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Total No. of Pages : 02

Total No. of Questions : 18

B.Tech.(CSE) (2011 Onwards E-III) (Sem.–7,8)

COMPILER DESIGN

Subject Code : BTCS-913

Paper ID : [A2995]

Max. Marks : 60

Time : 3 Hrs.

INSTRUCTION TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students has to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students has to attempt any TWO questions.

SECTION-A

Answer briefly :

1. Write at least two differences between compiler and an interpreter.
2. What are different types of errors during compilation?
3. Define regular expression.
4. Define bootstrapping.
5. Differentiate between pass and phase of compiler.
6. Define LR(0) and LR(1) grammar.
7. What is advantage of removing left recursion from a grammar?
8. What is the advantage of Triples over Quadruples in intermediate code storage?
9. What is the purpose of code optimization phase of compiler?
10. What is the use of symbol table?

SECTION-B

11. Construct action and goto table for LR(0) parser : (5)

(0) S→EE (1) E → eE (2) E → f (2.5)

12. a) Loop Optimization

b) What is the significance of quadruples, triples? Write quadruples and triples for the expression : (2.5)

$$(A + B) * (C + D) - (A + B + C)$$

13. What are three representations of IR (Intermediate Code)? Discuss SDT for three address code generation with example. (5)

14. Discuss stack allocation of space and Activation Records. (5)

15. What is Context Free Grammar (CFG)? Discuss Shift-Reduce Parser with example. (5)

SECTION-C

16. Write a note on LEX and YACC compilers.

17. a) Discuss predictive parsing and Recursive descent parsing.

b) What is Handle Pruning? Write with an example, how handle is removed while parsing a string?

18. a) Discuss various issues covered in code generation phase.

b) Discuss ambiguous and non-ambiguous parse trees. How ambiguity is removed from a parse tree?

Roll No. [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ]

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech (CSE) (Sem.–6)

COMPILER DESIGN

Subject Code : BTCS601-18

M.Code : 79249

Date of Examination : 18-01-2025

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A

1. **Write briefly :**

a) What is meant by ambiguous grammar?

b) What are syntax errors, give two examples?

c) What is an Interpreter?

d) Give some compiler construction tools.

e) Differentiate between compiler and interpreter.

f) Remove left recursion S-→ Aa/b, A--→ Ac/Sd/e.

g) What is Basic Block? Write its use.

h) Define the two parts of compilation and its function.

i) Define Ambiguous Grammar.

j) What is DAG?

SECTION-B

2. Explain Language Processing System with neat diagram.

3. What are issues in Lexical Analysis?

4. Explain various Errors encountered in different phases of compiler.

5. Construct Stack Implementation of Shift-Reduce Parsing for the grammar below:
   $E \rightarrow E+E \quad E \rightarrow E*E \quad E \rightarrow (E) \quad E \rightarrow id$
   For the given input string id1 + id2 * id3.

6. Construct LL(1) grammar for tile sentence $S \rightarrow iEts \mid iEtSeS \mid a \quad E \rightarrow b$

SECTION-C

7. Explain the following w.r.t code generation phase:

   a) Input to code generator

   b) Target Program

   c) Memory Management

   d) Instruction Selection

   e) Register Allocation

   f) Evaluation Order

8. Discuss different Storage Allocation Strategies.

9. Explain Principal Sources of Optimization with example.

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Roll No. | | | | | | | | | | | | | **Total No. of Pages : 02**

Total No. of Questions : 09

B.Tech. (CSE) (Sem–6)

COMPILER DESIGN

Subject Code : BTCS-601-18

M.Code : 79249

Date of Examination : 09-06-2023

Time : 3 Hrs. **Max. Marks : 60**

INSTRUCTIONS TO CANDIDATES :

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.**
3. **SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.**

SECTION-A

1. Write briefly :

a) Lexeme vs Token

b) Parse tree

c) Role of look ahead pointer in input buffering

d) What do you meant by an empty entity in the parsing table?

e) Phase *vs* Paas

f) Ambuiguis grammar

g) Left factor

S→iCtS | iCtSeS|a

C→b

h) Handle and Handle Pruning

i) Macro

j) Purpose of using Symbol Table

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SECTION-B

2. Write a note on error handling and recovery techniques.

3. How LR(0) parsing is performed on the given below grammar, create its parsing table and explain in detail.

   E→ T+E/T

   T→ id

4. Explain in detail three address codes along with their implementation.

5. Explain in various data structures used for the symbol table.

6. Explain in detail how DAG is created for basic blocks using a suitable example.

SECTION-C

7. Explain the various code optimization techniques in detail using suitable examples.

8. How does a string position = initial+rate*60 pass through various compiler phases?

9. **Write a note on :**

   a) YACC

   b) Lex.

