3.1.1 a) aa, baa, aba, aab

b) $S \to AA \to bAA \to bAbA \to bAbbA \to bAbbAb \to babbAb \to babbab$

$S \to AA \to AbA \to AbAb \to bAbAb \to bAbbAb \to babbab \to babbab$

$S \to AA \to AbA \to bAbA \to bAbbA \to bAbbAb \to babbAb \to babbab$

$S \to AA \to bAA \to bAAb \to bAbAb \to bAbbAb \to babbAb \to babbab$

c) $S \to AA \to b^mAA \to b^mAb^nA \to b^mAb^nAb^p \to b^mab^nAb^p$

$\to b^mab^nab^p$

3.1.2 $S \to bAb \to bSSb \to baAaSb \to baAabAbb \to baSSabSSbb \to$

$baSabSSbb \to baabSSbb \to baabSbb \to baabbb$

3.1.3

a) $G = (V, \Sigma, R, S)$ / $V = \{a, b, S\}$ / $\Sigma = \{a, b\}$

$R = \{ S \to aSa \ , \ S \to bSb \ , \ S \to c \}$

b) $G = (V, \Sigma, R, S)$ / $V = \{a, b, S\}$ / $\Sigma = \{a, b\}$

$R = \{ S \to aSa \ , \ S \to bSb \ , \ S \to e \}$

c) $G = (V, \Sigma, R, S)$ / $V = \{a, b\}$ / $\Sigma = \{a, b\}$

$R = \{ S \to aSa \ , \ S \to bSb \ , \ S \to e \}$

3.1.8

$G = (V, \Sigma, R, S)$ / $V = \{ :, =, +, *, <, (,), ;, id, if, then, lbl, while, do, goto, begin, end, \tau, F, E, M, S \}$

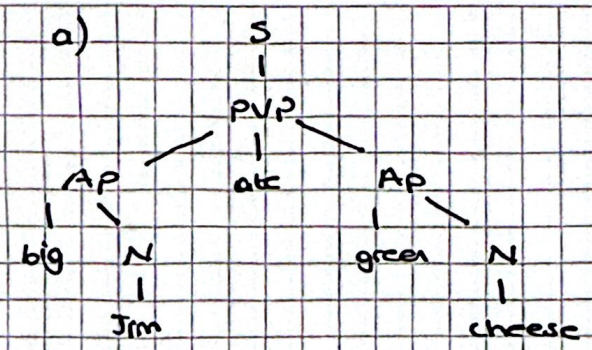
$\Sigma = \{ :, =, +, *, <, (,), ;, id, if, then, lbl, while, do, goto, begin, end \}$

$R = \{ S \to id := E, \ S \to if \ E < E \ then \ S, \ S \to while \ E < E \ do \ S$

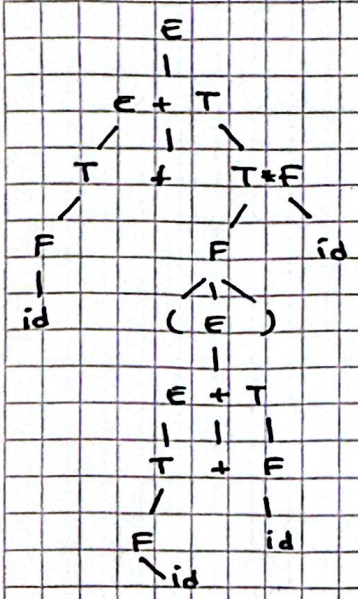
$S \to goto \ lbl, \ S \to begin \ M \ end, \ S \to lbl :, \ M \to S ; M,$

$E \to E+T, \ E \to T, \ T \to T*F, \ T \to F, \ F \to (E), \ F \to id \}$

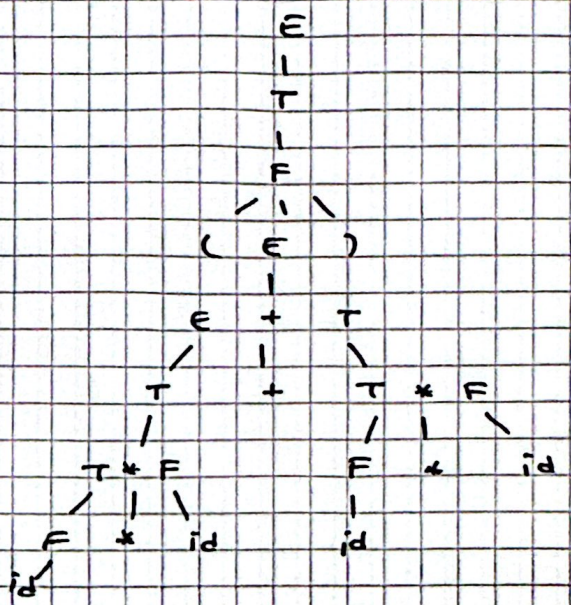
3.2.4 a)



b) id + (id + id) * id



(id * id + id * id)



Zeynep Ayça Akbayır
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