

BNF for Core

$\langle \text{prog} \rangle ::= \text{program } \langle \text{decl seq} \rangle \quad (1)$
 $\quad \text{begin } \langle \text{stmt seq} \rangle \text{ end}$
 $\langle \text{decl seq} \rangle ::= \langle \text{decl} \rangle \mid \langle \text{decl} \rangle \langle \text{decl seq} \rangle \quad (2)$
 $\langle \text{stmt seq} \rangle ::= \langle \text{stmt} \rangle \mid \langle \text{stmt} \rangle \langle \text{stmt seq} \rangle \quad (3)$
 $\langle \text{decl} \rangle ::= \text{int } \langle \text{id list} \rangle; \quad (4)$
 $\langle \text{id list} \rangle ::= \langle \text{id} \rangle \mid \langle \text{id} \rangle, \langle \text{id list} \rangle \quad (5)$
 $\langle \text{stmt} \rangle ::= \langle \text{assign} \rangle \mid \langle \text{if} \rangle \mid \langle \text{loop} \rangle \mid \langle \text{in} \rangle \mid \langle \text{out} \rangle \quad (6)$
 $\langle \text{assign} \rangle ::= \langle \text{id} \rangle = \langle \text{exp} \rangle; \quad (7)$
 $\langle \text{if} \rangle ::= \text{if } \langle \text{cond} \rangle \text{ then } \langle \text{stmt seq} \rangle \text{ end}; \quad (8)$
 $\quad \text{if } \langle \text{cond} \rangle \text{ then } \langle \text{stmt seq} \rangle \text{ else } \langle \text{stmt seq} \rangle \text{ end};$
 $\langle \text{loop} \rangle ::= \text{while } \langle \text{cond} \rangle \text{ loop } \langle \text{stmt seq} \rangle \text{ end}; \quad (9)$
 $\langle \text{in} \rangle ::= \text{read } \langle \text{id list} \rangle; \quad (10)$
 $\langle \text{out} \rangle ::= \text{write } \langle \text{id list} \rangle; \quad (11)$

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BNF for Core (contd.)

$\langle \text{cond} \rangle ::= \langle \text{comp} \rangle \mid !\langle \text{cond} \rangle \quad (12)$
 $\quad \mid [\langle \text{cond} \rangle \ \&\& \ \langle \text{cond} \rangle] \mid [\langle \text{cond} \rangle \ \text{or} \ \langle \text{cond} \rangle]$
 $\langle \text{comp} \rangle ::= (\langle \text{op} \rangle \ \langle \text{comp op} \rangle \ \langle \text{op} \rangle) \quad (13)$
 $\langle \text{exp} \rangle ::= \langle \text{trm} \rangle \mid \langle \text{trm} \rangle + \langle \text{exp} \rangle \mid \langle \text{trm} \rangle - \langle \text{exp} \rangle \quad (14)$
 $\langle \text{trm} \rangle ::= \langle \text{op} \rangle \mid \langle \text{op} \rangle * \langle \text{trm} \rangle \quad (15)$
 $\langle \text{op} \rangle ::= \langle \text{no} \rangle \mid \langle \text{id} \rangle \mid (\langle \text{exp} \rangle) \quad (16)$
 $\langle \text{comp op} \rangle ::= != \mid == \mid < \mid > \mid <= \mid >= \quad (17)$
 $\langle \text{id} \rangle ::= \langle \text{let} \rangle \mid \langle \text{let} \rangle \langle \text{id} \rangle \mid \langle \text{let} \rangle \langle \text{no} \rangle \quad (18)$
 $\langle \text{let} \rangle ::= A \mid B \mid C \mid \dots \mid X \mid Y \mid Z \quad (19)$
 $\langle \text{no} \rangle ::= \langle \text{digit} \rangle \mid \langle \text{digit} \rangle \langle \text{no} \rangle \quad (20)$
 $\langle \text{digit} \rangle ::= 0 \mid 1 \mid 2 \mid 3 \mid \dots \mid 9 \quad (21)$

■ Notes:

Productions (18)-(21) have no *semantic* significance;
 (19) and (21) are superseded by (19') and (21') on next page:

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BNF for Core (contd.)

$\langle \text{let} \rangle ::= A \mid B \mid C \mid D \mid E \mid F \mid G \mid H \mid I \mid J \mid K \mid L \mid M$
 $\mid N \mid O \mid P \mid Q \mid R \mid S \mid T \mid U \mid V \mid W \mid X \mid Y \mid Z \quad (19')$

$\langle \text{digit} \rangle ::= 0 \mid 1 \mid 2 \mid 3 \mid 4 \mid 5 \mid 6 \mid 7 \mid 8 \mid 9 \quad (21')$