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Roll No. | | | | | | | | | | | | | **Total No. of Pages : 02**

Total No. of Questions : 18

B.Tech. (CSE) PIT(Sem.–6)

COMPILER DESIGN

Subject Code : BTCS-601-18

M.Code : 79249

Date of Examination : 02-07-22

Time : 3 Hrs. **Max. Marks : 60**

INSTRUCTIONS TO CANDIDATES :

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.**
3. **SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.**

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SECTION-A

Write briefly :

1. Lexeme
2. Error
3. Three address code
4. Impact of empty entry in parsing table.
5. Type checking
6. NFA
7. Regular expression
8. Syntax tree
9. Context free grammar
10. Phase of a compiler.

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SECTION-B

11. Write a note on input buffering.

12. How shift reduce parsing is performed on given below grammar, explain in detail.

    $S \rightarrow S + S$

    $S \rightarrow S*S$

    $S \rightarrow id$

13. Differentiate between Parse tree and Syntax tree with the use of suitable example.

14. Explain the role of symbol table, symbol table management in compiler design.

15. Explain various issues of code generation in compiler design.

SECTION-C

16. Write a note on basic blocks and its optimization techniques.

17. Explain in detail the role of various phases of compiler with suitable example.

18. Explain in detail error handling mid recovery techniques available in compiler.

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PUNJABI UNIVERSITY, BFUHS, HPTU, HPSBTE , HARYANA DIPLOMA, MDU HARYANA

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Total No. of Questions : 09

B.Tech. (CSE) (Sem.–6)

COMPILER DESIGN

Subject Code : BTCS-601-18

M.Code : 79249

Date of Examination : 12-12-2022

Time : 3 Hrs. **Max. Marks : 60**

INSTRUCTIONS TO CANDIDATES :

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.**
3. **SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.**

SECTION-A

Write briefly :

1. a. Token

   b. DFA

   c. Augmented Grammar

   d. Preprocessor

   e. Loop Optimization

   f. DAG

   g. Parse tree

   h. Parsing Table

   i. Symbol Table

   j. Heap

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SECTION-B

2. Explain the role of lexical analyzer.

3. Perform predictive paring cm following grammar

$$E \rightarrow TE'$$

$$E1 \rightarrow +TE' \mid \varepsilon$$

$$T \rightarrow FT'$$

$$T' \rightarrow *FT' \mid \varepsilon$$

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

* ε denotes epsilon

4. Explain the role of basic blocks with the use of a suitable example.

5. Discuss issues of code generation in compiler design.

6. Write a note on Lex.

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SECTION-C

7. Write a note on peephole optimization.

8. What is a directed acyclic graph? Discuss the procedure for construction of a directed acyclic graph with suitable example.

9. How three address code is implemented in compiler? Explain in detail.

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Total No. of Questions : 18

B.Tech.(CSE) (2012 to 2017 E-III) (Sem.–7,8)
B.Tech. (IT)

COMPILER DESIGN

Subject Code : BTCS-913
M.Code : 71905

Time : 3 Hrs. Max. Marks : 60

INSTRUCTION TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A

Answer briefly :

1. Differentiate between stack allocation and static allocation.
2. Name two compiler construction tools.
3. Define 'Code Motion' and 'Constant Folding' with examples.
4. Define 'Basic Block' and write about its significance.
5. Write at least two differences between LR (0) parsers, SLR (1) parsers, CLR (1) and LALR Parsers.
6. Show that the grammar is ambiguous: $S \rightarrow Sa$ $S \rightarrow bS$ $S \rightarrow c$
7. List the functions of a pre-processor.
8. How do Self Hosting Compilers work?
9. Name 3 forms of output of code generator.
10. Write the triple representation of x := y[i].

