



Kunal Jha

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Computer Science Engineering(CS)

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TOPICWISE : COMPILER DESIGN-1(GATE - 2020) - REPORTS

OVERALL ANALYSIS

COMPARISON REPORT

SOLUTION REPORT

ALL(17)

CORRECT(10)

INCORRECT(4)

SKIPPED(3)

Q. 1

Have any Doubt?



Match Group-I and Group-II and select the correct answer using the codes given below the lists:

Group-I

Group-II

- | | |
|------------|--|
| A. Token | 1. Sequence of characters in the source program that matches the pattern of a token. |
| B. Pattern | 2. A pair consisting of a token name and an optional attribute value. |
| C. Lexeme | 3. Description of the form that can be accepted. |

Codes:

A	B	C
(a)	1	2
(b)	2	3
(c)	3	1
(d)	1	3

A a

B b

Correct Option

Solution :

- (b)
 • A token is a pair consisting of a token name and an optional attribute value. The token name is an abstract symbol representing a kind of lexical unit e.g. a particular keyword or a sequence of input characters denoting an identifier.
 • A pattern is a description of the form that the lexemes of a token may take. In the case of a keyword as a token, the pattern is just the sequence of characters that form the keyword.
 • A lexeme is a sequence of characters in the source program that matches the pattern for a token and is identified by the lexical analyzer as an instance of that token.

C c

Your answer is Wrong

D d

QUESTION ANALYTICS



Q. 2

Have any Doubt?



Which of the following is used for syntax analysis?

A Push down automata

Your answer is Correct

Solution :

- (a)
 Push down automata is used for syntax analysis to parse input string.
 Finite automata is used for lexical analysis.

B Finite automata

C Regular grammar

D None of these

QUESTION ANALYTICS



Q. 3

Have any Doubt?



Which of the following is true about the Directed Acyclic Graph (DAG)?

A It is used to generate the optimized 3-address code

B It is used to eliminate common sub expression elimination.

C Both (a) and (b)

Your answer is Correct

Solution :

- (c)
 Directed Acyclic Graph (DAG) is used to eliminate the common sub expression and can optimize the 3-address code.

D None of these

QUESTION ANALYTICS



Q. 4

Have any Doubt ?



Which of the following is correct?

A Output of intermediate code generation is machine dependent.

B If LR(1) parser has no conflict then SLR(1) may have conflict.

Your answer is Correct

Solution :

(b)
Output of intermediate code generation is machine independent.
If LR(1) parser has no conflict then SLR(1) may have conflict.
White spaces are not considered as a token in C language.

C White spaces are considered as a token in C language.

D Both (a) and (b)

QUESTION ANALYTICS



Q. 5

Have any Doubt ?



Consider the following grammar:

A → A(B) | B
B → B * C | id
C → (id)

Which of the following can be the correct handle in bottom up parsing for the given grammar?

A (id)

Correct Option

Solution :

(a)
Handle is the right hand side part of any production that helps in the reduction to a non terminal at LHS in bottom up parsing.
(id) is the RHS part of production C which is given in the grammar.

B id * C

C id * (id)

D None of these

QUESTION ANALYTICS



Q. 6

Have any Doubt ?



Consider the following expression of C program

abcd + (2 - 5 + 6 / 2 - ;

How many tokens are generated by the above expression during lexical analysis?

14

Your answer is Correct 14

Solution :

14
abcd + (2 - 5 + 6 / 2 - ;) ⇒ 14 tokens

QUESTION ANALYTICS



Q. 7

Have any Doubt ?



Consider the following program segment:

```
main ()  
{  
    int a, b, c;  
    a = 50;  
    b = &a;  
    printf("%d", b);  
}
```

The number of tokens in the above C code are _____.

28

Correct Option

Solution :

28
1 2 3
main ()
4
{

```

5 6 7 8 9 10 11
int a , b , c ;
12 13 14 15
a = 50 ;
16 17 18 19 20
b = & a ;
21 22 23 24 25 26 27
printf (" %d" , b ) ;
28
}

```



Your Answer is 27

QUESTION ANALYTICS



Q. 8

Have any Doubt ?



Consider the following grammar:

$A \rightarrow (A) | AA | \epsilon$

Number of terminals in FOLLOW(S) is _____.



Correct Option

Solution :

3

$A \rightarrow (A) | AA | \epsilon$

A is start symbol so follow of S contain

$\text{FOLLOW}(S) = \{ \), \}, \$ \}$

Total 3 terminal symbol.

QUESTION ANALYTICS



Q. 9

Have any Doubt ?



Consider the following 3-address code:

$t_1 = t + e$

$t_2 = g + a$

$t_3 = t_1 * t_2$

$t_4 = t_2 + t_2$

$t_5 = t_4 + t_3$

There are five temporary variables in above code. The minimum number of temporary variables that can be used in the equivalent optimized 3-address code of above code are



Your answer is Correct2

Solution :

2

$$\left. \begin{array}{l} t_1 = t + e \\ t_2 = g + a \\ t_3 = t_1 * t_2 \\ t_4 = t_2 + t_2 \\ t_5 = t_4 + t_3 \end{array} \right\} \quad \begin{array}{l} t_1 = t + e \\ t_2 = g + a \\ t_1 = t_1 * t_2 \\ t_2 = t_2 + t_2 \\ t_1 = t_1 + t_2 \end{array}$$

Above code represents the following expression: $((g + a) + (g + a)) + ((t + e) * (g + a))$.

∴ only two temporary variables are used.

QUESTION ANALYTICS



Q. 10

Have any Doubt ?



Consider the following statements:

I. The module that checks every character of the source text is called symbol table in a compiler.

II. Keywords of a language are recognized during lexical analysis.

III. Temporary variables are one of the contents of an activation record.

Which of the above statements is/are correct?

A I and III only

B I only

C II and III only

Correct Option

Solution :

(c)

The module that checks every character of the source text is called lexical analysis, keywords recognized during lexical analysis.

Temporary variables are part of activation record.

D I and II only

QUESTION ANALYTICS





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OVERALL ANALYSIS COMPARISON REPORT **SOLUTION REPORT**

ALL(17) CORRECT(10) INCORRECT(4) SKIPPED(3)

Q. 11

Have any Doubt ?



