R21

Code No.: U21PC601CS

MATURI VENKATA SUBBA RAO (MVSR) ENGINEERING COLLEGE
(Autonomous)
B.E. VI Semester (Main) (Branch: CSE) Examination, July 2024
COMPILER CONSTRUCTION

Time : 3 hours
Max. Marks : 70

Note :
i) FIRST Question is compulsory and answer any **FOUR** questions from the remaining six questions. Each question carries 14 Marks.
ii) Answers to each question must be written at one place only and in the same order as they occur in the question paper.
iii) Missing data, if any, may suitably be assumed.

Q.No.			Marks	CO	BT
1.	a)	What is Bootstrapping?	(2)	CO1	L1
	b)	Define Top-down parsing with an example.	(2)	CO2	L1
	c)	List the fields of activation record.	(2)	CO3	L2
	d)	Define Type checking.	(2)	CO4	L2
	e)	What is basic block?	(2)	CO5	L1
	f)	Describe preprocessor.	(2)	CO1	L1
	g)	What is constant folding?	(2)	CO5	L2
2	(a)	Define compiler. State various phases of a compiler and explain them in detail.	(7)	CO1	L2
	(b)	What is LEX? Explain LEX Specification file.	(7)	CO1	L2
3	(a)	Construct a predictive parsing Table (LL(1)) for the grammar E→ E+T | T T→T*F | F F→(E) | id	(7)	CO2	L4
	(b)	Discuss in brief about YACC.	(7)	CO2	L2
4	(a)	What is SDD? Explain the applications of syntax directed translation.	(7)	CO3	L3
	(b)	Differentiate Synthesized and Inherited attributes with suitable examples.	(7)	CO3	L3
5	(a)	Explain various storage allocation strategies.	(7)	CO4	L3
	(b)	What are the techniques to implement three address code? Explain in detail.	(7)	CO4	L4
6	(a)	Explain the issues in the design of code generator.	(7)	CO5	L2
	(b)	Discuss about the following i) Copy propagation ii) Dead code elimination iii) Code motion	(7)	CO5	L3
7	(a)	What is left recursion? Explain with an example.	(5)	CO1	L2
	(b)	What is a symbol table? Discuss about symbol table operations.	(5)	CO4	L2
	(c)	Explain Data flow analysis.	(4)	CO5	L3

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Subject: Compiler Design

Time: 3 Hours

Max. Marks: 70

Note: (i) First question is compulsory and answer any four questions from the remaining six questions. Each questions carries 14 Marks.

(ii) Answer to each question must be written at one place only and in the same order as they occur in the question paper.

(iii) Missing data, if any, may be suitably assumed.

1. (a) What is a Cross compiler?

   (b) Eliminate the left recursion from the following grammar:

   $E \rightarrow E+T \mid T$

   $T \rightarrow T*F \mid F$

   $F \rightarrow id$

   (c) What is the importance of LEX tool?

   (d) Differentiate between Synthesized attributes and Inherited attributes.

   (e) Give three address code for the following statement:

   $(a*b)+(c-d)*(a*b) +b$

   (f) What are basic blocks and flow graphs?

   (g) What do you mean by machine dependent and machine independent optimization?

2. (a) Explain the different phases of a compiler with a neat diagram and Illustrate the output of each phase of the compilation for the input $a = b * c + 60$ where a, b, c are float.

   (b) Describe the data structures used in Compiler Design.

3. (a) Construct SLR parsing table for the following grammar

   $S \rightarrow CC$

   $C \rightarrow aC \mid d$

   (b) Write short notes on YACC.

4. (a) Write the syntax directed definition and construct a syntax tree for the following expression: a-4+c.

   Consider the below grammar for the above expression.

   $E \rightarrow E + T$

   $E \rightarrow E - T$

   $E \rightarrow E * T$

   $E \rightarrow T$

   $T \rightarrow id$

   $T \rightarrow number$

   (b) Describe various symbol table organization techniques.

5. (a) Give Quadruple, Triple and Indirect triple representations for the following expression:

   $- (b+c) * d$

   (b) What is an activation record? Explain how it is related with runtime storage organization.

6. (a) What is a DAG? Construct the DAG for the following block:

   x=y*z
   w=p+y
   y=y*z
   p=w-x

   (b) Discuss various Peephole optimization techniques with examples.

7. (a) Construct first and follow sets for the following grammar:

   S → xABC
   A → a | bbD
   B → a | ε
   C → b | ε
   D → c | ε

   (b) Explain Recursive Descent parsing.

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FACULTY OF ENGINEERING
B.E. (CSE) VI- Semester (AICTE) (Backlog) Examination, February/ March 2023

Subject: Complier Design

Time: 3 Hours   Max. Marks: 70

(Missing data, if any, may be suitably assumed)
PART – A

Note: Answer all the questions.   (10 x 2 = 20 Marks)

1. Differences between compiler and Interpreter.
2. What do you mean by Cross-Compiler?
3. What is an ambiguous grammar? Give example.
4. Consider the following Grammar:

    A-> ABd|Aa|a

    B-> Be|b

    Remove left recursion of the grammer
5. What is syntax directed translation (SDD)?
6. What is a symbol table?
7. Define heap management mechanism.
8. What is stack allocation in compiler design?
9. What is code optimization?
10. What is control and data flow analysis?

PART – B

Note: Answer any five questions.   (5 x 10 = 50 Marks)

11. a) What are the different phases of compiler? Explain the phases in detail.
    b) Write down the output of each phase for the expression a:=b+c*50.

12. a) Explain about Left factoring and Left Recursion with an examples?
    b) Is the following grammar LL(1).

        E-> E+T/T

        T-> T*F/F

        F-> (E)/id

13. a) Differentiate between synthesized translation and inherited translation.
    b) What is a symbol table? What are its Contents?