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SECTION-B

11. Differentiate between top down and bottom up parsing. Show the steps of a shift reduce parser on input (a,(a,a)) using the following grammar :

    $S \rightarrow (L) \mid a$

    $L \rightarrow L, S \mid S$

12. Translate the arithmetic expression a * – (b + c) into

    a) Postfix notation

    b) Three-address code

13. What is the role of the lexical analyzer? Explain the issues in lexical analysis.

14. What is Code Optimization? Describe the principle sources of optimization.

15. Explain the various storage allocation strategies applied to activation records.

SECTION-C

16. Explain in detail the process of compilation. Illustrate the output of each phase of compilation for the input "a = (b+c) * (b+c) * 2".

17. What is the need of symbol table. Explain various data structures used for its storage.

18. Given the CFG G = {S, {S, U, V, W}, {a, b, c, d}, P} with P given as shown below :

    $S \rightarrow UVW$

    $U \rightarrow (S) \mid aSb \mid d$

    $V \rightarrow aV \mid \varepsilon$

    $V \rightarrow cW \mid \varepsilon$

    a) Construct a table-based LL(1) predictive parser for G;

    b) Give the parsing actions for the input string "(dc)ac".

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SECTION – D

8. What is Symbol Table ? Explain in detail about its contents and data structure. 20

9. Write short note on the following : 20

   (a) Basic blocks & flow graph

   (b) Peephole optimization

   (c) DAG

   (d) Loop Unrolling & Loop Jamming

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24488

B. Tech 7th Sem. (CSE) Examination – May, 2018

COMPILER DESIGN

Paper : CSE - 405 - F

Time : Three Hours] ***[Maximum Marks : 100***

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Attempt ***five*** questions in all, selecting ***one*** question from each section. Question No. **1** is ***compulsory***.

1. Write a short note on the following : 20

   (a) Differentiate top-down & bottom-up parser.

   (b) Remove left recursion $S \rightarrow Aa/b$, $A \rightarrow Ac/Sd/e$.

   (c) What is translator ? Differentiate between compiler & interpreter.

   (d) What is parsing ? Explain derivation & parse tree.

(e) What is regular expression ? How it is useful in compile design ?

SECTION – A

2. (i) What is Compiler ? Explain the structure of Compiler in detail. 14

(ii) Why do we need translator ? Explain. 6

3. (i) How do we implement lexical analyzer ? Explain with example. 10

(ii) Construct the NFA for the following regular expression : 10

$$R = (a \mid b)^*abb$$

SECTION – B

4. (i) Explain role of parser in detail. 10

(ii) Explain and remove the ambiguity from following CFG. 10

$$E \rightarrow E+E \mid E-E \mid E/E \mid E*E \mid (E) \mid -E \mid id$$

5. (a) Explain shift-reduce parsing with the help of an example. 10

(b) Test whether the grammar is LL (1) or not and construct a predictive parsing table for it. 10

$S \rightarrow iCtSS' \mid a$

$S' \rightarrow eS \mid \varepsilon$

$C \rightarrow b$

SECTION – C

6. (i) Check whether the following grammar is LR (1) or not ? 10

$S \rightarrow CC$

$C \rightarrow cC \mid b$

(ii) Construct the LR(0) parsing table for the following grammar. 10

$S \rightarrow L=R$

$S \rightarrow R$

$L \rightarrow * R$

$L \rightarrow id$

$R \rightarrow L$

Check whether this above grammar is LR (0) grammar is not.

7. (i) Convert the following statements into the Quadruple, Triple and Indirect triple representation : $A = -B * (C + D)$ 10

(ii) How syntax directed translation scheme is implemented ? Explain with example. 10

24488

B.Tech. 7th Semester (F) Scheme (CSE)

Examination, December–2018

COMPILER DESIGN

Paper – CSE- 405-F

Time allowed : 3 hours] *[Maximum marks : 100*

Note: *Attempt **five** questions in total selecting **one** question from each unit.* ***Question number 1 is compulsory.*** *All questions carry equal marks.*

Compulsory Question

1. (i) What is Language Translator?
   (ii) Differentiate Pass one and Pass two Compiler.
   (iii) Define lexeme, token pattern.
   (iv) What do you mean by ambiguous grammar? Explain by taking suitable example.
   (v) Differentiate parse tree and syntax tree.
   (vi) Define operator grammar.
   (vii) Define Syntax errors. How these errors are removed by Compiler'?
   (viii) Define handle and handle pruning.
   (ix) What do you mean by DAG?

Unit–I

2. (a) What do you mean by Compiler? Why we need compiler. What are the computer construction tools?

(b) Briefly explain the structure of a compiler.

