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CS 326 Homework 1

1.

The front and the back end of a compiler are implemented as separate passes because the front end is dependent on the language and not the machine, and the back end is dependent on the machine but not the language.

To put it another way, the front end can be used on any machine for compiling the language in question. The back end can be used for any language, but not for any machine. The two ends are implemented separately so they can be more portable to the different situations to which they are suited.

2.

a. (a|b) (a|b) (a|b) (a|b)\*

b. ( 25 | 50 | 75 | needs-more-places )

needs-mode-places = ( non-zero-digit digit\* ( 00 | 25 | 50 | 75 ) )

non-zero-digit = ( 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 )

digit = ( 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 )

c. a (aa)\*

d. aa (a|b)\* bb

3.

a. exp -> aa T bb

T -> a T | b T | ℰ

b. exp -> aa T

T -> aa T | ℰ

c. exp -> (T)T | [T]T | {T}T

T -> (T)T | [T]T | {T}T | ℰ

4 / 5. Attached.

6. exp -> a T b

T -> aa T bb | ℰ