14. a) Generate a Three Address Code for the following

    for (let i = 0; i < 5; i++)
     {
       a= b+c;
     }
    b) What is Data Flow Analysis? Explain.

..2..

15. a) Explain Role of peephole optimization in compilation process.
    b) What is code optimization? Explain machine dependent and independent code
       optimization.

16. a) Is the given grammar SLR ?Construct Parsing Table.
    A->(A)|a
    b) Explain the usage of YACC parser generator in construction of a parser.

17. Write a short note on: (ANY TWO)
    a) Quadqaples ,Triples and Indirect triple
    b) DAG
    c) LEX

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FACULTY OF ENGINEEERING

B.E. (CSE) VI Semester (AICTE) (Main& Backlog) Examination, September/October -2022

Subject : COMPILER DESIGN

Time: 3 Hours   Max. Marks: 70

(Missing data, if any, may be suitably assumed)

PART – A

Note: Answer all the questions.   (10 x 2 = 20 Marks)

1. Differentiate between Compiler and Interpreter
2. List out the data structures of compiler
3. What is Left Recursion? Give an example.
4. Define Bottom up parser
5. What are the types of three address statements?
6. Differentiate between Synthesized and Inherited attributes.
7. Define Peehole Optimization.
8. Define Basic Block and Flow Graph.
9. Define symbol Table.
10. Define Activation Record.

PART- B

Note: Answer any five questions   (5 x 10 = 50 Marks)

11. Explain phases of compiler with example for each phase and explain translation process for each phase.

12. Solve CLR for S→CC, C→cC, C→d and explain parsing table of CLR

13. Explain Symbol table in detail.

14. Explain Type Checking in detail

15. Explain Principal Sources of Optimization in detail

16. (a) Construct DAG for the expression a=a+a*(b-c)+(b-c)*d
    (b) Explain Quadruple, Triple and Indirect Triples for a= a *- (b+c)

17. Explain (a) LEX tool
            (b) Shift Reduce Parser

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FACULTY OF ENGINEERING

B.E. 4/4 (CSE) I – Semester (Main) Examination, November/December 2012

Subject: Compiler Construction

Time: 3 Hours   Max.Marks : 75

Note: Answer all questions from Part – A. Answer any five questions from Part – B.

PART – A (25 Marks)

1. What is Boot strapping?   (2)
2. Differentiate between compiler and interpreter.   (3)
3. What is left recursion? Eliminate left recursion for the given expression   (3)

$$A \rightarrow Aa|Ab|c|d$$

4. Show that the grammar is ambiguous $S \rightarrow aSbS|bSaS|E$ (Epsclon)   (3)

5. Write syntax tree for an expression $a * - (b+c)$ (3)
6. What are the parameter passing mechanisms in a programming language?   (2)

7. Write the indirect triple for the expression $X := -a*b + -a*b$ (3)
8. State the rules to define loader in basic block.   (2)
9. Define induction variable.   (2)
10. What is relocation?   (2)

PART – B (5x10 = 50 Marks)

11. Show the translation process of compiler for the given expression   (10)

$$\text{Success:} = \text{effort} + IQ * 100.$$

12. (a) Check whether the following grammar is LL(1) or not   (6)
    $$S \rightarrow iEtS| iEtSeS|a$$
    $$E \rightarrow b$$
    (b) What is ambiguous grammar give example?   (4)

13. (a) Differentiate between static run time environment and stack based run time
    environment.   (5)
    (b) Discuss symbol table organization.   (5)

14. Main ( )
```
{
    int a[10], i,
    For (i = 0;  i < 10;  i++)

    a[i] = i*2;
}
```
    Convert above program into 3-address code and apply all optimization
    techniques on that code.   (10)

15. Describe data flow analysis in detail.   (10)

16. Discuss the design issues of absolute loader.   (10)

17. Write short notes on:
    (a) Heap allocations   (5)
    (b) Recursive Descent parsers.   (5)

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Code No. 2395 / N

FACULTY OF ENGINEERING

B.E. 3/4 (CSE) II – Semester (Main) Examination, April / May 2013

Subject: Compiler Construction

Time: 3 Hours

Max.Marks: 75

Note: Answer all questions from Part – A and any five questions from Part – B.

PART – A (25 Marks)

1. Differentiate between pass and phase. (2)
2. Describe the data structures associated with compiler. (3)
3. Define CFG. Write CFG to recognize palindrome. (3)
4. What is left factoring give example? (3)
5. Write about the fields of activation record. (3)
6. Define S-attributed and L-attributed grammars. (3)
7. Specify applications of SDT. (2)
8. Write about value-number method. (2)
9. Construct DAG for the expression a + a ∗ (b-c) + (b-c) ∗ d. (2)
10. What is basic block? (3)
    (2)

PART – B (5x10 = 50 Marks)

11.(a) Explain various phases of compiler with neat diagram. (8)
   (b) What is boot strapping? (2)

12.(a) Write an algorithm to construct first and follow set. (4)
   (b) Construct the predictive parse table for the following grammar and show the moves
       made by the parser on input i∗i$.

$$E \rightarrow TE'$$
$$E' \rightarrow +Te' / \epsilon$$
$$T \rightarrow FT'$$
$$T \rightarrow *FT'/\epsilon$$
$$E \rightarrow (E) / i$$
(6)

13.(a) Explain the data structures used for symbol table implementation. (5)
   (b) Write about syntax directed definitions. (5)

14. Explain machine dependent and machine independent optimizations in detail. (10)

15.(a) Explain heap management. (5)
   (b) Explain various representations of three address code of an expression

$$X = -a*b + -a*b$$
(5)

16.(a) Explain shift reduce parser. (5)
   (b) What is flow graph? Explain live variable analysis. (5)

17. Write short notes on:
   a) Lexical analyzer generator lex. (5)
   b) Syntax error handling. (5)

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Code No. 6354 / M

FACULTY OF ENGINEERING

B.E. 3/4 (CSE) II – Semester (Main) Examination, June 2014

Subject : Compiler Construction

Time : 3 hours

Max. Marks : 75

Note: Answer all questions from Part-A. Answer any FIVE questions from Part-B.