3. (a) Design a DFA over an alphabet $\Sigma = \{a,b\}$ that accepts all the strings ending with **ab.**

(b) What is LEX? Discuss its role in compiler design.

Unit–II

4. (a) Explain the Chomsky hierarchy.

(b) Construct a CFG for the language.

5. Explain different Parsing Technique in detail.

Unit–III

6. Explain code optimization and its utility with example.

7. What do you mean by three address code quadruples and triples? Explain with example.

Unit–IV

8. (a) What are typical entries in symbol table, what are various data structures used to implement the table?

(b) How symbol table space can be reused? Give some example.

9. Write short notes on:

(a) Peephole optimization

(b) Machine Dependent Code

B. Tech. 7th Semester (CSE) F-Scheme
Examination, December–2017
COMPILER DESIGN
Paper–CSE–405–F

Time allowed : 3 hours] *[Maximum marks : 100*

Note : *Attempt **five** questions selecting **one** question from each section and **Question No. 1 is compulsory.***

1. Describe the following : 20

(i) Input buffering

(ii) Parsing

(iii) Syntax directed definitions

(iv) Role of Parser.

Section–A

2. (i) What is Compiler ? Explain the different phases of Compiler in detail. 12

(ii) Explain various compiler construction tools. 8

3. (i) Construct the transition diagram for the following regular expressions 10

(a) (a/b)*abb(a/b)*

(b) (a/b)/(ab)*b/a*(bb)*

(ii) How do we implement lexical analyzer ? Explain with example. 10

Section–B

4. (i) Explain Chomsky hierarchy of grammars. 10

(ii) What is context free grammar ? Give the left most and right most derivation for the following grammar. Also draw its derivation tree for it and check its ambiguity for id + id + id :

$$E \rightarrow E+E \mid E-E \mid E^* E \mid E/E \mid id$$ 10

5. (i) Test whether the grammar is LL(1) or not and construct a predictive parsing table for it. 10

$$S \rightarrow AaAb \mid BaBa, A \rightarrow e, B \rightarrow e$$

(ii) Consider the following grammar :

$$S \rightarrow ABC, A \rightarrow Aa \mid d, B \rightarrow Bb \mid e, C \rightarrow Ce \mid f$$

Eliminate left recursion from the above grammar. 10

Section–C

6. Check whether the following grammar is LR (0) or not. 20

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

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

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

7. (i) State and explain the syntax directed translation scheme for the desk calculator and give the parse tree and translation for the string

(7 + 4) * 249/3 + 26. 10

(ii) What is intermediate code representation ? Explain quadruple, triples and indirect triples with the help of an example. 10

Section–D

8. (i) Explain the various types of errors generated during the various phases of the compiler. How do we recover from these errors ? 10

(ii) What is the use of Symbol Table ? Explain any two data structures associated with Symbol Table. 10

9. Write short notes on the following :

(a) Loop optimization

(b) Code generation. 20

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24488

B. Tech. 7th Semester (CSE) Examination – December, 2016

COMPILER DESIGN

Paper : CSE – 405 - F

Time : Three Hours] *[Maximum Marks : 100*

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : The candidate have to attempt first ***compulsory*** question and ***one*** question from each of the four sections.

1. Describe the following : 20

(i) Input buffering

(ii) Parsing

(iii) LALR

(iv) Linked lists

SECTION – I

2. (i) What is compiler. Explain the different phases of compiler. 10

(ii) Explain in detail about compiler construction tools. 10

3. Write short note on following : 20

(i) Finite auto mata

(ii) Lexical analysis

(iii) Regular expression

(iv) Input buffering

SECTION – II

4. Give a complete description about syntax analysis. 20

5. Describe the following : 20

(a) Predictive parsing

(b) Operator precedence parsing

SECTION – III

6. Explain the following : 20

(i) LR parser

(ii) Canonical LR parser

7. Describe the following : 20

(i) Construction of syntax trees

(ii) Three address code

(iii) Quadruples and triples

SECTION – IV

8. Give a complete description about code optimization and code generation. 20

9. What is error ? Explain in detail about lexical phase error, syntactic phase error and semantic error. 20

Roll No. .....

24488

B. Tech. 7th Semester (CSE) Examination – June, 2016

COMPILER DESIGN

Paper : CSE-405-F

Time : Three Hours] *[Maximum Marks : 100*

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : The candidate have to attempt ***first compulsory*** question and ***one*** question from each Section. All questions carry equal marks.

