

Homework 1

1.
a) terminals : $a, b, c, +, -, *$
non-terminals : S

b) $S \rightarrow SbS$

$\Rightarrow a+bS$

$\Rightarrow a+b*S$

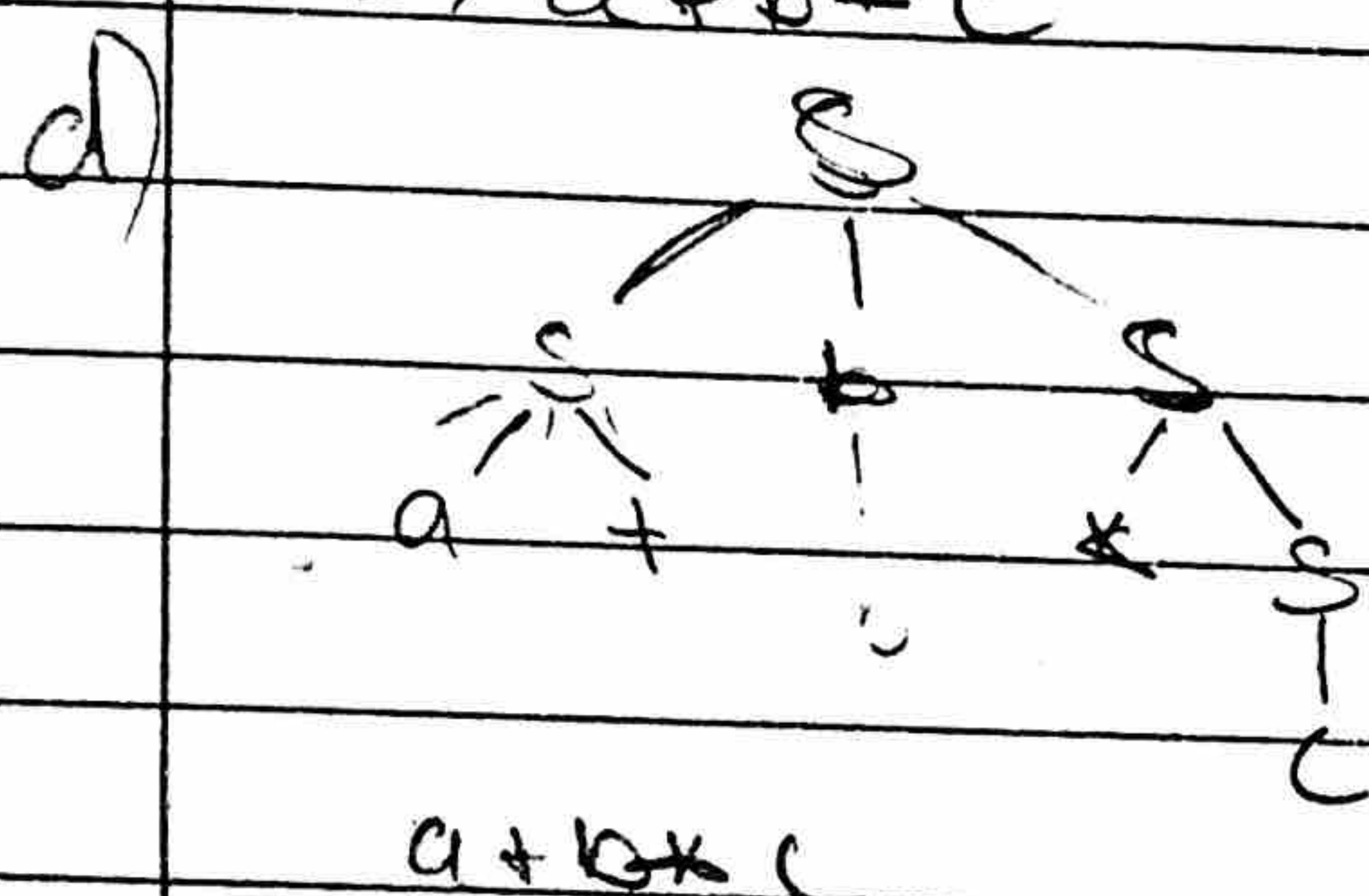
$\Rightarrow a+b*c$

c) $S \rightarrow SbS$

$\Rightarrow Sb*S$