PART – A (25 Marks)

1 What is cross compiler? Why is bootstrapping required to generate cross compilers?   2

2 Write short notes on input buffering.   2

3 Find first and follow set for the following grammar.   3

$$S \rightarrow aBDh$$
$$B \rightarrow cC$$
$$C \rightarrow bC|\varepsilon$$
$$D \rightarrow EF$$
$$E \rightarrow g|\varepsilon$$
$$F \rightarrow f|\varepsilon$$

4 Why SLR and LALR are more economical to construct than canonical LR?   2

5 What is SDD? What are the applications of syntax directed translation?   3

6 Describe static scope and dynamic scope.   2

7 Briefly explain type conversion and coercion.   3

8 List out the various types of three address statements represent the following statement
in to triple representation   3
$$X[i] : = y ;$$

9 Construct the DAG for the following statement   3

$$x = y * z$$
$$w = p + y$$
$$y = y * z$$
$$p = w - x$$

10 State the major properties of dataflow analysis.   2

......2

PART – B (50 Marks)

11 a) Explain the translation phases of a compiler for the given expression.
$$P = i + r * 60$$
    b) Write short notes on LEX tool.

12 Construct CLR parsing table for the below grammar.
$$S \rightarrow AA$$
$$A \rightarrow Aa|b$$

13 a) What are synthesized attributes and inherited attributes explain with suitable context free grammar.
    b) Explain data structures for implementing symbol table.

14 a) Consider the following piece of code for searching an element x in an array A[100]

```
begin
    location = -1
    i = 0
    while (i < 100) do
    begin
        if A[ i ] = x then location = i
        i = i + 1
    end
end
```

    b) Discuss about garbage collection in detail.

15 a) Explain code optimization techniques.
    b) Explain issues in the code generation.

16 Explain how to compute data flow equations using live variable analysis by considering any flow graph.   1

17 Write short notes on the following :
    a) Explain problems in top-down parsing.
    b) Error recovery techniques in various phases
    c) Discuss using diagram "Displays"

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Code No. 9154

FACULTY OF ENGINEERING

B.E. 3/4 (CSE) II – Semester (Supplementary) Examination, January 2015

Subject: Compiler Construction

Time: 3 hours

Max. Marks: 75

Note: Answer all questions from Part - A. Answer any FIVE questions from Part - B.

PART – A (25 Marks)

1	What is the role of lexical analyzer?	2
2	Describe the data structures associated with compiler.	3
3	Write about input buffering.	3
4	Define CFG, write CFG to recognize palindrome.	3
5	Write rules to construct first set.	2
6	What is handle pruning?	2
7	Define S-attributed and L-attributed grammars.	2
8	Construct DAG for the expression :	3
	a + a * (b – c) + (b – c) * d	
9	Explain dead code elimination with example.	2
10	Write about peephole optimizations.	3
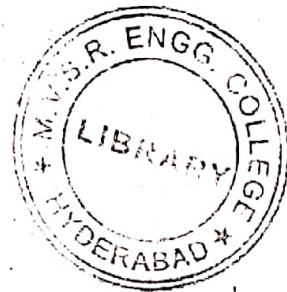
PART – B (50 Marks)

11 a) Explain various phases of compiler. 6
b) Explain boot strapping and porting. 4

2 Explain the construction of SLR parse table for the following grammar and show the moves made by parser on input

i + i $

$$E \rightarrow E + T \mid T$$
$$T \rightarrow T * F \mid F$$
$$F \rightarrow (E) \mid i$$

10

13 a) Write about syntax directed definitions. 5
b) Explain the data structures used for symbol table implementation. 5

14 a) Explain machine independent optimization techniques. 5
b) Write about data flow analysis. 5

15 a) Explain the process of access non local data on a stack. 5
b) Explain type checking and type conversions. 5

16 a) Explain Top down passing techniques. 5
b) Write about error handling. 5

17 Write short notes on : 5
a) Three address code 5
b) Parser generator – Yacc

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Code No. 9154 / M

FACULTY OF ENGINEERING

B.E. 3/4 (CSE) II-Semester (Main) Examination, May / June 2015

Subject : Compiler Construction

Time : 3 Hours

Max. Marks: 75

Note: Answer all questions from Part - A and answer any five questions from Part-B.

PART – A (25 Marks)

1 Define porting. (2)
2 Eliminate Left Recursion. (3)
$E \rightarrow E + T / T$
$T \rightarrow T * F / F$
$F \rightarrow (E) / i d$
3 What is ambiguity? Write an example for ambiguous grammar. (3)
4 Write applications of syntax Directed Definition. (2)
5 Write Indirect triple for the following statement (3)
$X : = - a * b + - a x b$
6 Write Dynamic storage Allocation techniques. (3)
7 Define Basic Block. (2)
8 What is panic mode Recovery? (2)
9 Define code motion. (3)
10 What is Type checking? (2)

PART – B (50 Marks)

11 Show the translation process for (10)
Success : = Hard work + luck

12 Write short notes on
(a) Recursive Descent parsers (5)
(b) Yacc parser generator (5)

13 (a) Explain symbol table organization. (5)
(b) Write applications of Block structured languages. (5)

14 (a) Explain peephole optimization. (5)
(b) Explain error recovery in syntax analysis. (5)

15 Construct LACR for the following grammar. (10)
$E \rightarrow E + T / T$
$T \rightarrow T * F / F$
$F \rightarrow (E) / i d$

16 Explain the following: (10)
(a) Predictive LL (S)
(b) SDD

17 Find out FIRST and FOLLOW for the following grammar: (10)
$S \rightarrow ACB / Ba / Cd$
$A \rightarrow e t / \epsilon$
$B \rightarrow g h / d$
$C \rightarrow d / e / \epsilon$

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FACULTY OF INFORMATICS

Subject : Compiler Construction

Time : 3 hours

Max. Marks : 75

Note: Answer all questions from Part-A. Answer any FIVE questions from Part-B.