Consider the basic block given below:

$$a = b + c$$

$$c = a + d$$

$$d = b + c$$

$$e = d - b$$

$$a = e + b$$

The minimum number of nodes and edges present in the DAG representation of the above basic block respectively are

A 9 and 12

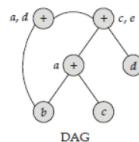
B 6 and 6

Your answer is Correct

Solution :

(b)

6 nodes and 6 edges



C 8 and 10

D 4 and 4

QUESTION ANALYTICS



Q. 12

Have any Doubt ?



Consider the following grammar:

$$S \rightarrow AB \mid BA$$

$$A \rightarrow Aba \mid b$$

$$B \rightarrow BaA \mid a$$

Which of the following grammar is equivalent to the given grammar after eliminating the left recursion?

A $S \rightarrow AB \mid BA$
 $A \rightarrow Aba \mid b$
 $B \rightarrow BaA \mid a$

B $S \rightarrow AB \mid BA$
 $A \rightarrow bA'$
 $A' \rightarrow BaA' \mid \epsilon$
 $B \rightarrow aAB \mid a$

C $S \rightarrow AE \mid BA$
 $A \rightarrow bA'$
 $A' \rightarrow BaA' \mid \epsilon$
 $B \rightarrow aB'$
 $B' \rightarrow ABB' \mid \epsilon$

D $S \rightarrow AB \mid BA$
 $A \rightarrow bA'$
 $A' \rightarrow baA' \mid \epsilon$
 $B \rightarrow aB'$
 $B' \rightarrow aAB' \mid \epsilon$

Your answer is Correct

Solution :
 (d)

Left recursion is there in the production Rule 2 and 3.

Rule 2 :

$$A \rightarrow Aba \mid b$$

After removing left recursion :

$$A \rightarrow bA'$$

$$A' \rightarrow baA' \mid \epsilon$$

Rule 3 :

$$B \rightarrow EaA \mid a$$

After removing left recursion :

$$B \rightarrow aB'$$

$$B' \rightarrow aAB' \mid \epsilon$$

Hence, the grammar after resolving left recursion is,
 $S \rightarrow AB \mid BA$

$A \rightarrow bA'$
 $A' \rightarrow baA' \mid \epsilon$
 $B \rightarrow aB'$
 $B' \rightarrow aAB' \mid \epsilon$

QUESTION ANALYTICS



Q. 13

Have any Doubt ?



Consider the following C program:

```
# include <stdio.h>
main ()
{
    int x = 10, y = 12;
    char * a;
    a = &x ;
    x = 1xab;
    printf ("%d %d", x, * a);
}
```

Which of the following type of error (earliest phase) is identified during compilation of the program?

A Lexical error

Correct Option

Solution :

(a)

Statement '7' of the 'C' program which states,

$x = 1xab;$

If represents lexical error.

Since, the predefined rule in 'C' language for an integer is "An identifier can only have alphanumeric characters (a-z, A-Z, 0-9) and underscore (_)" . The first character of an identifier can only contain alphabet (a-z, A-Z) or underscore (_).

B Syntax error

Your answer is Wrong

C Semantic error

D None of these

QUESTION ANALYTICS



Q. 14

Have any Doubt ?



Consider the following three address code table:

Operand-1	Operand-2	Operation	Result
a	b	+	t_1
c		-	t_2
t_2	d	+	t_2
t_1	t_2	*	t_1
t_1	e	+	t_1
t_1		Move	S

Which of the following expression represents the above three address code (quadruple notation)?

A $S = [[a + b - c] * (c + d)] + e$

Your answer is Correct

Solution :

(b)

The code is as follows,

$$\begin{aligned}
 t_1 &= a + b \\
 t_2 &= -c \\
 t_2 &= t_2 + d = [-c + d] \\
 t_1 &= t_1 * t_2 = [a + b] * [-c + d] \\
 t_1 &= t_1 + e = ([a + b] * [-c + d]) + e \\
 S &= t_1 \\
 S &= [(a + b) * (-c + d)] + e
 \end{aligned}$$

C $S = [[a + b - c] + d] + e$

D None of these

QUESTION ANALYTICS



Q. 15

Have any Doubt ?



Assume +, -, ×, / are usual arithmetic operator, + has highest precedence and right associative and -, ×, / have equal precedence and left associative.
The output of the following expression is _____.
 $18 \times 2 - 8 + 9 - 3 \times 10 / 5$

13

Correct Option

Solution :

$$\begin{aligned}
 & + \text{ has highest precedence} \\
 & (((18 \times 2) - (8 + 9)) - ((3 \times 10)/5)) \\
 & (((18 \times 2) - 17) - ((3 \times 10)/5)) \\
 & (36 - 17) - 6 = 13
 \end{aligned}$$

Your Answer is 32

QUESTION ANALYTICS

+

Q. 16

Have any Doubt ?



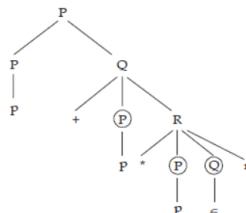
Consider the following grammar:

$$\begin{aligned}
 P &\rightarrow PQ \mid p \\
 Q &\rightarrow +PR \mid Rq \mid \epsilon \\
 R &\rightarrow *PQr \mid \epsilon
 \end{aligned}$$

Total number of reductions using LR(1) parser for the string $p + p * pr$ using the given grammar _____.

7

Your answer is Correct

Solution :Given string $p + p * pr$ 

Total number of reductions is 7.

QUESTION ANALYTICS

+

Q. 17

Have any Doubt ?



