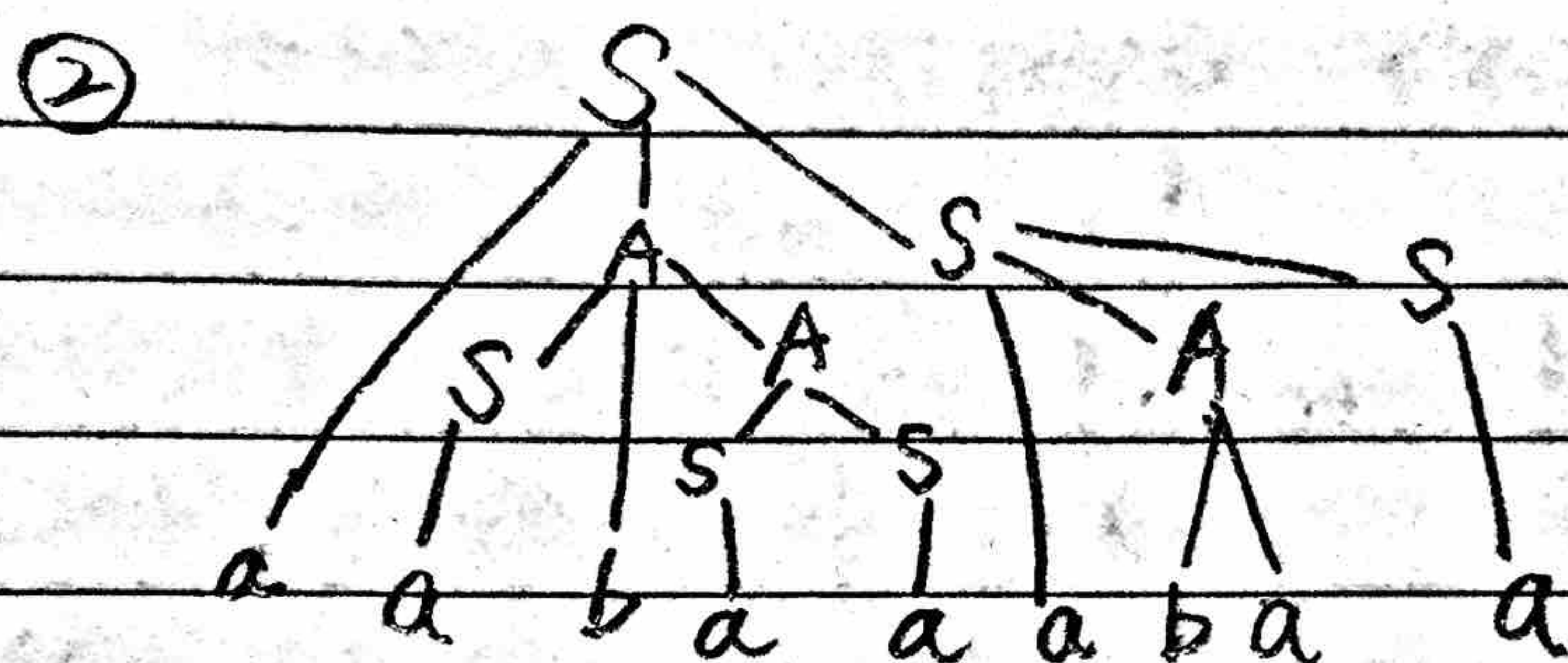
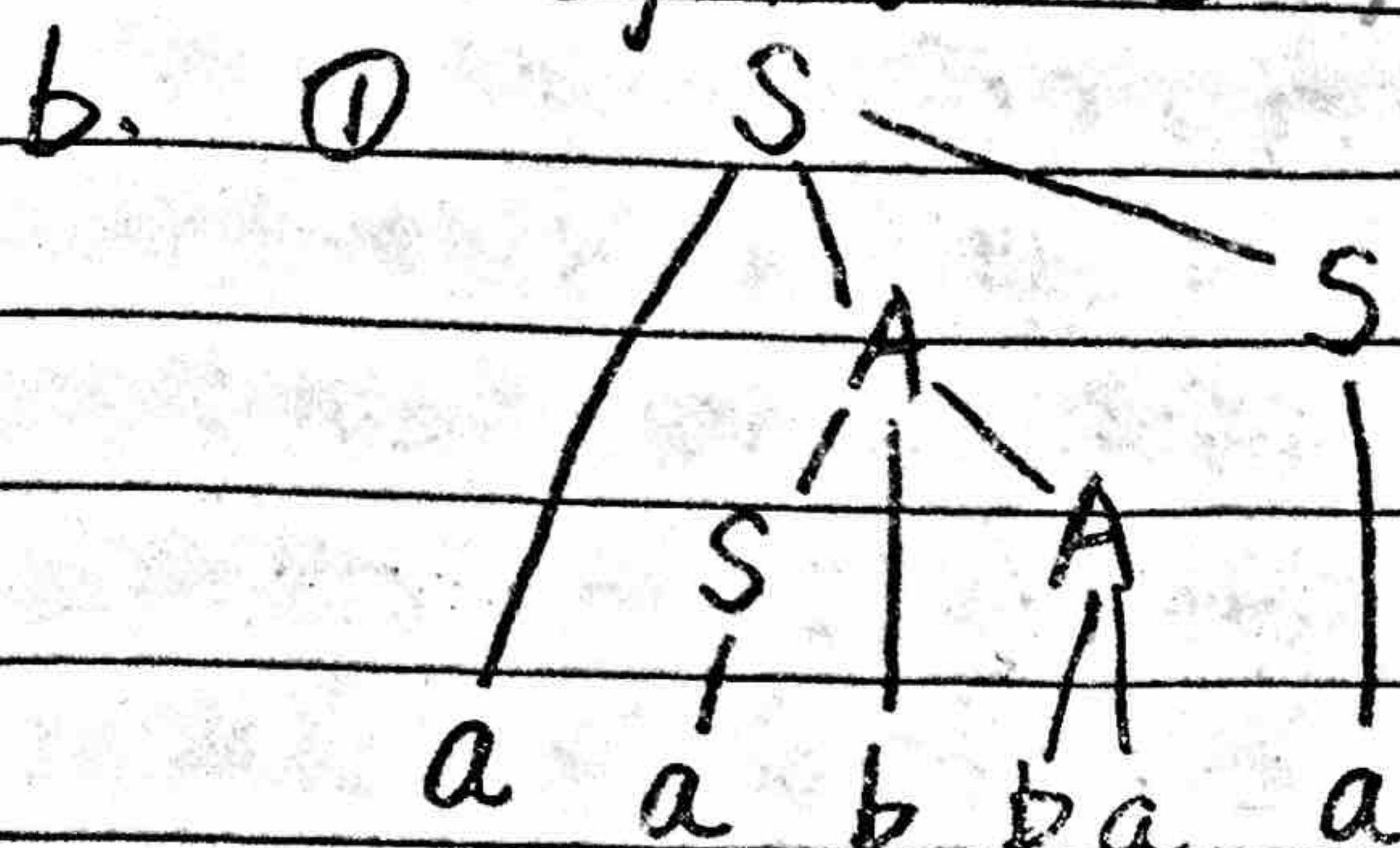


cse 413 HW8 Part I

1. a. terminals = a b

nonterminals: S A

start symbol = S



c. ① $S \Rightarrow aAS \Rightarrow aSbAS \Rightarrow aabAS$
 $\Rightarrow aabbaS \Rightarrow aabbaa$

② $S \Rightarrow aAS \Rightarrow aSbAS \Rightarrow aabAS$
 $\Rightarrow aabSSS \Rightarrow aabaaAS$
 $\Rightarrow aabaaabAS \Rightarrow aabaaabaa$

2. a. $P ::= (P) | () | [P] | [] | PP$

b. $X ::= ab | ba | xx | aXb | bXa$

c. $R ::= WcV$

d. $W ::= aWa | bWb | aa | bb$

$V ::= aVbb | abb$

4. $OBJ ::= DN | N$

3. $S ::= S;S | SUB PRE | SUB PRE OBJ$

$SUB ::= DN | N$

$PRE ::= V | V PREP OBJ | V OBJ$

$D ::= a | an | the$

$N ::= time | arrow | banana | flies | fruit | NN$

$V ::= flies | like$ $PREP ::= like$

(S = sentence, D = determiner, N = noun, OBJ = object

PREP = prep. SUB = subject, V = verb)