PART – A (25 Marks)

1. List the various error recovery strategies for a lexical analysis. 2
2. What is a Regular expression? 3
3. Define recursive descent parsing. 2
4. Define lest recursion removal, remove left recursion from. 3

   $exp \rightarrow exp + term \mid exp - term \mid term$

5. Draw the DAG for the expression a: = b*-c+b*-c. 3
6. What is an attributed grammar? 3
7. What is an Activation record? What are its contents? 3
8. Define optimizing compiler. 2
9. What is an absolute loader? 2
10. List out the machine dependent loader features. 2

PART – B (50 Marks)

11. a) Explain the different phases of a compiler with a neat diagram, showing the output of each phase, with an example. 6
    b) How input buffering can increase the efficiency of compilation? Explain. 4

12. a) Compute the FIRST and FOLLOW sets for the following grammar. 4

    $S \rightarrow iEtSS' \mid a$

    $S' \rightarrow eS \mid E$

    $E \rightarrow b$

    b) Construct recursive descent parser for the following grammar 6

    $E \rightarrow E + T \mid T$

    $T \rightarrow TF \mid F$

    $F \rightarrow F^* \mid a \mid b$

13. Construct SLR parser for the following grammar 10

    $E \rightarrow E^*B \mid E + B \mid B$

    $B \rightarrow 0 \mid 1$

14. What is a syntax tree? Write syntax directed definition for constructing a syntax tree for an expression. The grammar for an expression is given below. 10

    $E \rightarrow E + T \mid E - T \mid T$

    $T \rightarrow T^*F \mid F$

    $F \rightarrow (E) \mid id \mid num$

15. Explain the principal sources of optimization with examples. 10

16. a) Explain the design of absolute loader. 6
    b) Discuss about a simple bootstrap loader. 4

17. Write short notes on :
    a) Syntax directed translation 5
    b) Data flow analysis frame work 5

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FACULTY OF ENGINEERING

B.E. 3/4 (CSE) II – Semester (Suppl.) Examination, January 2016

Subject : Compiler Construction

Max. Marks : 75

Time : 3 hours

Note: Answer all questions from Part-A. Answer any FIVE questions from Part-B.

PART – A (25 Marks)

1. What is Bootstrapping compiler? — 2
2. Explain role of Lexical Analyzer. — 2
3. What is left factoring? — 3
4. What is L attribute definition? Give an example. — 3
5. State the data structures of symbol table. — 2
6. What are the various forms of intermediate code generation? — 3
7. Write triple notation for the following statement. — 3

$$X := -a + b * -a + b$$

8. Define Lower, Leader. — 2
9. State the properties of data flow analysis. — 2
10. State error recovery techniques in top down parsing. — 3

PART – B (50 Marks)

11. a) Explain phases of compiler for the following source code. — 6

    a [index] = 5 + 2 ;

    b) Write short notes on LEX tool. — 4

12. Construct LALR for the following grammar. — 10

    $$S \to CC$$
    $$C \to a/d$$

13. a) Write SDD notations for the desktop calculator. — 5

    $$E := E + T$$
    $$T := T * F \mid F$$
    $$F := (E) \mid id$$

    b) Explain symbol table. — 5

14. Explain storage organization in detail. — 10

15. a) Explain principles of code optimization. — 5
    b) Explain Basic blocks. — 5

16. a) Explain non block structured languages. — 5
    b) Explain three address code types. — 5

17. Write short notes on : — 10
    a) Predictive parsers
    b) Ambigous Grammars

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Code No. 5195

FACULTY OF ENGINEERING

B.E. 3/4 (CSE) II-Semester (Main) Examination, May 2016

Subject : Compiler Construction

Time : 3 hours

Max. Marks : 75

Note: *Answer all questions from Part-A. Answer any FIVE questions from Part-B.*

PART – A (25 Marks)

1 Distinguish between front end and back end.	2
2 Write about input buffering.	3
3 What is left factoring? Why is it required?	2
4 Define S-attributed and L-attributed grammars.	2
5 Construct DAG for the expression a+a*(b-c)+(b-c)*d.	3
6 Define type conversion. Explain its types.	2
7 Discuss the conflicts in shift reduce parsing.	3
8 What is an activation record? What are its contents?	3
9 Show that the grammar is ambiguous $S \rightarrow aSbS|bSaS|\varepsilon$.	2
10 What are the parameter passing mechanism in a programming language?	3

PART – B (50 Marks)

11 a) Explain the phases of compilation in detail.	6
b) Explain about various data structures used in a compiler.	4
12 a) Explain Recursive descent parsing with an example.	6
b) Give specifications of YACC.	4

13 Is the given grammar SLR(1)? Why?   10
Construct the parsing table

$S \rightarrow L = R \,|\, R$

$L \rightarrow *R \,|\, id$

$R \rightarrow L$

14 a) What are synthesized attributes and inherited attributes? Explain with a suitable CFG.	5
b) Explain data structures for implementing symbol tables.	5
15 a) Explain code optimization techniques.	5
b) Explain issues in code generation.	5

16 Explain how to compute data flow equations using live variable analysis by considering any flow graph.   10

17 Explain in detail any Two of the following :
   a) Basic blocks and their construction
   b) Error recovery in top down parsers
   c) Various forms of three-address code with an example.