Consider the following SDT (Syntax Directed Translation)

$$\begin{aligned}
 A \rightarrow A \# B & \quad [\epsilon \cdot \text{val} = \epsilon_1 \cdot \text{val} \times \epsilon_2 \cdot \text{val}] \\
 A \rightarrow B & \quad [A \cdot \text{val} = B \cdot \text{val}] \\
 B \rightarrow B \& C & \quad [B \cdot \text{val} = B \cdot \text{val} - C \cdot \text{val}] \\
 B \rightarrow C & \quad [B \cdot \text{val} = C \cdot \text{val}] \\
 C \rightarrow \text{num} & \quad [C \cdot \text{val} = \text{num}]
 \end{aligned}$$

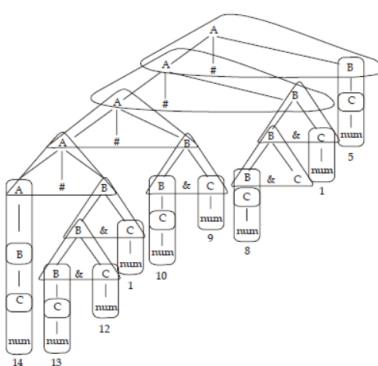
What will be the output of the following expression?
14 # 13 & 12 & 1 # 10 & 9 # 8 & 2 & 1 # 5

0

Your answer is Correct

Solution :

0



As we can see from SDT, the operation '&' will perform first then '#'. & is having more precedence than #

$$\begin{aligned}
 14 \# 13 \& 12 \& 1 \# 10 \& 9 \# 8 \& 2 \& 1 \# 5 \\
 &= 14 \times ((13 - 12) - 1) \times (10 - 9) \times ((8 - 2) - 1) \times 5 \\
 &= 14 \times 0 \times 1 \times 5 \times 5 = 0
 \end{aligned}$$

QUESTION ANALYTICS

+





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Q. 1
[Have any Doubt ?](#)


Which of the following will result in shift-reduced conflict in LR(0) parser?

A { $Q \rightarrow a.c, R \rightarrow c.$ }

Your answer is Correct

Solution :

- (a) { $Q \rightarrow a.c, R \rightarrow .c$ }
It will give SR conflict.
- (b) { $Q \rightarrow c.d, R \rightarrow .c$ }
No SR conflict.
- (c) { $Q \rightarrow .a, R \rightarrow .ba$ }
No SR conflict.

B { $Q \rightarrow c.d, R \rightarrow c.$ }

C { $Q \rightarrow .a, R \rightarrow .ba$ }

D Both (a) and (b)

QUESTION ANALYTICS


Q. 2
[Have any Doubt ?](#)


Consider the following statements:

- I. Between SLR(1) and LALR(1), LALR(1) is easy to implement and SLR is equally powerful as LALR(1).
- II. For a given CFG, SLR(1) and CLR(1) both will have same shift entries.

Which of the above is not true?

A I only

Correct Option

Solution :

- (a) Between SLR(1) and LALR(1), SLR(1) is easy to implement and LALR(1) is more powerful than SLR(1).
- SLR(1) and CLR(1) both have same shift entries for a given CFG.

B II only

Your answer is Wrong

C Both I and II

D None of these

QUESTION ANALYTICS


Q. 3
[Have any Doubt ?](#)


Consider the following SDT:

- $A \rightarrow A * B$ { $A.val = A_1.val * B.val$ }
- $A \rightarrow A + B$ { $A.val = A_1.val + B.val$ }
- $A \rightarrow id$ { $A.val = id.num$ }

The given SDT is

A L-attributed but not S-attributed

B Only S-attributed

C Both S-attributed and L-attributed

Your answer is Correct

Solution :

- (c) SDT has synthesized attribute so it is S-attributed and every translation is written at the end of production. Every S-attributed is also L-attributed.

D None of these

QUESTION ANALYTICS



Q. 4

[Have any Doubt ?](#)

Which of the following is correct?

- A One of the purpose of using intermediate code in compiler to improve the register allocation.

Your answer is Wrong

- B Leaf node of the tree is synthesized attribute.

Correct Option

Solution :

(b)
Purpose of intermediate code is compiler to enhance the portability of the code.
Leaf node of the tree is synthesized attribute it take value from parent.
The storage used for heap and stack section can grow at run time.

- C The storage used for heap section can grow at run time but not stack section.

- D None of these

QUESTION ANALYTICS



Q. 5

[Have any Doubt ?](#)

Which of the following statements are correct?

I. Both heap and stack are essential to implement recursion.

II. Dynamic allocation of activation records is essential to implement recursion.

- A Both I and II

- B Only I

- C Only II

Your answer is Correct

Solution :

(c)
Only stack is essential to implement recursion.

- D None of the above are correct

QUESTION ANALYTICS



Q. 6

[Have any Doubt ?](#)

Consider the following CFG:

$S \rightarrow SAB$

$A \rightarrow aAe \mid \epsilon$

$B \rightarrow bBd \mid \epsilon$

Number of elements in the follow (B) _____.

4

Your answer is Correct

Solution :

4

$S \rightarrow SAB$

$A \rightarrow aAe \mid \epsilon$

$B \rightarrow bBd \mid \epsilon$

$$\begin{aligned} FOLLOW(B) &= FOLLOW(S) \cap \{d\} \\ &= \{a, b, \$\} \cup \{d\} \\ &= \{a, b, d, \$\} \end{aligned}$$

Total 4 elements.

QUESTION ANALYTICS



Q. 7

[Have any Doubt ?](#)

Consider the following CFG:

$S \rightarrow dAe \mid fe$

$A \rightarrow f \mid g$

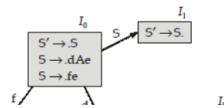
Total number of state in the LR(0) construction are _____.

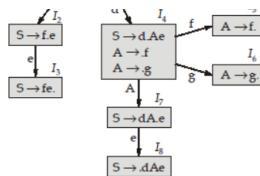
9

Your answer is Correct

Solution :

9





Total 9 states in LR(0) construction.

QUESTION ANALYTICS

Q. 8

Have any Doubt?



Consider the following SDT:

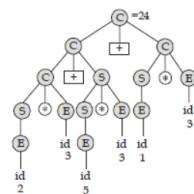
$$\begin{array}{ll}
 C \rightarrow C \sqcup S & \{C.val = C_1.val + S.val\} \\
 C \rightarrow S & \{C.val = S.val\} \\
 S \rightarrow S \circ E & \{S.val = S_1.val \times E.val\} \\
 S \rightarrow E & \{S.val = E.val\} \\
 E \rightarrow id & \{E.val = id.num\}
 \end{array}$$

Find the value of input expression "2○3○5○3○1○3".

