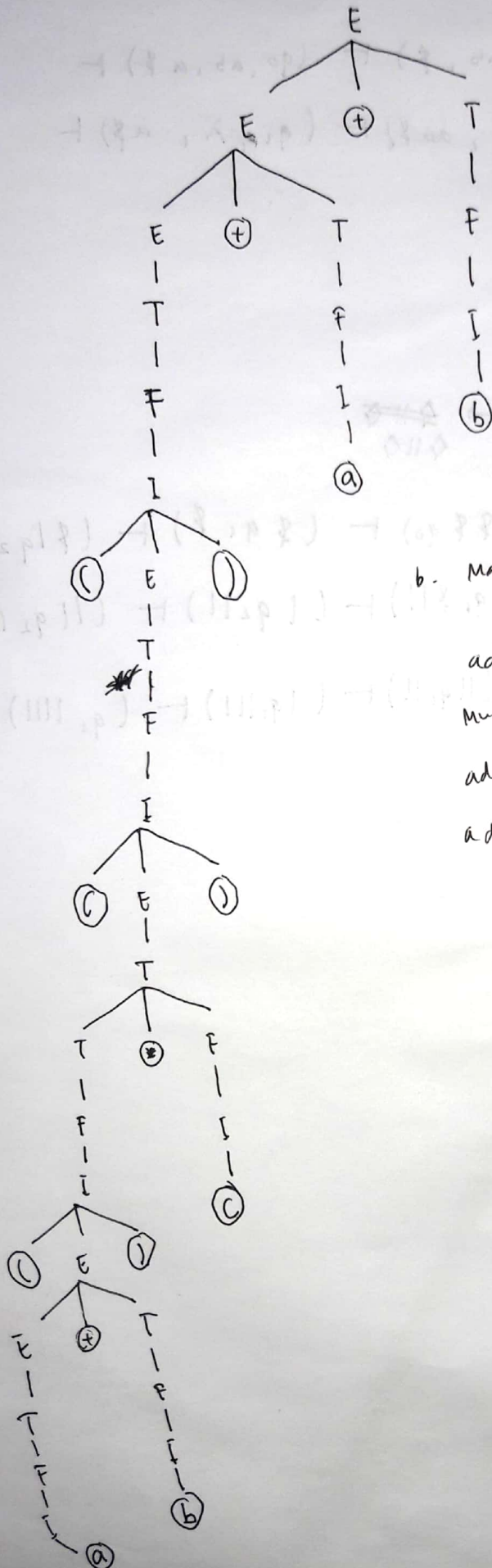


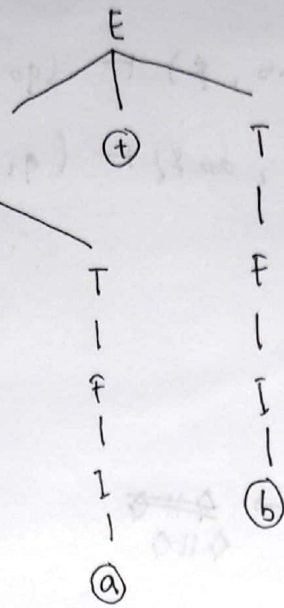
1. Bentue CNF
P: $S \rightarrow aSb \mid ab$

CNF :

$S \rightarrow AB$
 $A \rightarrow AC$
 $B \rightarrow BD$
 $A \rightarrow a$
 $B \rightarrow b$
 $C \rightarrow a$
 $D \rightarrow b$



2. a. perurutan Tree $((a+b)*c)) + a+b$



b. Machine code $((a+b)*c)) + a+b$

add P, a, b

mult Q, P, c

add R, Q, a

add S, R, b

3.

misal string : aab

$(q_0, aab, \$) \vdash (q_0, aab, \$) \vdash (q_0, ab, a\$) \vdash$

$(q_0, b, aa\$) \vdash (q_1, b, aa\$) \vdash (q_1, \lambda, a\$) \vdash$

$(q_2, \lambda, \$) \parallel \text{Accept}$

String aab diterima PDA

4.

misal ^{initial} input $x = 11 \rightarrow \begin{matrix} \text{---} \\ \text{---} \\ \text{---} \\ \text{---} \end{matrix}$

$(q_0 11) \vdash (\$ q_0 1) \vdash (\$ \$ q_0) \vdash (\$ a, \$) \vdash (\$ 1 q_2) \vdash$

$(\$ 1 q_1) \vdash (\$ q_1 11) \vdash (q_1 \$ 11) \vdash (1 q_2 11) \vdash (11 q_2 1) \vdash$

$(111 q_2) \vdash (111 q_1 1) \vdash (11 q_1 11) \vdash (1 q_1 111) \vdash (q_1 1111) \vdash$

$(q_3 1111) \parallel \text{halt \& accept}$

output $1111 = xx = 2x$

$f(x) = 2x$