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FACULTY OF ENGINEERING

B.E. 3/4 (CSE) II – Semester (Supplementary) Examination, Nov. / Dec. 2016

Subject : Compiler Construction

Time : 3 hours

Max. Marks : 75

Note: Answer all questions from Part-A. Answer any FIVE questions from Part-B.

PART – A (25 Marks)

1. Distinguish between a Pass and a Phase.   2
2. What are cross compilers? Why is bootstrapping required to generate them?   3
3. Eliminate left recursion from the given CFG.   3
   $S \rightarrow Aa \mid b$
   $A \rightarrow Ac \mid SD \mid \varepsilon$
4. Define handle. Give an example.   2
5. Draw a syntax tree and DAG for the following expression   3
   $(a*b)+(c-d)*(a*b)+b$
6. What is an attribute grammar?   2
7. Explain how dynamic allocation is done.   2
8. Write LR (0) items for $A \rightarrow (A) \mid a$ 3
9. What is an activation record? Discuss its structure.   3
10. Define induction variable.   2

PART – B (50 Marks)

11. a) Give the output of each phase of a compiler when the given statement is processed $a = b*c/d-e+20$ 6
    b) Explain the input buffer scheme for scanning the source program.   4

12. a) Give the rules to construct FIRST and FOLLOW sets.   4
    b) Is the given grammar LL(1)?   6
    $E \rightarrow E+T \mid T$
    $T \rightarrow T*F \mid F$
    $F \rightarrow (E) \mid id$

13. a) Differentiate between static runtime environments and stack based run time environments.   5
    b) Discuss symbol table organizations.   5

14. a) main()   5
```
    {
     int a[10], i;
     for (i = 0; i < 10 ; i++)
     a[i] = i*2;
    }
```
    Convert the following program into 3 address code, and optimize it if required.
    b) Explain briefly parameter parsing mechanisms.   5

..2

15 Describe Data Flow analysis in detail.   10

16 a) Discuss code optimization techniques.   5
   b) Discuss garbage collection in detail.   5

17 Write short notes on any Two of the following :   10
   a) Error Recovery in bottom up parsers.
   b) LEX
   c) Basic blocks and their construction

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Code No. 5200

FACULTY OF INFORMATICS

B.E. 3/4 (IT) II – Semester (Main) Examination, May / June 2016

Subject: Compiler Construction

Time: 3 Hours

Max.Marks: 75

Note: Answer all questions from Part A. Answer any five questions from Part B.

PART – A (25 Marks)

1 What is an interpreter?
2 Give the general format of LEX Program.
3 What is the role of a Parser in a Compiler?
4 Define left recursion, eliminate left recursion from the following grammar.
     $E \rightarrow E + n|n$
5 What are S-attributed definitions?
6 Draw the DAG representation for the following expression
     $a + a * (b-c) + (b-c) * d$
7 Write about heap management.
8 What are the issues in the design of a code generator?
9 What is a semi lattices.
10 List the techniques used for Semantic Preserving Transformation.

PART – B (50 Marks)

11 Show the translation process of compiler for the given expression.
     Position: = initial + rate*60

12 Consider the following grammar
     $S \rightarrow A S \mid b$
     $A \rightarrow S A \mid a$
   Construct the SLR Parsing table for this grammar and show all moves for the parsing of the input string "abab" using table.

13 Write the syntax directed definition for the following grammar and also draw the annotated parsetree for the input string 3*5+4n
     $L \rightarrow En$
     $E \rightarrow E+T \mid T$
     $T \rightarrow T*F \mid F$
     $F \rightarrow (E) \mid digit$

...2.

14 a) *Explain Peephole optimization.* 5

   b) *Write about the performance metrics used in the design of a Garbage Collector.* 5

15 What is Recursive Descent Parser? Construct a Recursive Descent Parser for the following grammar. 10

        F → E + T / T

        T → TF / F

        F → F* / a / b

16 a) Explain the synchronization between parallel loops. 5

   b) Discuss about a simple bootstrap loader. 5

17 Write a short note on

   a) Major Data structures in a compiler 5

   b) Three Address Code 5

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FACULTY OF ENGINEERING

B.E. 3/4 (CSE) II – Semester (New) (Main) Examination, May/June 2017

Subject: Compiler Construction

Time: 3 Hours   Max.Marks: 75

Note: Answer all questions from Part A and any five questions from Part B.

PART – A (25 Marks)

1 Distinguish between tokens, patterns and lexemes giving examples for each.   [3]

2 What is left factoring? Why should a grammar be left factored?   [2]

3 Give the specifications of YACC.   [3]

4 What are ambiguous grammars? Give an example.   [2]

5 What are the different parameter passing mechanisms?   [2]

6 What is an activation record? Explain all the fields in detail.   [3]

7 Explain how dynamic memory allocation is done.   [2]

8 Differentiate between SLR(1) and LR(1) grammars.   [3]

9 Differentiate between a Basic block and a flow graph.   [2]

10 Explain Recursive descent parsing.   [3]

PART – B (5x10 = 50 Marks)

11 a) Explain the translation process of a compiler for the given expression:
       $p = i + r * 60$, where p, i, r are float.   [6]

   b) Explain Boot strapping and Porting.   [4]

12 a) Give the rules to construct FIRST and FOLLOW sets.   [4]

   b) Is the given grammar LR(1)?   [6]
      $S \rightarrow id \mid V := E$
      $V \rightarrow id$
      $E \rightarrow V \mid n$

13 a) What is an Attribute grammar? Give the SDD for the given grammar and   [6]
       construct the annotated parse tree for the string: float x , y
       decl $\rightarrow$ type var_list
       type $\rightarrow$ int | float
       var_list $\rightarrow$ id , var_list | id

   b) What is the structure of a symbol table? What are its contents?   [4]

14 a) Construct a DAG and 3-address for the given expression: [6]
       $((a - b) + (x + y) * (a + b)) - (a + b) * (x + y)$

   b) Discuss Static run time environment.