24

Your answer is **Correct**

Solution :
24



QUESTION ANALYTICS



Q. 9

Have any Doubt?



Consider the following grammar:

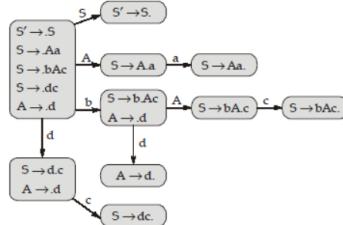
$$\begin{array}{l}
 S \rightarrow Aa \mid bAc \mid dc \\
 A \rightarrow d
 \end{array}$$

Find the number of states in SLR (1) parser construction.

10

Correct Option

Solution :
10



10 states required in SLR (1) parser.

Your Answer is 9

QUESTION ANALYTICS



Q. 10

Have any Doubt?



Consider the following grammar:

$$\begin{array}{l}
 S \rightarrow qQr \\
 Q \rightarrow qR \mid qQ \\
 R \rightarrow Rr
 \end{array}$$

Which of the following is correct about above grammar?

A LALR(1) but not SLR(1)

B CLR(1) but not LALR(1)

C SLR(1) but not LR(0)

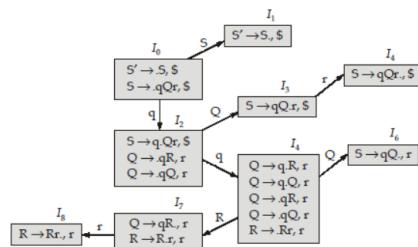
D None of these

Correct Option

Solution :

(d)

Constructing CLR(1) parser



In the canonical item I_7 has product $Q \rightarrow qR, r$ $R \rightarrow Rr, r$ which has shift reduce conflict.
So grammar is not LR(1).
So it is also not SLR(1), LALR(1), LR(0).

QUESTION ANALYTICS

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ALL(17) CORRECT(8) INCORRECT(5) SKIPPED(4)

Q. 11

Have any Doubt ?



Consider the following statements:
 I. Every regular set has a LR(1) grammar.
 II. Recursive descent parser can not use left recursive grammar.
 III. Symbol table is used as data structure in compiler.
 Which of the above statement is correct?

A I and II only

B I and III only

C II and III only

D I, II and III

Correct Option

Solution :

(d)

Every regular set has a LR(1) grammar.
 Symbol table is used in compiler and all the information is kept about token, activation records etc.
 Recursive descent parser can use not left recursive grammar but LL(1) can not use.

QUESTION ANALYTICS



Q. 12

Have any Doubt ?



Which of the following is operator grammar?

- I. $S \rightarrow aAe$
 $A \rightarrow aA \mid \epsilon$
- II. $A \rightarrow aaB$
 $B \rightarrow ae$
- III. $S \rightarrow a \mid A$
 $A \rightarrow aS$

A II and III only

Your answer is Correct

Solution :

(a)

- I. $S \rightarrow aAe$
 $A \rightarrow aA \mid \epsilon$

Operator grammar can not have two adjacent non terminal and no null production is allowed
 so I not operator grammar.

- II. $A \rightarrow aaB$
 $B \rightarrow ae$

It is operator grammar.

- III. $S \rightarrow a \mid A$
 $A \rightarrow aS$

It is operator grammar.

B III only

C I and II only

D II only

QUESTION ANALYTICS



Q. 13

Have any Doubt ?



Consider the following CFG:

- $$\begin{aligned} S &\rightarrow AaC \mid aA \\ A &\rightarrow bC \mid C \\ C &\rightarrow aC \mid a \end{aligned}$$

Which of the following is true about the above grammar?

A Left recursive and unambiguous

B Non left recursive and ambiguous

Your answer is Correct

Solution :

- (b) $S \rightarrow AaC \mid aA$

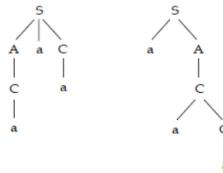
$A \rightarrow aC \mid a$

Grammar is non left recursive.

$A \rightarrow bC \mid C$

$C \rightarrow aCa$

aaa can be generated by two different parse tree.



So it is ambiguous.

C Ambiguous and left recursive

D None of these

QUESTION ANALYTICS



Q. 14

Have any Doubt ?



Consider the following LL (1) parsing table:

Non Terminals	x	q	r	y	\$
S	$S \rightarrow P$	$S \rightarrow P$	$S \rightarrow P$	$S \rightarrow P$	$S \rightarrow P$
P	$P \rightarrow TQR$	$P \rightarrow QR$	$P \rightarrow QR$	$P \rightarrow TQR$	$P \rightarrow QR$
Q		$Q \rightarrow q$	$Q \rightarrow \epsilon$		$Q \rightarrow \epsilon$
R			$R \rightarrow r$		$R \rightarrow \epsilon$
T	$T \rightarrow x$			$T \rightarrow y$	

Which of the following string generates syntax error by the LL (1) parser with start symbol 'S'?

A y

B xqr

C xyq

Correct Option

Solution :

(c)

From the table, the grammar can be concluded as :

$S \rightarrow P$
 $P \rightarrow QR \mid TQR$
 $Q \rightarrow q \mid \epsilon$
 $R \rightarrow r \mid \epsilon$
 $T \rightarrow x \mid y$

String 'y' and 'xqr' can be parsed successfully with the help of stack and given LL (1) parsing table.

D All of these

QUESTION ANALYTICS



Q. 15

Have any Doubt ?



Consider the following program code with 5 temporary variables a, b, c, d, e:

a = 20
b = 25
c = a * b
d = c + a
e = 3
c = e * d
e = c + b

Assume that all operations take their operands from register, minimum number of register needed to execute this code without spilling _____.

2

Correct Option

Solution :

2

$r_1 = 20$
 $r_2 = 25$
 $r_3 = r_1 * r_2$
 $r_1 = r_3 + r_1$
 $r_3 = 3$
 $r_3 = r_3 * r_1$
 $r_1 = r_3 + r_2$

Total 3 register is required.

