IMP

END MODULE

```
MODULE IMP-SYNTAX
   SYNTAX AExp ::= Int
                       String
                       Id
                        ++ Id
                        read ()
                       AExp / AExp [division, strict]
                       AExp + AExp [strict]
                       (AExp) [bracket]
   SYNTAX BExp ::= Bool
                       AExp \le AExp [seqstrict]
                        ! BExp [strict]
                       BExp && BExp [strict(1)]
                       (BExp) [bracket]
   SYNTAX Block ::= \{\}
                     | \{Stmt\}|
   \mathtt{SYNTAX} \quad \mathit{Stmt} ::= \mathit{Block}
                      Id = AExp; [strict(2)]
                       if (BExp)Block else Block [strict(1)]
                       while (BExp)Block
                       int Ids ;
                       print (AExps) ; [strict]
                       halt ;
                       spawn Stmt
                      Stmt Stmt
   SYNTAX Ids ::= List\{Id, ", "\} [strict]
   SYNTAX AExps ::= List\{AExp, ", "\} [strict]
END MODULE
MODULE IMP
   SYNTAX KResult ::= Int
                          Bool
                        String
  CONFIGURATION:
                                                   store
             PGM:Stmt
                            env
                                         store
                                                                                                                                                                                                                                                                                       [lookup]
  RULE
                          X \mapsto N
                                        N \mapsto I
                 X:Id
  RULE
                                                                                                                                                                                                                                                                                    [increment]
                              X \mapsto N
                   ++ X
                 \overline{I +_{Int} \mathbf{1}}
  RULE
                                   ListItem (I:Int)
                 read ()
                                          \bulletList
  RULE I1 / I2
                            requires I2 = /=_{Int} 0
          \overline{I1 \div_{Int} I2}
  RULE I1 + I2
          I1 +_{Int} I2
  RULE Str1 + Str2
          \overline{Str1 +_{String} Str2}
  Rule I1 \leq I2
          I1 \leq_{Int} I2
  RULE ! T
  RULE \, true && B
               \check{B}
   RULE false && —
             false
  RULE {}
                                                                                                                                                                                                                                                                                     [structural]
  {\tt RULE} \quad \{S\}
                                                                                                                                                                                                                                                                                     [structural]
  RULE
                 X = I:Int;
  RULE S1:Stmt S2:Stmt
                                                                                                                                                                                                                                                                                     [structural]
               S1 \curvearrowright S2
  {\tt RULE} \quad {\tt if} \; ({\tt true}) S \; {\tt else} \, -\!\!\!\!\!\!-
   \quad \text{while } (B)S
  RULE
                                                                                                                                                                                                                                                                                     [structural]
          if (B)\{S \text{ while } (B)S\} \text{ else } \{\}
  RULE
                 int X, Xs;
                                         \rho[X \leftarrow N:Int]
  RULE int \bullet_{Ids} ;
                                                                                                                                                                                                                                                                                     [structural]
   {\tt SYNTAX} \quad \textit{Printable} ::= \textit{Int}
                        String
   SYNTAX AExp ::= Printable
  RULE
                 print(P:Printable, AEs);
                                 \overline{AEs}
                                                      ListItem (P)
  RULE print(\bullet_{AExps});
                                                                                                                                                                                                                                                                                     [structural]
```