

Answer Key

PRUP GHOST

1) (a) Source \rightarrow Lexical Analysis \rightarrow Syntax Analysis \rightarrow Semantic Analysis \rightarrow IR Generation \rightarrow IR Optimization \rightarrow Code Generation \rightarrow Code Optimization \rightarrow Machine Code

$$TM = 0.6 \times IM + 0.4 \times EM$$

\hookrightarrow Back Phase Approx. Output

MOV R1, IM

MUL R1, #0.6

MOV R2, EM

MUL R2, #0.4

ADD R2, R1

MOV TM, R2

(7)

(3)

(b) NO. of Tokens:

Print (" / . d Hai" , 8 X) ;
id op string op id op id op delim
1 2 3 4 5 6 7 8

Total: 8

2

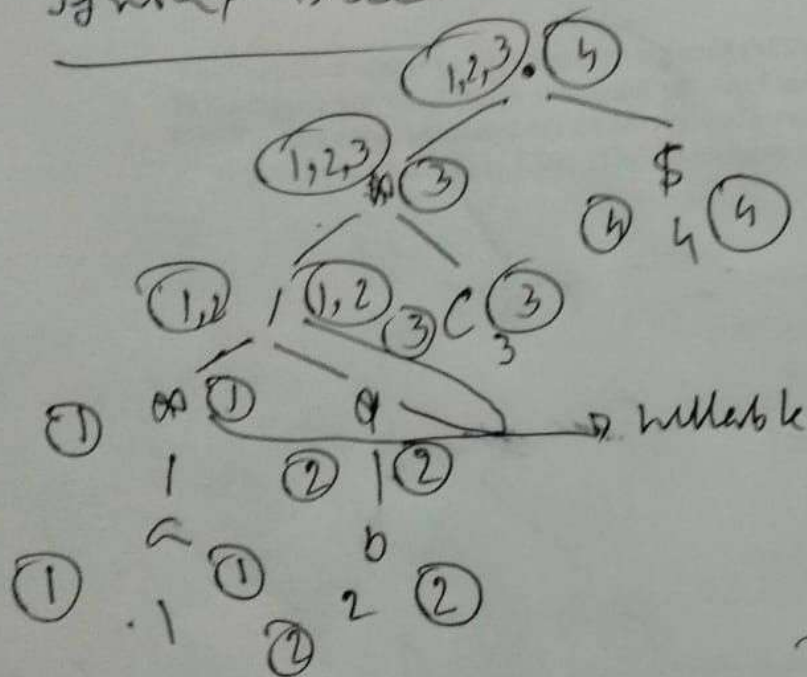
first

RB to DFA

$(a^+ | b^+).c$

$= (a^+ | b^+).c$

Syntax Tree



	Node	Followers
a	1	1,3
b	2	2,3
c	3	4

		a	b	c
1,2,3	A	B	C	D
1,3	B	B	E	D
2,3	C	E	C	D
	D	E	E	E
	E	E	E	E

③ a) $start \rightarrow$ it can then start
 | it can then start else start
 | other

$$S \rightarrow \underline{ictS} | \underline{ictSeS} | b$$

→ Right
 brackets
 prob
 Ambiguous

nth possible ways

(one way)

$start \rightarrow$ matched / unmatched

matched \rightarrow it can then matched else matched
 / other

unmatched \rightarrow it can then start / it can then
 matched else
 unmatched

④ $E \rightarrow F \neq E | F \$ E | F$

$F \rightarrow F \& E |$ constant \nearrow level decides
 priority

So, $\&$ \rightarrow Highest Priority

$\#$ and $\$$ \rightarrow same Priority

Type of Recursion \rightarrow Associativity

\hookrightarrow Right for $\#$ and $\$$ \rightarrow Right
 Associative

\hookrightarrow Left for $\&$ \rightarrow Left Associative

② Expression \rightarrow Expression + Term | Term
 Term \rightarrow Term * Factor | Factor
 Factor \rightarrow constant | (Expression)

\rightarrow Recursive Descent Parser
 Add Recursive Procedure for each production
 in the way

Example

Procedure Factor()

Begin

If input-Symbol = constant then
 Advance()

Else if input-Symbol = '(' then

Begin

Advance()

Call E()

if input-Symbol = ',' then

Advance()

else Error()

end

Else Error()

return for Term, Expression -

5) Grammar

- ① $S \rightarrow A$
- ② $A \rightarrow Bb | cd$
- ③ $B \rightarrow aB | \epsilon$
- ④ $C \rightarrow cC | \epsilon$

Ans:- First Set

S	A	B	C
a	a b	a	c
b	c d	ϵ	ϵ
c	ϵ		
d			
ϵ			

same

Follow Set

S	A	B	C
\$	\$	b	d

Parse Table

	a	b	c	d	\$
S	$S \rightarrow A$	$S \rightarrow A$	$S \rightarrow A$	$S \rightarrow A$	
A	$A \rightarrow Bb$	$A \rightarrow Bb$	$A \rightarrow cd$	$A \rightarrow cd$	
B	$B \rightarrow aB$	$B \rightarrow \epsilon$			
C			$C \rightarrow cC$	$C \rightarrow \epsilon$	

5 b

Stack	Input	Rule
\$ S	cccd \$	
\$ A	cccd \$	$S \rightarrow A$
\$ cdc	cccd \$	$A \rightarrow cd$
\$ dc	cccd \$	$A \rightarrow cc$
\$ dc	ccd \$	
\$ dcc	ccd \$	$C \rightarrow cC$
\$ dc	cd \$	
<hr/>		
\$	\$	

2

Accepted