Your Answer is 3

QUESTION ANALYTICS



Q. 16

[Have any Doubt ?](#)

Consider the following grammar:

$$\begin{aligned} S &\rightarrow A \\ A &\rightarrow BC \mid DBC \\ B &\rightarrow Bb \mid \epsilon \\ C &\rightarrow c \mid \epsilon \\ D &\rightarrow a \mid d \end{aligned}$$

A LL(1) parsing table is constructed for the grammar as:

	a	b	c	d	\$
S					
A					
B					
C			C → c		
D	D → a			D → d	

Let 'x', 'y', 'z' and 'u' represents the number of entries in rows of Non-terminals 'S', 'A', 'B' and 'C' respectively. The value of $x + y + z + u$ is _____.

18

Correct Option

Solution :

18

The LL (1) parsing table will be,

	a	b	c	d	\$
S	S → A	S → A	S → A	S → A	S → A
A	A → DBC	A → BC	A → BC	A → DBC	A → BC
B		B → Bb	B → Bb		B → Bb
C		B → ε	B → ε		B → ε
D	D → a		C → c		C → ε

	first ()	follow ()
S	{b, c, a, d, ε}	{\$}
A	{b, c, a, d, ε}	{\$}
B	{b, ε}	{b, c, \$}
C	{c, ε}	{\$}
D	{a, d}	{b, c, \$}

$$\begin{aligned} x &= 5, y = 5, z = 6, u = 2 \\ x + y + z + u &= 18 \end{aligned}$$

QUESTION ANALYTICS



Q. 17

[Have any Doubt ?](#)

Consider the following grammar:

$$\begin{aligned} S &\rightarrow aABbcD \\ A &\rightarrow ASd \mid \epsilon \\ B &\rightarrow SAc \mid hC \mid \epsilon \\ C &\rightarrow Sf \mid Cg \\ D &\rightarrow BD \mid \epsilon \end{aligned}$$

The number of productions that will be in G after elimination of null productions only are _____.

18

Correct Option

Solution :

18

$$\begin{aligned} S &\rightarrow aABbCD \\ A &\rightarrow ASd \mid \epsilon \\ B &\rightarrow SAc \mid hC \mid \epsilon \\ C &\rightarrow Sf \mid Cg \\ D &\rightarrow BD \mid \epsilon \end{aligned}$$

Delete $D \rightarrow \epsilon$

$$\begin{aligned} S &\rightarrow aABbCD \mid aABbC \\ A &\rightarrow ASd \mid \epsilon \\ B &\rightarrow SAc \mid hC \mid \epsilon \\ C &\rightarrow Sf \mid Cg \\ D &\rightarrow BD \mid B \mid D \end{aligned}$$

Delete $B \rightarrow \epsilon$

$$\begin{aligned} S &\rightarrow aABbCD \mid aABbC \mid aAbCD \mid aAbC \\ A &\rightarrow ASd \mid \epsilon \\ B &\rightarrow SAc \mid hC \\ C &\rightarrow Sf \mid Cg \\ D &\rightarrow BD \mid B \mid D \end{aligned}$$

Delete $A \rightarrow \epsilon$

$$\begin{aligned} S &\rightarrow aABbCD \mid aABbC \mid aAbCD \mid aAbC \mid aBbCD \mid aBbC \mid abCD \mid abC \\ A &\rightarrow ASd \mid Sd \\ B &\rightarrow SAc \mid hC \mid Sc \\ C &\rightarrow Sf \mid Cg \\ D &\rightarrow BD \mid B \mid D \end{aligned}$$

18 productions are present after removal of all null productions.

Your Answer is 17

QUESTION ANALYTICS





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SKIPPED(10)

Q. 1

Have any Doubt?



Match List-I with List-II and select the correct answer using the codes given below:

List-I

List-II

- | | |
|-----------------|------------------------|
| A. Load time | 1. Relocation |
| B. Compile time | 2. Token recognition |
| C. Link time | 3. Resolving reference |
| D. Run time | 4. Activation record |

Codes:

	A	B	C	D
(a)	1	4	3	2
(b)	1	2	3	4
(c)	1	3	2	4
(d)	4	1	3	2

 A a B b

Your answer is Correct

Solution :

- (b)
Load time relocation is done on load time.
Compile time: token recognition during compilation.
Link time: Reference can be resolved.
Run time: Activation record created during run time.

 C c D d

QUESTION ANALYTICS



Q. 2

Have any Doubt?



Consider the grammar defined by the following production rules:

$$\begin{aligned} S &\rightarrow A * B \mid C \\ A &\rightarrow B + A \mid \\ B &\rightarrow B - C \mid b \\ C &\rightarrow C \end{aligned}$$

Which of the following is true?

 A * is left associative and - is right associative B + is right associate and have higher precedence than - C + is left associative and - is right associative D - is left associate and highest precedence

Your answer is Correct

Solution :

- (d)
+ is right associative and have less precedence than -
- is left associative and have highest precedence

QUESTION ANALYTICS



Q. 3

Have any Doubt?



Which of the following is not included in the activation record of recursive function call?

 A Return value of function B Global variables of program

Correct Option

Solution :

- (b)
Global variables section is included in the "main" activation record of the program.
All activation record makes access link to the "main" function to access the global variables.

 C Local variable of function

Q. 4

Have any Doubt ?



Which of the following is correct?

- A** Loader resolves external memory references, when the code is one file may refer to a location in another file.

Your answer is Wrong

- B** It is easy to design compiler for different source languages and target machines because of the two phase division of compiler.

Correct Option

Solution :

(b)
The compiler is divided into two phase, all the compiler modules from lexical analysis till ICG are in front end and after that back end.
Heap and stack both can grow at runtime.

- C** The storage used for heap section can grow at run time but not stack section.

- D** None of these

Q. 5

Have any Doubt ?



Which of the following give syntax error?

- I. For (a, b, c);
- II. While (x, y, c);
- III. If (x)
- IV. int 1a;

- A** I and II only

- B** II only

- C** IV only

Your answer is Wrong

- D** None of these

Correct Option

Solution :

(d)
For (a, b, c); and While (x, y, c); If (x) all is the function name int 1a gives lexical error not syntax error.

Q. 6

Have any Doubt ?



Match List-I with List-II and select the correct answer using the codes given below:

List-I

- A. Expanding macros into source language statements.
- B. It takes the output generated by the compiler as input and generate relocatable machine code as the output.
- C. Puts together all the executable object files into memory for execution.

