. Here is a corrected definition of scientific notation from HW1.
 - a leading sign (+ or -) is optional
 - exactly one non-zero digit must precede the decimal point.
 - one or more digits may follow the decimal point
 - exponents are optional, if present are in the form of a letter E followed by a non-optional sign (+ or -) followed by an integer exponent