1. Explain the following : 20

(i) Translator

(ii) Passing

(iii) SLR

(iv) Error

SECTION – A

2. What is Compiler ? Explain the structure of Compiler in detail. 20

3. Describe the following : 20

   (i) Conversion from Regular expression to Finite Automata.

   (ii) Implementation of Lexical Analyzer.

SECTION – B

4. Explain the following in detail : 20

   (i) Context free Grammer

   (ii) Role of Parser

5. Define Parsing. Explain in detail about Parsing Technique. 20

SECTION – C

6. What is Syntax directed Translation Scheme ? Also explain the implementation of Syntax directed translation. 20

7. Describe the following : 20

   (i) Canonical LR Parser

   (ii) LALR

SECTION – D

8. What is symbol Table ? Explain in detail about its contents and data structure. 20

9. (i) What do you mean by Code Generation ? Explain. 10

   (ii) Explain the register allocation for temporary and user defined variables. 10

Roll No. .....

24488

B. Tech. 7th Semester (CSE) Examination – May, 2015

COMPILER DESIGN

Paper : CSE-405-F

Time : Three Hours] *[Maximum Marks : 100*

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Attempt ***five*** questions. Question No. 1 is ***compulsory***. Select one question from each Section.

1. (a) What is the need of translator ?

(b) What is the role of lexical analyzer ?

(c) What is top down parsing ?

(d) What is the role of parser.

(e) What is LALR ?

(f) Compare parse tree and syntax tree.

(g) What is symbol table ?

(h) What do you mean by DAG ?

SECTION – A

2. What is compiler ? Explain different phase of compiler. Also describe various compiler construction tool.

3. (a) What is regular expression ? Find the regular expression correspondence to

(b) How to minimize number of state of DFA ? Explain with example.

SECTION – B

4. What do you mean by grammar ? Explain Context Free Grammar ? Write a CFG for the regular expression $r = 0^* 1(0 + 1)^*$.

5. What is parsing ? Explain shift reduce parsing and operator precedence parsing technique. Check whether following grammar is operator precedence grammar.

$E \rightarrow E + T/T$ $\quad$ $E \rightarrow T * F/F$ $\quad$ $F \rightarrow (E)/id$

SECTION – C

6. Write quadruples, triples and indirect triples for the expression .

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

7. (a) Define SLR ? Write a algorithm for construction of and SLR parsing table.

(b) What is Canonical LR parsing ? Explain with example.

SECTION – D

8. What is error ? Explain the various types of error generated during various phase of compiler. How does we remove from these error ?

9. (a) What is code optimization ? Explain.

(b) Explain how CPU Register are allocated while creating machine code ?

Roll No. .....

24488

B. Tech. 7th Semester (CSE)

Examination – December, 2014

COMPILER DESIGN

Paper : CSE-405-F

Time : Three hours] *[Maximum Marks : 100*

Before answering the question, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Attempt ***five*** questions in all, selecting one question from each Section. Question No. 1 is ***compulsory***. All questions carry equal marks.

1. (a) Write short note on compiler construction tools. 5

(b) Consider the grammar : 5

$$S \rightarrow aSbS \mid bSaS \mid \varepsilon$$

Show that this grammar is ambiguous by constructing two different leftmost derivations for the sentence abab.

(c) Register and address descriptor in code generation. 5

(d) Compare single pass and multipass compiler. 5

SECTION – A

2. (a) Design the regular expression for given transition diagram : 10

(b) Construct a DFA with reduced states equivalent to the regular expression $10+(00+1)0*10$. 10

3. (a) Explain the various phases of compiler. 10

(b) What is a LEX ? Discuss its role in compiler design. 10

SECTION – B

4. (a) What is predictive parsing ? Explain with example. 10

(b) Show with the help of example that no LL (1) grammar can be ambiguous. 10

5. (a) Define LR parser. Write down its advantages and limitations. Explain the algorithm of LR parser. 12

(b) Explain canonical LR parser. 8

SECTION – C

6. What is symbol table ? Explain the data structures used to construct symbol tables. 20

7. (a) Discuss about syntactic and semantic phase errors. 10

(b) What is three address code ? Explain the type of three address statements. 10

SECTION – D

8. (a) Explain basic blocks and flow graphs in code generation. 10

(b) Explain the transformation on basic blocks. 10

9. Write short notes on :

(a) Machine dependent code, 7

(b) Code generation, 6

(c) Register allocation and assignment. 7

Roll No. .....