List-II

1. Assembler
2. Loader
3. Preprocessor

Codes:

- | | | |
|-------|---|---|
| A | B | C |
| (a) 3 | 2 | 1 |
| (b) 3 | 1 | 2 |
| (c) 1 | 2 | 3 |
| (d) 1 | 3 | 2 |

- A** a

Your answer is Wrong

- B** b

Correct Option

Solution :

(b)
The preprocessor expand macros, into source language statements and generate modified source program as the output. The assembly language is processed by a program called an assembler that produces relocatable machine code.
Loader puts together all of the executable object files into memory for execution.

- C** c

- D** d

Q. 7

Have any Doubt ?



Consider the following grammar:

- $$\begin{aligned} S &\rightarrow La \mid b \\ L &\rightarrow LA \mid Lae \mid be \mid \epsilon \end{aligned}$$
- Which of the following is equivalent non left recursive grammar of above grammar?

A $S \rightarrow La \mid b$
 $L \rightarrow beL'$
 $L \rightarrow AL' \mid aeL' \mid \epsilon$

B $S \rightarrow La \mid b$
 $L \rightarrow beL' \mid L'$
 $L' \rightarrow AL' \mid aeL'$

C $S \rightarrow La \mid b$
 $L \rightarrow beL' \mid L'$
 $L' \rightarrow aeL' \mid \epsilon$

D None of these

Your answer is Correct

Solution :

(d)

Grammar $S \rightarrow La \mid b$
 $L \rightarrow LA \mid Lae \mid be \mid \epsilon$

Equivalent non left recursive grammar

$S \rightarrow La \mid b$
 $L \rightarrow beL' \mid L'$
 $L' \rightarrow AL' \mid aeL' \mid \epsilon$

Q. 8

Have any Doubt ?



Which of the following is correct?

A Dynamic memory allocation is performed during compilation.

B A programming language which allows recursion can be implemented with dynamic storage allocation.

Your answer is Correct

Solution :

(b)

Dynamic memory allocation is performed during run time.

A programming language which allows recursion can not be implemented with static storage allocation.

C Both (a) and (b)

D None of these

Q. 9

Have any Doubt ?



Which of the following is true about storage allocation?

A Heap allocation is used for symbol table.

B Names local to a procedure are allocated space on a heap automatically.

C Heap allocation is used for dynamic data structure.

D Both (a) and (c)

Correct Option

Solution :

(d)

Heap allocation is used for symbol table and it is used for dynamic data structure.

Stack allocation is used for the names local to the procedure.

Q. 10

Have any Doubt ?



Which of the following is not a functionality of C compiler?

A Identifying syntax error

B Identifying tokens

C Linking

Your answer is **Correct**

Solution :

(c)

Linking is done by a linker after compilation process.

Compiler can identify token, generates compilation error which can be lexical, syntax or semantic.

D None of these

 QUESTION ANALYTICS

+

Item 1-10 of 33 « previous 1 2 3 4 next »

Total 24 tokens.

QUESTION ANALYTICS +

Q. 14

Have any Doubt ?



Consider the following statements:

S_1 : YACC tool is an LALR(1) parser generator.

S_2 : SLR(1) is more powerful than LALR(1).

S_3 : LL(1) is bottom up parser.

The number of the above statement which is true _____.

1

Your answer is Correct!

Solution :

1

YACC tool is an LALR(1) parser generator.

LALR(1) is more powerful than SLR(1).

LL(1) is top down parser.

QUESTION ANALYTICS +

Q. 15

Have any Doubt ?



Consider the basic block given below:

$a = a + b$

$c = a \times c$

$a = c + a$

The minimum number of edges present in the DAG representation of above basic block _____.

6

Your answer is Correct!

Solution :

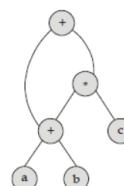
6

$$a = a + b$$

$$c = (a + b) \times c$$

$$b = ((a + b) \times c) + a + b$$

DAG representation



Total 6 edges.

QUESTION ANALYTICS +

Q. 16

Have any Doubt ?



Consider the following statements:

I. If LALR(1) has conflict then CLR(1) never contain any conflict.

II. If CLR(1) has no conflict then LALR(1) has no conflict.

The number of not correct statements _____.

2

Correct Option

Solution :

2

I. If LALR(1) has conflict then CLR(1) may or may not have conflict.

II. If CLR(1) has no conflict then LALR(1) may have conflict.

So both is not true.

QUESTION ANALYTICS +

Q. 17

Have any Doubt ?



Consider the following statements:

S_1 : Every unambiguous grammar generates regular set.

S_2 : Every regular grammar is unambiguous.

Which of the above statement(s) is/are not correct?

A S_1 only

B S_2 only

B The number of bits in the input string.

C The value of the binary is octal form.

D None of these

 QUESTION ANALYTICS



Q. 20

 Have any Doubt?



Consider the following grammar:

$S \rightarrow aAb \mid aBc \mid bAd \mid bBe$

$A \rightarrow n$

$B \rightarrow n$

Assume K represents the number of rows in LL(1) table L in SLR(1) and M in LR(1) respectively.
Which of the following is correct relation for the above grammar?

A $K = L = M$

B $K = L < M$

C $K < L < M$

Your answer is Correct

Solution :

(c)
 $S \rightarrow aAb \mid aBc \mid bAd \mid bBe$

$A \rightarrow n$

$B \rightarrow n$

Using LL(1) parser $K = 3$, number of rows is LL(1) are S, A, B

Using SLR number of states $L = 13$

Using CLR(1) number of states $M = 14$

$K < L < M$

D $K < L = M$

 QUESTION ANALYTICS



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Q. 21
[Have any Doubt ?](#)


Consider the following two context free grammar:

$$G_1 : S \rightarrow aaAb \mid aab \mid A$$

$$A \rightarrow aaAb \mid aAb \mid \epsilon$$

$$G_2 : S \rightarrow aAb \mid ab \mid A$$

$$A \rightarrow aAb \mid \epsilon$$

Which of the above CFG has equivalent unambiguous CFG?