15 a) Discuss the Issues in Code Generation.   [5]

   b) Differentiate between Machine Dependent and Machine Independent   [5]
      optimizations.

16 a)   Error Recovery in top down parsers.   [5]

   b) Give quadruples, triples and indirect triples for the expression: [5]
      X := - a + b * - a + b

17 Answer any two of the following questions.   [10]
   a) Brute forcing parsing
   b) LEX.
   c) Input Buffering.

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FACULTY OF ENGINEERING

B.E. 3/4 (CSE) II – Semester (Old) Examination, May/June 2017

Subject: Compiler Construction

Time: 3 Hours

Max.Marks: 75

Note: Answer all questions from Part A and any five questions from Part B.

PART – A (25 Marks)

1 Distinguish between Pass and Phase. (2M)
2 What is Boot Strapping? (3M)
3 What is Left Recursion? How to eliminate it? (3M)
4 Write applications of Syntax Directed Translation. (2M)
5 What is DAG Notation? (2M)
6 What is Symbol Table and Write the Operations of symbol table. (2M)
7 Write triple notation for the given expression (3M)
    X:=-a*b+-a*b
8 What is Basic Block in Code Generation? (3M)
9 State the Parameter passing mechanisms in programming Languages. (2M)
10 What is Yacc ? Explain the Syntax. (3M)

PART – B (5x10 = 50 Marks)

11 a) Explain the Translation Process. (6M)
   b) Write Lex Specification for valid identifier and digits recognition (4M)

12 a) Show that the given grammar is LL(1) or Not (6M)
       S→ iEts | iEtses | a
       E→ b
   b) What are the major Problems in topdown parsers explain with example? (4M)

13 a) Given Grammar G is SLR(1) or not (10M)
       S → CC
       C→ aC | d

14 Explain symbol table organization for block structured and non Block structured Languages. (10M)

15 a) Explain Peephole Optimization Techniques. (5M)
   b) Explain Machine Independent Optimization. (5M)

16 a) Write Error Recovery Strategies in Parsers. (6M)
   b) List common errors in phases of a compiler. (4M)

17. Write Short Notes on: (10M)

   a) Shift Reduce Parsers

   b) Storage Organization

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FACULTY OF ENGINEERING

B.E. 3/4 (CSE) II – Semester (Old) Examination, December 2017

Subject: Compiler Construction

Time: 3 Hours   Max.Marks: 75

Note: Answer all questions from Part A and any five questions from Part B.

PART – A (25 Marks)

1 Distinguish between Pass and Phase. (2M)

2 What is Boot Strapping? (3M)

3 What is Left Recursion? How to eliminate it? (3M)

4 Write applications of Syntax Directed Translation. (2M)

5 What is DAG Notation? (2M)

6 What is Symbol Table and Write the Operations of symbol table. (2M)

7 Write triple notation for the given expression (3M)

     X:=-a*b+-a*b

8 What is Basic Block in Code Generation? (3M)

9 State the Parameter passing mechanisms in programming Languages. (2M)

10 What is Yacc? Explain the Syntax. (3M)

PART – B (5x10 = 50 Marks)

11 a) Explain the Translation Process. (6M)
     b) Write Lex Specification for valid identifier and digits recognition (4M)

12 a) Show that the given grammar is LL(1) or Not (6M)
        S→ iEts | iEtses | a
        E→ b
     b) What are the major Problems in topdown parsers explain with example? (4M)

13 a) Given Grammar G is SLR(1) or not (10M)
        S → CC
        C→ aC | d

14 Explain symbol table organization for block structured and non Block structured Languages. (10M)

15 a) Explain Peephole Optimization Techniques. (5M)
     b) Explain Machine Independent Optimization. (5M)

...2

16 a) Write Error Recovery Strategies in Parsers. (6M)

b) List common errors in phases of a compiler. (4M)

17. Write Short Notes on: (10M)

a) Shift Reduce Parsers

b) Storage Organization

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FACULTY OF ENGINEERING

B.E. 3/4 (CSE) II – Semester (New) (Suppl.) Examination, December 2017

Subject: Compiler Construction

Time: 3 Hours   Max.Marks: 75

Note: Answer all questions from Part A and any five questions from Part B.

PART – A (25 Marks)

1 State error recovery techniques in top down parsing. [3]
2 What is an activation Record? What are its contents? [3]
3 What is Recursive Descent parsing? [3]
4 What is Shift Reduce and Reduce Reduce Conflict? [2]
5 What is Left Recursion? Eliminate left recursion from the expression: [3]

     A → Aa | Ab | c | d

6 Discuss Garbage collection. [2]
7 Define Handle. Give an example. [2]
8 Construct a DAG for the statement: [3]

     x = y * z , w = p + y , y = y * z , p = w - x

9 Define bottom-up parsing. [2]
10 Define type conversion. Explain its types. [2]

PART – B (5x10 = 50 Marks)

11 a) Explain the different phases of compilation with a neat diagram showing the output of each phase with an example. [6]

    b What are the major data structures in a compiler. [4]

12 Is the given grammar SLR? Why? Construct the parsing table. [10]

     E → E * B | E + B | B
     B → 0 | 1

13 a) What is a syntax tree? Write SDD for constructing a syntax tree for the expression: (34 – 3) * 42 given the grammar: [6]

     E → E + T | E – T | T
     T → T * F | F
     F → (E) | id | num

    b) Explain data structures for implementing symbol tables. [4]

..2

14. Explain storage organization in detail. [10]

15. Explain various code optimization techniques. [10]

16 a) What is a basic block? How do you divide the sequence of three address [5] statements into basic blocks? Explain with a clear example.

   b). Explain Bootstrapping and Porting with examples? [5]

17 Give short notes on any two of the following: [10]
   a) Brute Forcing Parsing
   b) YACC
   c) Data flow analysis.

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FACULTY OF INFORMATICS

B.E. 3/4 (IT) II-Semester (Old) Examination, December 2017

Subject : Compiler Construction

Time : 3 hours   Max. Marks : 75

Note: Answer all questions from Part-A. Answer any FIVE questions from Part-B.