$\Rightarrow Sb*c$

$\Rightarrow a+b*c$

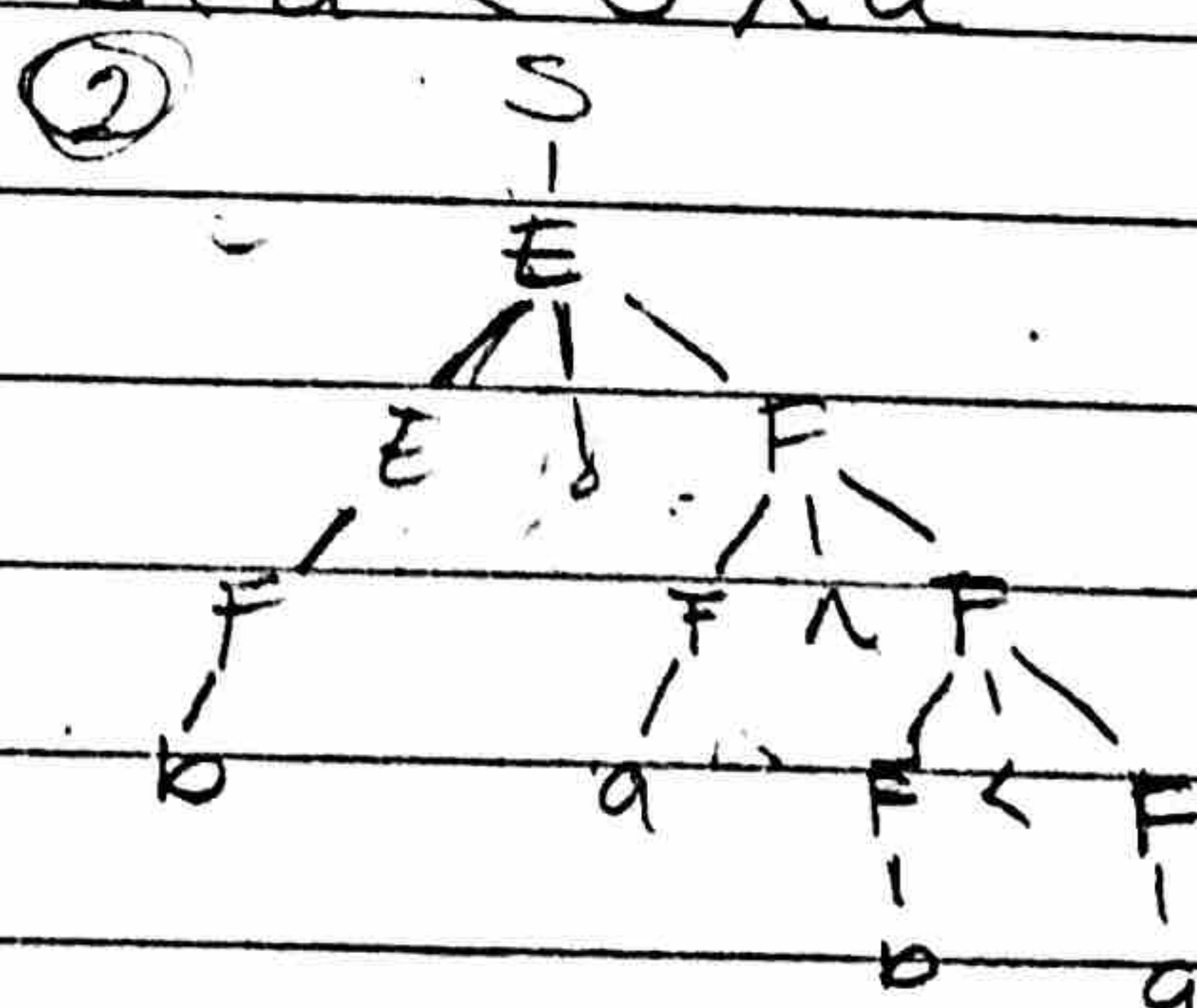
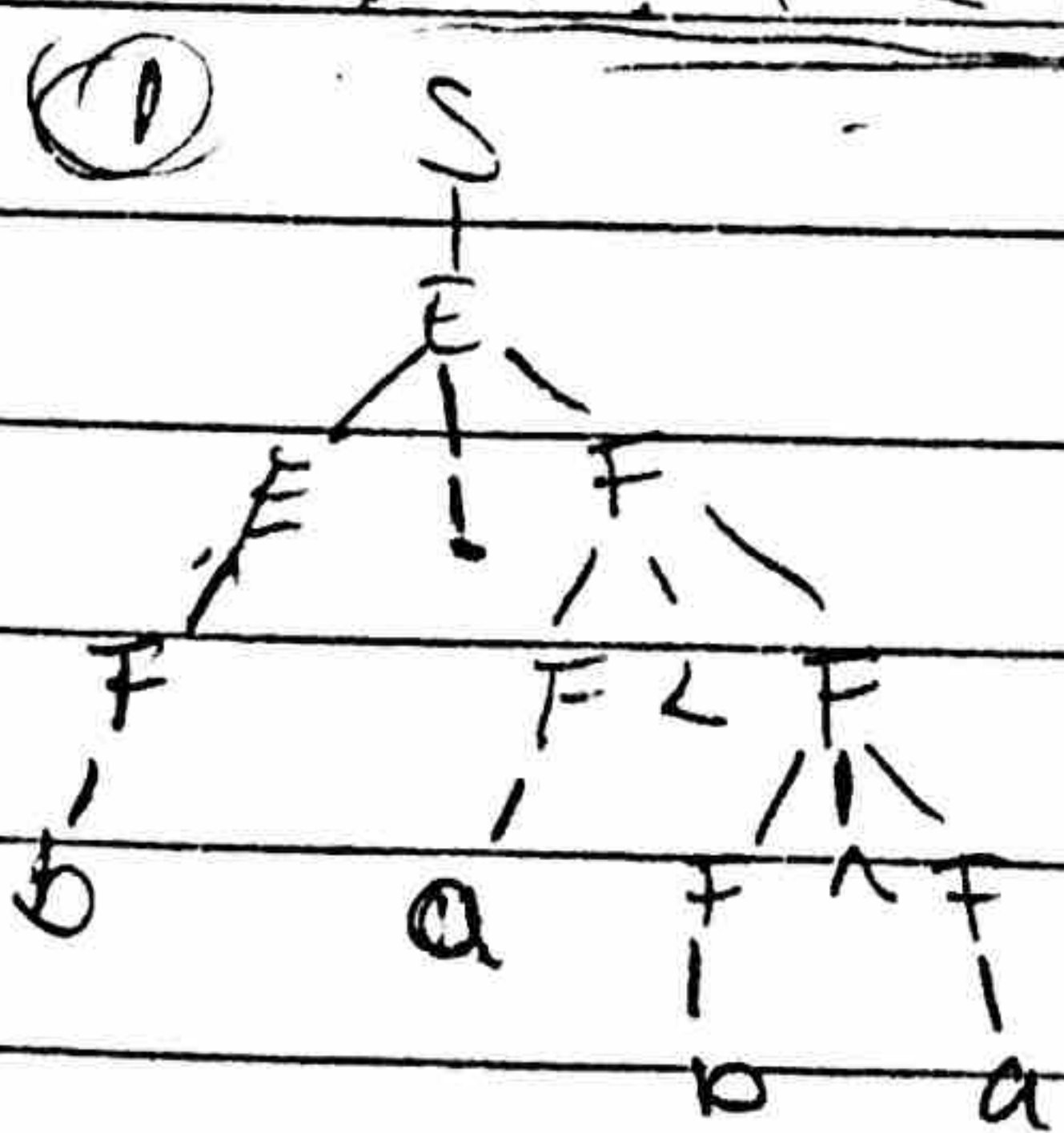


