



UTM
UNIVERSITI TEKNOLOGI MALAYSIA

FACULTY OF ENGINEERING

SCHOOL OF COMPUTING

SESSION 2020/2021 SEMESTER 2

SCSJ3203 THEORY OF COMPUTER SCIENCE
SECTION 04

TUTORIAL 7
CFG PART 2

Name : AQILAH HANIM BINTI MOHD TAUFIK

Matrics : B19EC0006

Lecturer : DR ZALMIYAH ZAKARIA

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TCS Tutorial 7: CFG Part 2.

i. i) a) $\Sigma, a, b, aaabbbb, ab$

b) $ba, bbaa, bbbbbb, ababab, aba$

c) $L = a^*b^*$

ii. a) Σ, a, aa, aaa, ba

b) No

c) $L = (a \cup b)^*$

2. a) String $abbbaab$

$S \Rightarrow SAB$

$\Rightarrow SABAB$

$\Rightarrow \lambda ABAB$

$\Rightarrow \lambda aBAB$

$\Rightarrow \lambda abBAB$

$\Rightarrow \lambda abbaBAB$

$\Rightarrow \lambda abba\lambda AB$

$\Rightarrow \lambda abba\lambda aAB$

$\Rightarrow \lambda abba\lambda aaB$

$\Rightarrow \lambda abba\lambda aabB$

$\Rightarrow \lambda abba\lambda aab\lambda$

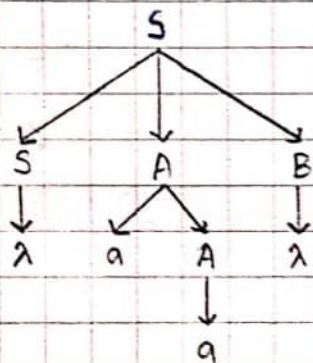
$\Rightarrow abbaab$

2. b) String aa

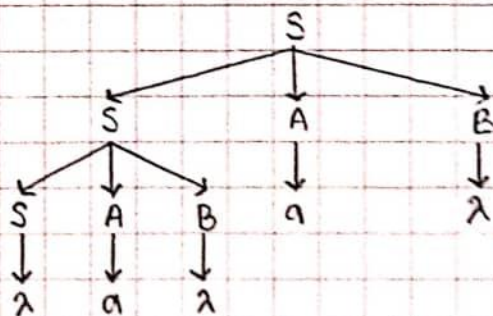
① $S \Rightarrow SAB$
 $\Rightarrow \lambda AB$
 $\Rightarrow \lambda aAB$
 $\Rightarrow \lambda aaB$
 $\Rightarrow \lambda aa\lambda$
 $\Rightarrow aa.$

② $S \Rightarrow SAB$
 $\Rightarrow SABAB$
 $\Rightarrow \lambda ABAB$
 $\Rightarrow \lambda aBAB$
 $\Rightarrow \lambda a\lambda AB$
 $\Rightarrow \lambda a\lambda aB$
 $\Rightarrow \lambda a\lambda a\lambda$
 $\Rightarrow aa$

2. c) ①



②



2. d) RE : $(a^*ab^*)^*$

3.a) $S \rightarrow AB$
 $A \rightarrow aA \mid \lambda$
 $B \rightarrow bBc \mid \lambda$

b) $S \rightarrow aS \mid aB$
 $B \rightarrow bBc \mid \lambda$

c) $S \rightarrow aSd \mid aAd$
 $A \rightarrow bAc \mid bc$

d) $S \rightarrow AB$
 $A \rightarrow aAB \mid \lambda$
 $B \rightarrow cBd \mid \lambda$

e) $S \rightarrow AB$
 $A \rightarrow aA \mid \lambda$
 $B \rightarrow bbBc \mid bbc$

f) $S \rightarrow asc \mid aBc$
 $B \rightarrow bBc \mid bc$

Table 3	Table 4
1. Two-parts	4
2. Two-parts	5
3. Nested	1
4. Two-parts	6
5. Nested	2
6. Two-parts	3