PART – A (25 Marks)

1	Differentiate between pass and phase.	2
2	Define recursive descent parsing.	2
3	Define left recursion; remove left recursion from the following productions.	
	exp → exp +term | exp -term | term.	3
4	Write LR(0) items for E → E+n / n	3
5	Write rules for computation of FIRST (x).	2
6	Differentiate between top-down and bottom up parsers.	2
7	Draw the DAG for the expression a: = b*-c+b*-c.	3
8	What is an activation record? What are its contents?	3
9	Write about use of algebraic identities.	2
10	Discuss about structure of YACC.	3

PART – B (50 Marks)

11 Explain the phases of a compiler with a neat diagram, showing the output of each phase, with an example.   10

12 Construct LL(1) parser for the following grammar   10

$E → TE'$

$T → TE' \| \in$

$T → FT' \| \in$

$T' → *FT' \| \in$

$F → (E) \| id$

13 Construct SLR parser for the following grammar   10

$E → E*B \| E + B \| B$

$B → 0 \| 1$

14 a) Explain about memory Hierarchy of a computer.   5

    b) Explain the issues in design of a code generator.   5

15 a) Explain the synchronization between parallel loops.

    b) Discuss about a simple bootstrap loader.   5

                                                                                              5

16 a) Discuss about various code optimization techniques.

    b) Translate the assignment statement a = b*c - b*d into quadruples and triples.   5

                                                                                              5

17 a) Explain about recursive descent parsing with an example.

    b) Explain about LEX structure with an example program.   5

                                                                                              5

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FACULTY OF INFORMATICS

B.E. 3/4 (IT) II-Semester (New) (Supplementary) Examination, December 2017

Subject : Compiler Construction

Time : 3 hours   Max. Marks : 75

Note: Answer all questions from Part-A. Answer any FIVE questions from Part-B.

PART – A (25 Marks)

1 Define Boot strapping.   2
2 Write a regular expression to identify floating point numbers.   2
3 Define left recursion removal. Remove left recursion from   3
   $E \rightarrow E + T|T$
   $T \rightarrow T * F|F$
4 Write short notes on YACC.   3
5 Define shift-reduce conflict and Reduce-reduce conflict.   3
6 Define synthesized and inherited attributes.   3
7 Define an attribute grammar.   2
8 Write the two address code for the following expression : a * (b+c).   2
9 What is activation record? What are its content?   3
10 What is the role of symbol table?   2

PART – B (5 x 10 = 50 Marks)

11 Explain the compiler translation process with an example.   10
12 a) Construct NFA for the regular expression (a/b)*   4
   b) Find the FIRST and FOLLOW from the grammar given below: 6
      $S \rightarrow AaBD$
      $A \rightarrow c \mid \in$
      $B \rightarrow b \mid \in$
      $D \rightarrow d \mid \in$

13 Construct a DFA of LR(0) items and the parsing table for the following grammar and
   show all the moves for the parsing of the input string ((a)) using the table :
   $A \rightarrow (A) \mid a$ 10

14 a) Explain various parameters parsing mechanisms.   5
   b) Explain stack based runtime environment.   5

15 What is a symbol table? Discuss the contents of the symbol table and explain the
   techniques for organizing the symbol table.   10

16 a) Discuss about code optimization techniques.   5
   b) Write briefly memory organization during program-execution.   5

17 Write short notes on the following :
   a) EBNF notations   3
   b) Error recovery in Top down parsers   3
   c) Type inference and type checking   4

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FACULTY OF ENGINEERING

B.E. 3/4 (CSE) II-Semester (Main & Backlog) Examination May/June 2018

Subject: Compiler Construction

Max. Marks: 75

Time: 3 Hrs.

Note: Answer all questions from Part – A & any five questions from Part – B.

1. Define the terms "Language Translator" and "compiler" (2)
2. Write short notes on bootstrapping (2)
3. Define left recursion. Is the following grammar left recursive? (3)

$$E \rightarrow E + E | E * E | a | b$$

4. What is an ambiguous grammar? Give examples . (3)
5. Define Induction variable. (2)
6. What is code optimization? Give example for any two optimization approaches. (3)
7. What is a Basic Block? (2)
8. What is an activation record? Discuss its structure. (3)
9. What are the Error-recovery actions in a lexical analyzer? (2)
10. Specify the functionality of linker, loader and compiler (3)

PART – B (50 Marks)

11. a) What are the phases of the compiler? Explain the phases in detail. Write down the output of each phase for the expression a:=b+c*50 7
    b) What are cross compilers? 3
12. (a) Is the given grammar LL(1)? 6

$$E \rightarrow E + T | T$$

$$T \rightarrow T * F | F$$

$$F \rightarrow (E) | id$$

    (b) What is an LALR(1) grammar? 4
13. (a) Check whether the following grammar is SLR(1) or not 8
    Explain your answer with reasons.

$$S \rightarrow L = R | R$$

$$L \rightarrow *R | id$$

$$R \rightarrow L$$

    (b) Define Kernel items and Non-kernel items. 2
14. With a neat diagram explain the format of the Symbol Table. And discuss the tree structures representation of scope information. 10
15. (a) Convert the following program into 3 address code 5

```
X=0
do
{
A=B-C*D;
X=X+1;
}
while(X<6)
```

    (b) Discuss garbage collection in detail. 5
16. (a) Explain DAG representation of the basic blocks with an example. 5
    (b) Explain various machine independent code optimization techniques. 5
17. Write short notes on any two from the following:
    (a) Input Buffering 10
    (b) Syntax Directed Translation
    (c) Error Recovery

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FACULTY OF ENGINEERING

BE VII Semester (CSE) (CBCS)(Main) Examination, December 2019

Subject: Compiler Construction

Time: 3 hours   Max. Marks: 70

Note: Answer all questions from Part-A & any FIVE questions from Part-B.