 A G₁ only

 B G₂ only

Correct Option

Solution :

(b)

$$S \rightarrow aaAb \mid aab \mid A$$

$$A \rightarrow aaAb \mid aAb \mid \epsilon$$

This is inherently ambiguous language.

No unambiguous grammar exists for it

$$G : S \rightarrow aAb \mid ab \mid A$$

$$A \rightarrow aAb \mid \epsilon$$

 Language $a^n b^n$

Unambiguous CFG

$$S \rightarrow aAb \mid \epsilon$$

 C Both G₁ and G₂
 D Neither G₁ nor G₂
[QUESTION ANALYTICS](#)

Q. 22
[Have any Doubt ?](#)


Consider the intermediate code given below:

- | | |
|-----------------------|--|
| 1. j = 1 | 2. if (j ≤ n) goto 4 |
| 3. goto 11 | 4. t ₁ = a + b |
| 5. R = t ₁ | 6. t ₂ = t * c |
| 7. R = t ₂ | 8. t ₂ = t ₂ + d |
| 9. R = t ₃ | 10. j = j + 1 goto 2 |

11. end

Which of the following has intermediate code for above code?

- | | |
|-------------------|-------------------|
| (a) j = 1 | (b) j = 1 |
| while (j ≤ n) | while (j ≤ n) |
| { | { |
| R = a + b | R = a + b |
| R = b * c | R = R * c |
| R = C + d | R = R + d |
| j++ | j++ |
| } | } |
| (c) j = 1 | (d) None of these |
| while (j ≤ n) | |
| { | |
| R = a + b * c + d | |
| j++ | |
| } | |

 A a

 B b

Your answer is Correct

Solution :

(b)

```
j = 1
while (j ≤ n)
{
    R = a + b           intermediate code
    R = R * c
    R = R + d
}
```

```
j = 1
if (j ≤ n) then
    t1 = a + b
    R = t1
    t2 = R * c
    R = t2
    t2 = t2 + d
    R = t3
    goto 2
else
```

end

C c

D d

QUESTION ANALYTICS +

Q. 23

Have any Doubt ?



Which of the following is LL(1) grammar?

A $S \rightarrow aSb?ab?\epsilon$

B $S \rightarrow aS?Sb?\epsilon$

C $S \rightarrow (S)?SS?\epsilon$

D None of these

Your answer is Correct

Solution :

- (d)
A grammar is LL(1) if it is unambiguous, non left recursive and left factored.
(a) is ambiguous
(b) is left recursive
(c) is ambiguous
So option (d) is correct.

QUESTION ANALYTICS +

Q. 24

Have any Doubt ?



Consider the following grammar and statement about given grammar:

$S \rightarrow bcS|Sds|e|\epsilon$

S_1 : Grammar is not LL(1).

S_2 : Cardinality of FOLLOW(S) is 3.

A Only S_1 is true

Your answer is Correct

Solution :

- (a)
 $\text{FOLLOW}(S) = \{\$, d\}$
Cardinality is 2
For LL(1)
This is left recursive grammar so not LL(1).

B Only S_2 is true

C Both S_1 and S_2 are true

D None of these

QUESTION ANALYTICS +

Q. 25

Have any Doubt ?



Consider the following grammar:

$S \rightarrow aS|AB$

$A \rightarrow bA|B$

$B \rightarrow cB|d$

Which of the following is true about above grammar?

A LL(1) but not LR(1)

B SLR(1) but not LL(1)

C Both LL(1) and LR(1)

Correct Option

Solution :

- (c)
 $S \rightarrow aS|AB$
 $A \rightarrow bA|B$
 $B \rightarrow cB|d$
 $\text{FIRST}(aS) \cap \text{FIRST}(AB) = \{a\} \cap \{b, c, d\} = \emptyset$
 $\text{FIRST}(bA) \cap \text{FIRST}(B) = \{b\} \cap \{c, d\} = \emptyset$
 $\text{FIRST}(cB) \cap \text{FIRST}(d) = \{c\} \cap \{d\} = \emptyset$
Grammar is LL(1) so it is also LR(1).

Q. 26

Have any Doubt ?



Which of the following is true?

- A** Every language has a regular superset.

Correct Option

Solution :

(a)

 Σ^* is a superset of every language.

Intersection of infinity regular language may not be regular.

- B** Intersection of infinity regular languages must be regular.

- C** Both (a) and (b)

- D** None of these

Your answer is Wrong

Q. 27

Have any Doubt ?



Consider the following grammar:

 $S \rightarrow (A) \mid aA$ $A \rightarrow SA' \mid e$ $A' \rightarrow zSA' \mid \epsilon$

Which of the following is true about the above grammar?

- A** FIRST (A) = {}, a
FOLLOW (A) = {(), a, \$}

- B** FIRST (A) = {a, e, ϵ , ()
FOLLOW (A) = {z,), \$}

- C** FIRST (A) = {(), a, e}
FOLLOW (A) = {z,), \$}

Your answer is Correct

Solution :
(c)

$$\begin{aligned} \text{FIRST (A)} &= \text{FIRST (S)} \cup \{\epsilon\} \\ &= \{(), a\} \cup \{\epsilon\} \\ &= \{(), a, e\} \\ \text{FOLLOW (A)} &= \{()\} \cup \text{FOLLOW (S)} \\ &= \{()\} \cup \{\$, z\} \\ &= \{(), z, \$\} \end{aligned}$$

- D** FIRST (A) = {a, e, ()
FOLLOW (A) = {}, \$}

Q. 28

Have any Doubt ?



Consider the following augmented grammar with labels a and b:

 $S' \rightarrow S$ **a** : $S \rightarrow (S)S$ **b** : $S \rightarrow \epsilon$

LR (0) sets are given as following for the above grammar.

(1)	(2)	(3)	(4)	(5)	(6)
$S' \rightarrow S$	$S' \rightarrow S.$	$S \rightarrow (S)S$	$S \rightarrow (S.)S$	$S \rightarrow (S)S$	$S \rightarrow (S)S.$
$S \rightarrow (S)S$		$S \rightarrow (S)S$		$S \rightarrow (S)S$	
$S \rightarrow .$		$S \rightarrow .$		$S \rightarrow .$	

If the following SLR (1) table is constructed as below then find the missing entries at E_1 , E_2 and E_3 respectively.

