

CMPT 383
Quiz #3
September 29, 2005

- 1) Using grammar 1, show the parse tree, the abstract syntax tree and the leftmost derivation for

$A = B * (C * (A + B))$

Grammar 1

$\langle \text{assign} \rangle ::= \langle \text{id} \rangle = \langle \text{expr} \rangle$
 $\langle \text{id} \rangle ::= A \mid B \mid C$
 $\langle \text{expr} \rangle ::= \langle \text{expr} \rangle + \langle \text{term} \rangle \mid \langle \text{term} \rangle$
 $\langle \text{term} \rangle ::= \langle \text{term} \rangle * \langle \text{factor} \rangle \mid \langle \text{factor} \rangle$
 $\langle \text{factor} \rangle ::= (\langle \text{expr} \rangle) \mid \langle \text{id} \rangle$

- 2) Describe, in English, the language defined by grammar 2.

Grammar 2

$\langle S \rangle ::= \langle A \rangle \langle B \rangle \langle C \rangle$
 $\langle A \rangle ::= a \langle A \rangle \mid a$
 $\langle B \rangle ::= b \langle B \rangle \mid b$
 $\langle C \rangle ::= c \langle C \rangle \mid c$

- 3) Which of the following sentences are in the language generated by grammar 3?

- a) abcd
- b) acccbd
- c) acccbcc
- d) acd
- e) accc

Grammar 3

$\langle S \rangle ::= a \langle S \rangle c \langle B \rangle \mid \langle A \rangle \mid b$
 $\langle A \rangle ::= c \langle A \rangle \mid c$
 $\langle B \rangle ::= d \mid \langle A \rangle$

- 4) Convert the following EBNF to BNF:

- a) $\langle S \rangle ::= \langle A \rangle \{ b \langle A \rangle \}$
- b) $\langle A \rangle ::= a [b] \langle A \rangle$