PART – A [Marks: 20]

1	Define the terms Language Translator and compiler.	2
2	Write short notes on Bootstrapping and Porting.	2
3	Define left recursion. Is the following grammar left recursive? $E \rightarrow E{+}E \mid E{*}E \mid a \mid b$	2
4	Define Handle and handle pruning?	2
5	Write LR(0) items for $A \rightarrow (A) \mid a$	2
6	Explain the error recovery strategies in syntax analysis.	2
7	Define static allocations and stack allocations.	2
8	Define a syntax-directed translation?	2
9	What are basic blocks and flow graphs?	2
10	What are the properties of optimizing compilers?	2

PART – B [5 x 10 = 50 Marks]

11 a) What is an ambiguous grammar? Give example.   3

b) What are the phases of the compiler? Explain the phases in detail.   7
Write down the output of each phase for the expression
a: = b + c * 50

12. a) Enumerate the rules for computing FIRST() and FOLLOW().   4

b) Define an LL(1) grammar. Is the following grammar LL(1).   6
$S \rightarrow iEtS \mid iEtSes \mid a$
$E \rightarrow b$

13. a) Check whether the following grammar is SLR (1) or not. Explain   5
your answer with reasons.
$S \rightarrow L = R \mid R$
$L \rightarrow *R \mid id$
$R \rightarrow L$

b) Construct an LR(1) parsing table for the following given grammar   5
S –> XX
X –>aX
X –> b

14. a) What are different storage allocation strategies? Explain.   5

b) Discuss in detail about the run time storage arrangement.   5

15. a) Construct a DAG for the expression: a+a*(b-c)+(b-c)*d   4

    b) Explain the following with example: 6
      i) Quadqaples
      ii) Triples
      iii) Indirect triple

16. a) Discuss the various issues in the code Generation.   5

    b) What is LEX? Discuss the usage of LEX in Lexical Analyzer generation.   5

17.   Write Short Notes on any two of the following   5+5
    a) LALR(1)
    b) Peephole optimization
    c) symbol table organizations

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FACULTY OF ENGINEERING

BE VII- Semester (CBCS)(CSE) (Main& Backlog) Examination, March/April 2021

Subject : Compiler Construction

Time: 2 Hours

Max. Marks: 70

PART – A

Note: Answer any Five Questions

(5x2 = 10Marks)

1. What is Porting.

2. Give the definition for Regular Expression.

3. Check whether the Grammar isAmbiguous or not

   E→E+E|E*E|id

4. Write the rules to construct follow set

5. What are the common conflict that arise during shift reduce parsing.

6. Give the format of a YACC file.

7. What is type checking ?Give its types.

8. What are the parameter passing techniques in a programming language.

9. Construct DAG for a+a*(b-c)+(b-c)*d

10. What is Dead Code Elimination.

PART – B

Note: Answer any Four Questions

(4x15 = 60Marks)

11. Explain the various phases of compilation with an example.

12. Is the grammar LL(1) or not prove

    S→ (L) | a

    L→L, S | S

13. Explain the construction of SLR parse table for the following grammar

    E→E+T|T

    T→T*F|F

    F→(E) |id

14. a) Discuss briefly about symbol table organization.

    b) Differentiate between fully-static runtime and stack based runtime environments.

15. Explain principal sources of optimization with examples.

16. a) Write in detail about data flow analysis.

    b) Explain with example about conversion from Regular expression to DFA.

17. Write about

    a) Parser Generator-YACC

    b) S-Attributed and L-Attributed Grammar.

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Time: 2 Hours

Subject: Compiler Design

Max. Marks: 70

(Missing data, if any, may be suitably assumed)

PART – A

Note: Answer any five questions.

(5x2 = 10 Marks)

1 State error recovery techniques in top down parsing.
2 What is Boot Strapping?
3 Difference between Top Down parsing and Bottom up parsing.
4 What are ambiguous grammars? Give an example.
5 What is Yacc? Explain the Syntax.
6 Define shift-reduce conflict and Reduce-reduce conflict.
7 Define an ambiguous grammar.
8 What is Basic Block in Code Generation?
9 Write about back patching.
10 Write the functions of bootstrap loader.

PART – B

Note: Answer any four questions.

(4x15 = 60 Marks)

11 (a) Enumerate the various phases of a compiler. Explain each phase briefly.
   (b) Write a LEX program to count the number of words, characters, blank spaces and lines.

12 (a) Check whether the following grammar is LL(1) or not: S-> iEtS |iEtSeS | a, E->b.
   (b) Explain in detail about Shift Reduce Parsing.

13 construct a CLR parsing table for given grammar: S->L=R/R, L->*R/id, R->L.

14 (a) Explain various parameters parsing mechanisms.
   (b) Explain in detail about Hash Table in Symbol Table organization.

15 (a) Write briefly about memory organization during program execution.
   (b) Explain Stack-based runtime environments.

16 (a) Explain DAG representation of the basic blocks with an example.
   (b) Explain various machine independent code optimization techniques.

17 Write short notes on:
   (a) Error handling in top-down parsers.
   (b) Code generation from DAGs.
   (c) Semantic analysis.

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