	()	\$	\$
1	S_3	r_b	2
2		Accept	
3	S_3	E_1	E_2
4		S_5	4
5	S_3	r_b	E_3
6	r_a	r_a	

- A** $r_a \ r_b \ S$

B $r_{x'} r_{x'} 6$

C $r_{y'} r_{x'} 5$

D $r_{y'} r_{y'} 6$

Your answer is Correct

Solution :

(d)

Set 3 contain $S \rightarrow \cdot$ as reduced item.

Follow (S) = { }, $\$$

In row 3, entry for column 'y' and 'S' will be " r_b ".

$$E_1 = r_{y'} E_2 = r_b \quad [\because b : S \rightarrow e]$$

In set 5, on S it goes to set 6.

In row 5, entry for non-terminals 'S' is state 6.

$$E_3 = 6 \quad [\because (5) \xrightarrow{S} (6)]$$

$$E_1 = r_{y'} E_2 = r_b \text{ and } E_3 = 6$$

QUESTION ANALYTICS



Q. 29

Have any Doubt ?



Consider the given grammar with semantic actions given below:

$$S \rightarrow S_1 + S_2 \quad \{S.\text{sign} = S_2.\text{sign}\}$$

$$S \rightarrow S_1 * (S_2) \quad \{S.\text{sign} = S_1.\text{sign} * S_2.\text{sign}\}$$

$$S \rightarrow S_1 / S_2 \quad \{\text{if } (S_1.\text{sign} == 0) \text{ then } S.\text{sign} = 1 \text{ else } S.\text{sign} = 0\}$$

$$S \rightarrow +S_1 \quad \{S.\text{sign} = 0\}$$

$$S \rightarrow -S_1 \quad \{S.\text{sign} = 1\}$$

$$S \rightarrow \text{id} \quad \{S.\text{sign} = 0\}$$

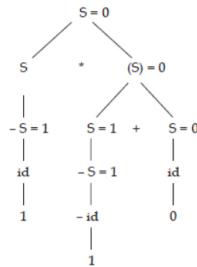
The attribute value at the root S for input $-id \times (-id + id)$ is _____.
(S_1 and S_2 are same as S)

0

Correct Option

Solution :

0



QUESTION ANALYTICS



Q. 30

Have any Doubt ?



Consider the following grammar:

$$S \rightarrow Aa \mid aAc \mid dC$$

$$A \rightarrow e$$

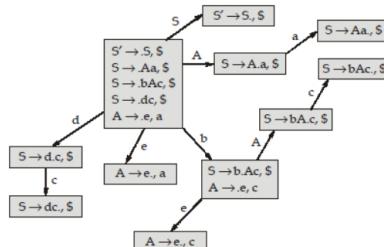
The number of conflict occurs in LALR(1) parser construction _____.

0

Correct Option

Solution :

0



There is no conflict in any state of LALR(1) parser.

QUESTION ANALYTICS





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Q. 31
[Have any Doubt ?](#)

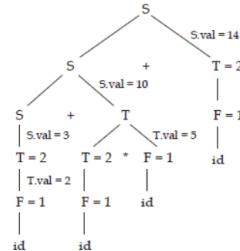

Consider the following syntax directed translation scheme:

$$\begin{aligned} S \rightarrow S + T & \quad \{S.\text{val} = S.\text{val} + T.\text{val} + 2\} \\ S \rightarrow T & \quad \{S.\text{val} = T.\text{val} + 1\} \\ T \rightarrow T \times F & \quad \{T.\text{val} = T.\text{val} + F.\text{val} + 2\} \\ T \rightarrow F & \quad \{T.\text{val} = F.\text{val} + 1\} \\ F \rightarrow \text{id} & \quad \{F.\text{val} = 1\} \end{aligned}$$

 For an input $c + d \times e + f$, this translation scheme will give output _____.

14
[Correct Option](#)
Solution :

14



QUESTION ANALYTICS


Q. 32
[Have any Doubt ?](#)


Consider the following grammar with corresponding synthesized attributes.

$$\begin{aligned} F \rightarrow \cdot L & \quad \{F \cdot \text{val} = L \cdot \text{val}\} \\ L \rightarrow LB & \quad \{L \cdot \text{len} = L_1 \cdot \text{len} + 1, L \cdot \text{val} = L_1 \cdot \text{val} + 2^{-L \cdot \text{len}} \times B \cdot \text{val}\} \\ L \rightarrow B & \quad \{L \cdot \text{len} = 1, L \cdot \text{val} = B \cdot \text{val}/2\} \\ B \rightarrow 0 & \quad \{B \cdot \text{val} = 0\} \\ B \rightarrow 1 & \quad \{B \cdot \text{val} = 1\} \end{aligned}$$

 If "F · val" gives the value of the binary fraction generated by F in the above grammar then that will be the value of F · val on input .101 _____.
 (Upto 3 decimal places)

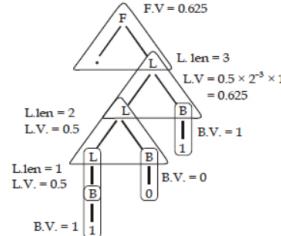
0.625 [0.622 - 0.627]
[Correct Option](#)
Solution :

0.625 [0.622 - 0.627]

Given grammar

$$\begin{aligned} F & \rightarrow \cdot L \\ L & \rightarrow LB \\ L & \rightarrow B \\ B & \rightarrow 0 \\ B & \rightarrow 1 \end{aligned}$$

Input string .101



QUESTION ANALYTICS


Q. 33
[Have any Doubt ?](#)


Consider the following CFG:

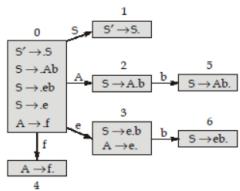
$$\begin{aligned} S & \rightarrow Ab \mid eb \\ A & \rightarrow e \mid f \end{aligned}$$

How many conflicts occur in LR (0) parsing construction?

1
[Correct Option](#)

Solution :

1



State '3' has 1 shift-reduced conflict in LR (0).

No other state has conflict.

⇒ Only 1 conflict exist.

Your Answer is 0

QUESTION ANALYTICS

+

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