e) $+a$
 b
 $+b$

* 2)

a) $b! a < b \& a$

$= E \Rightarrow F \Rightarrow \underline{F < F} \Rightarrow * \underline{F < F \wedge F} \Rightarrow * \underline{E! F < F \wedge F}$
 $\Rightarrow * \underline{F! F < F \wedge F} \Rightarrow * b! a < b \wedge a$



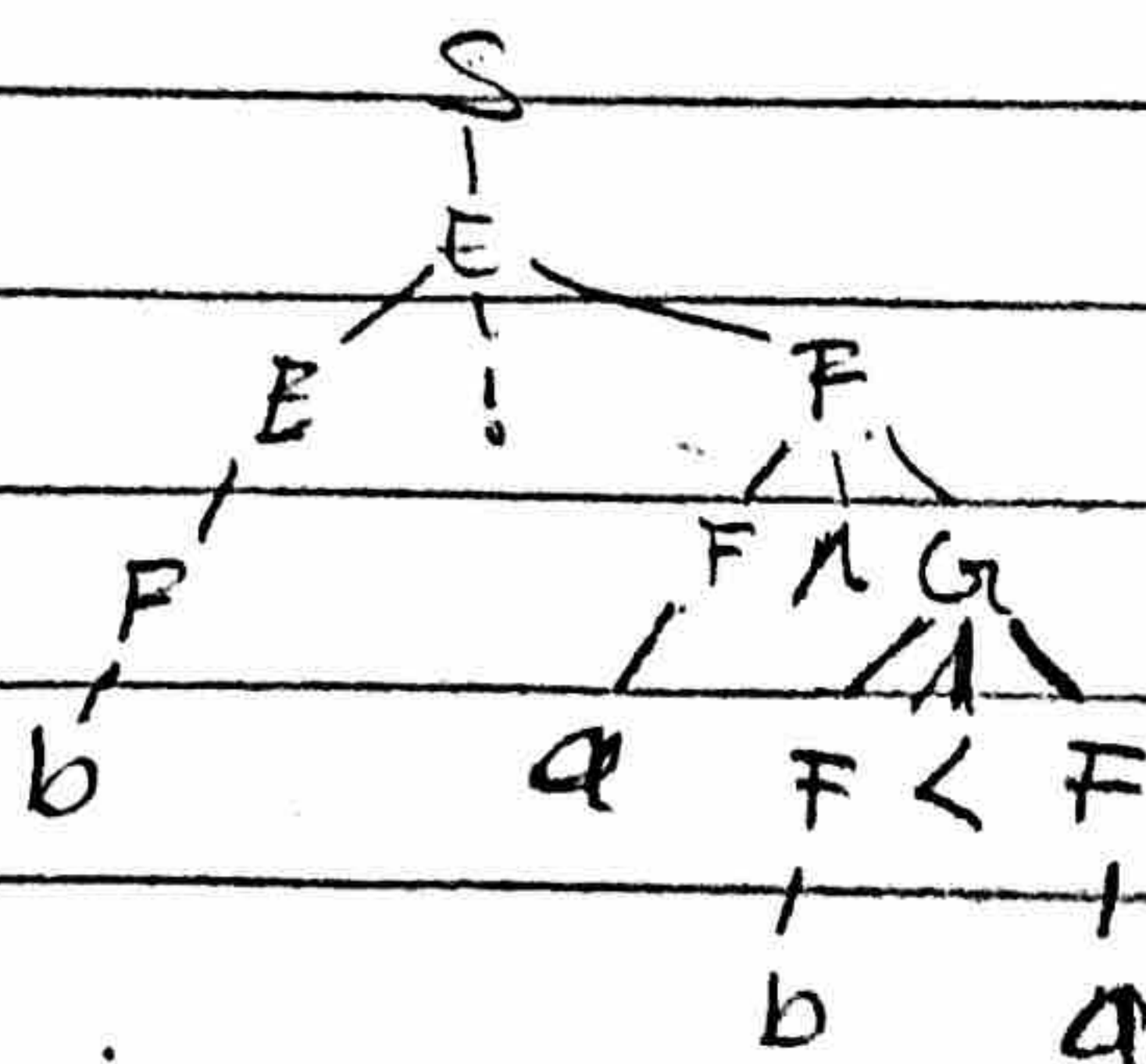
b) $S \rightarrow E!c$

$E \rightarrow E!F | F$

$F \rightarrow \underline{F \wedge G} | a | b$

$G \rightarrow \underline{F < F}$

c)



d. instead of having Ambiguity with F
you. by having F and G you have a set
path to create $G \rightarrow F \mid F$

3

a) $+$, $-$: left Associative $*$, $/$: Right Associative
in $E +$ and $-$ can be added to the left
it will grow on the left i.e. $E + T \Rightarrow (E + T) + T$ and
So on.

for $*$, $/$ it is Right Associative for e.i.
 $E + T \Rightarrow E + (F * T)$ and So on - it Grows to
The Right

b) Precedence is what was higher
precedence / priority in operations.
 $*$, and $/$ have a higher precedence
than $+$, $-$. it follows the regular
mathematical Rules

c) in $x / y + z * y - z$

The highest precedence would be
 (x / y) and $z * y$ Since they are on the
same level you can do either First. Since
 $-$ is the third operation it would be
Smart to do $/$ then $*$. Then you
do $(z * y) - z$ the last operation
is Addition $(+)$.

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more 1's Than 0's?

41
a) describe string $0^n 1^m$ where $m \geq n$

$S \rightarrow 0S1 \mid \epsilon$

$E \rightarrow E1 \mid 1 \mid \epsilon$

b) Baby language

$S \rightarrow \text{verb} \mid \text{adj} \mid \text{noun} \mid \text{noun verb noun}$
you need ϵ

Rules

$S \rightarrow nvn \mid v \mid n \mid a$

$N \rightarrow \text{A terminal } n$

$V \rightarrow \text{eat}$

$A \rightarrow \text{big tree}$

$a \rightarrow A \mid \epsilon$

$n \rightarrow N \mid \epsilon$

A apple n

A owl n

A mama n

A baba n

A puppy n