

˘The Grammar Executing Machine

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es ← newstack(); mode ← SEARCH;           ˘Initialization
ps ← newstack(); p0 ← ps; *ps ← " = G'E' ";
+ *ps; p ← grammar; +p; **ps ← *p; p ← *ps; ++p; *p ← EoS;
p ← grammar; i ← input; o ← "";          ˘'; must begin grammar
do mode = PARSE ⇒                          ˘Executing a Rule.
  if *p ∈ Letter ⇒                          ˘recursive call
    mode ← SEARCH;
    +p; *ps ← p; p ← grammar                ˘descent
  [] *p = ''' ⇒                              ˘input
    +p;                                     ˘skip ' '
    if *p = *i ⇒ +i; ++p                    ˘shift
    [] true ⇒ mode ← BACK; --p              ˘no match
    fi
  [] *p = ''' ⇒                              ˘output
    +p; +o; *o ← *p; ++p
  [] *p = ';' ⇒                              ˘return
    -p; +es; *es ← p;                       ˘record parse
    if ps < p0 ⇒ mode ← QUIT;                ˘stack empty: done
    [] true ⇒ p ← *ps; -ps; +p               ˘ascent
    fi
  fi
[] mode = BACK ⇒                            ˘Backtracking.
  if *p ∈ Letter ⇒ +ps; *ps ← p; p ← *es; -es
  [] *p = ''' ⇒ -i; ---p                    ˘unshift input terminal
  [] *p = ''' ⇒ -o; ---p                    ˘unshift output terminal
  [] *p = '=' ⇒ mode ← SEARCH; +p
  fi
[] mode = SEARCH ⇒                          ˘Searching for a Rule.
  if *p ∈ Letter ⇒ +p                       ˘skip nonterminal
  [] *p = ''' ⇒ +++p                        ˘skip input terminal
  [] *p = ''' ⇒ +++p                        ˘skip output terminal
  [] *p = ';' ⇒                             ˘end of rule
    +p;                                     ˘skip ' ; '
    if *p = **ps ⇒ mode ← PARSE             ˘match, descent
    [] true ⇒ ++p                            ˘no match
    fi
  [] *p = EoS ⇒                              ˘search failed
    if ps ≠ p0 ⇒                             ˘continue or abort
    fi;
    p ← *ps; -ps; mode ← BACK; -p           ˘backtrack
  fi
od

```