

CSE 413 HW8 PART I

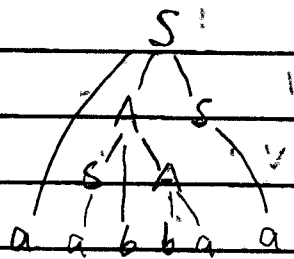
$$1. \quad \delta ::= aAS|a$$
$$A ::= SbA \mid SS \mid ba$$

a. terminals : a, b

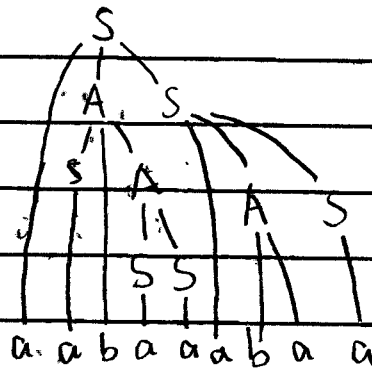
nonterminals:  $S, A$

start symbol : A

b.  $aabbba \rightarrow S = aAS = aSbAS = aabbas$



oabaaaba



C  $asbbaa : \therefore S \Rightarrow aAS \Rightarrow asbAS \Rightarrow aabAS \Rightarrow aabbaS \Rightarrow aabbaa$

$$aabaaabaa : S \Rightarrow aAS \Rightarrow aSbAS \Rightarrow aabAS \Rightarrow aabSSS$$
$$\Rightarrow aabass \Rightarrow aabaas \Rightarrow aabaaaAS$$
$$\Rightarrow aabaaabaS \Rightarrow aabaaabaa$$

2. a.  $S ::= (+ B +) + B$

$$A::= [L + B + ] + B$$
$$|B| := |S| |A| \phi$$
$$b \quad S :: = a \mid S + b \mid b \mid S + a \mid \phi$$

DPF AIR HMD hahj T

c.  $S ::= F_c T$

$F ::= aRa | aa | R$

$R ::= bFb | bb | F$

$T ::= abb | aTbb$

3.  $S ::= NP + VP | NP + PL$

$NP ::= D + N | N | N + NVP$

$VP ::= V + NP | V + NVP$

$PL ::= V + NP$

$NVP ::= V +$

$N ::= \text{time} | \text{arrow} | \text{banana} | \text{fruit}$

$D ::= a | an | the$

$V ::= \text{flies} | \text{like}$

Time flies like an arrow

