

1) A CFG FOR $1^*01^*(0+10)^*$

$$S \rightarrow AOAB$$

$$A \rightarrow 1A | \epsilon$$

$$B \rightarrow CB | \epsilon$$

$$C \rightarrow 0 | 10$$

2) $\{a^i b^j c^k \mid i \neq j \text{ OR } j \neq k\}$ S.L.L (b)

$$S \rightarrow E | K$$

$$E \rightarrow DF$$

$$D \rightarrow AC | CB$$

$$C \rightarrow aCb | \epsilon$$

$$A \rightarrow aA | a$$

$$B \rightarrow bB | b$$

$$F \rightarrow cF | \epsilon$$

$$K \rightarrow GJ$$

$$J \rightarrow BI | IH$$

$$I \rightarrow bIc | \epsilon$$

$$H \rightarrow cH | c$$

$$G \rightarrow aG | \epsilon$$

$i \neq j$

$j \neq k$

3) $\{x \mid x \in \{a,b\}^* \text{ AND } x \text{ IS NOT OF THE FORM } wv \}$ S.I.I.(c)

$$S \rightarrow X/Y$$

$$X \rightarrow aV/bV$$

$$V \rightarrow aX/bX/\epsilon$$

$$Y \rightarrow AB/BA$$

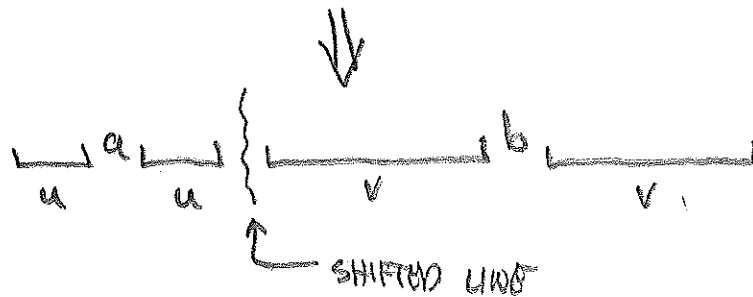
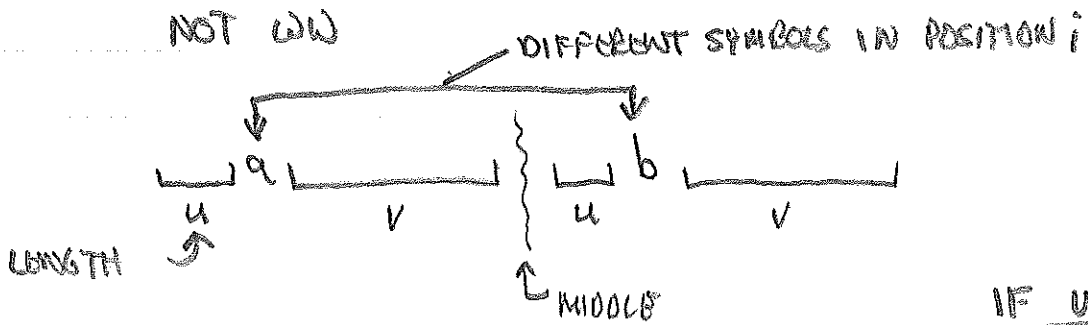
$$A \rightarrow aAa/aAb/bAa/bAb/a$$

$$B \rightarrow aBa/aBb/bBa/bBb/b$$

} ODD LENGTH STRINGS

} EVEN LENGTH STRINGS

EVEN LENGTH STRING ANALYSIS:



IF $u < v$
($v > u$ IS SIMILAR)

4) 5.1.2 (b+c)

(b) LEFT MOST

$S \Rightarrow AIB$
 $\Rightarrow IB$
 $\Rightarrow IOB$
 $\Rightarrow IOOB$
 $\Rightarrow IOOIB$
 $\Rightarrow IOOI$

RIGHTMOST

$S \Rightarrow AIB$
 $\Rightarrow AIOB$
 $\Rightarrow AIOOB$
 $\Rightarrow AIOOIB$
 $\Rightarrow AIOOI$
 $\Rightarrow IOOI$

(c)

$S \Rightarrow AIB$

LEFTMOST

$\Rightarrow 0AIB$

$\Rightarrow 00AIB$

$\Rightarrow 000AIB$

$\Rightarrow 000IB$

$\Rightarrow 0001IB$

$\Rightarrow 00011$

$S \Rightarrow AIB$

RIGHTMOST

$\Rightarrow AIB$

$\Rightarrow AI1$

$\Rightarrow 0AI1$

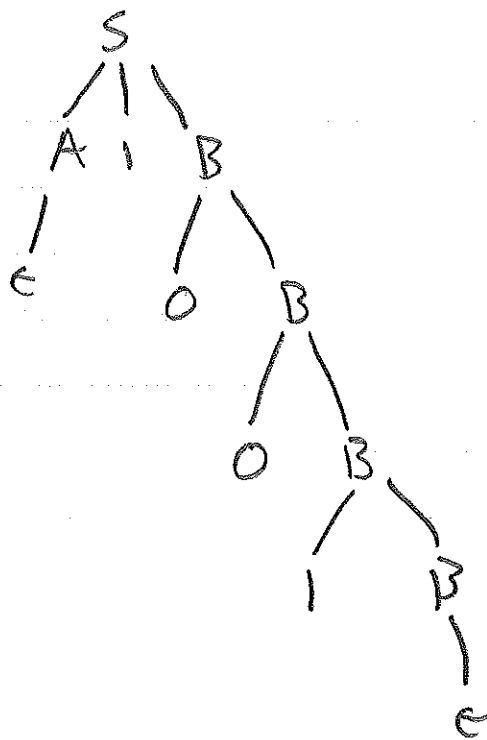
$\Rightarrow 00AI1$

$\Rightarrow 000AI1$

$\Rightarrow 00011$

5) 5.2.1 (b+c)

(b)



(c)