2416

B.E. (7th Semester) (CSE)

Examination– December, 2013

COMPILER DESIGN

'E' Scheme

Paper : CSE-405-E

Time : Three hours] *[Maximum Marks : 100*

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Attempt any *five* questions.

1. (a) Briefly describe the following terms :

(i) Translators

(ii) Compilers

(iii) Interpreters

(iv) Assemblers

(v) Compiler Construction tools. 5 x 2 = 10

(b) Describe the different phases of compiler. 10

2. (a) What is Input Buffering ? Explain. 10

(b) Explain the role of Lexical analyzer. 10

3. (a) Devise a mechanism to convert NFA to DFA. 10

(b) Draw the NFA for regular expression

((a/b)*c)* | (ab)* | ba 10

4. (a) What do you mean by a grammar ? What are its components ? Why does one use context free grammars ? 10

(b) Define ambiguous grammar ? Identify the reasons for ambiguities. Explain with example. 10

5. What are the characteristics of operator grammar ? How does one construct the operator precedence table? Explain with an example. Also discuss the limitations of operator precedence parser. 20

6. (a) What are viable prefixes ? Describe the process of parsing the language using LR parser. 10

(b) Discuss the process of constructing LR(O) parsing table. 10

7. (a) What do you mean by term "three address code" ? Enumerate the features of three address code. 10

(b) What are the attributes associated with a symbol table ? Discuss the operations possible with a symbol table. 10

8. (a) List out the main sources of optimization. 6

(b) What do you mean by common subexpression ? What are the advantages of identifying it. 7

(c) Define dead Code. What are the causes of dead code ? 7

Roll No. .....

24488

B. Tech. 7th Sem.

(Computer Science Engineering) VIII

Examination – December, 2013

COMPILER DESIGN

'F' Scheme

Paper : CSE-405-F

Time : Three hours] *[Maximum Marks : 100*

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complain in this regard, will be entertained after examination.

Note : ***First question is compulsory.*** Attempt any one question from each of the four section. All questions carry equal marks.

1. (a) Write short notes on different forms of object codes. 5×4

(b) What do you mean by instruction variables? How they are eliminated?

(c) What do mean by DAG? What are its applications?

(d) Write short note on regular expressions.

(e) Describe the data structure for symbol table.

SECTION – A

2. (a) Explain functionality different phases of compiler with the help of example. 10

   (b) What is translator? What are the characteristics of a good translator? 10

3. (a) What are various compiler construction tools? Explain. 10

   (b) Convert the regular expression (a|b)*ab(a+b)* into corresponding minimized finite state automata. 10

SECTION – B

4. Construct the predictive parsing table for the following grammar and Test whether the grammar is LL (1) or not? 20

   $S \rightarrow 1\,AB \mid \varepsilon$

   $A \rightarrow 1AC \mid 0C$

   $B \rightarrow 0S$

   $C \rightarrow 1$

5. Create 3-address code, quadruple, triple and indirect triple for the following expression: 20

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

SECTION – C

6. Consider the following grammar: 20

$$S \rightarrow 0S0 \mid 1S1 \mid 10$$

(a) Construct the SLR parsing table for the given grammar.

(b) Construct the LALR parsing table.

7. (a) What are syntax trees? How these can be constructed? 10

(b) Explain CLR with suitable example. 10

SECTION – D

8. (a) What is meant by register allocation? Why it is considered as important? 10

(b) Write short note on code generation with suitable example. 10

9. What are different types of errors that can occur? What remedial action does a compiler can take in each case? 20

Roll No. .....

2416

B. E. 7th Semester (CSE)

Examination – December, 2012

COMPLIER DESIGN

Paper : CSE-405-E

Time : Three hours] *[Maximum Marks : 100*

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Attempt any *five* questions. All questions carry equal marks.

1. (a) What do you mean by Complier ? Why we need complier ? What are the computer construction tools ?

(b) How can a multi-pass compiler can be reduced to a single pass compiler ? Explain.

2. (a) Discuss LR and LALR method in detail with suitable example.

(b) Explain working of parser generated by YACC.

3. (a) What is lexical analyser ? Explain its role.

(b) What is context free grammar ? Give the left and right most derivation of the following grammar also draw its derivation free for it and check its ambiguity for id + id + id :

(i) $E \rightarrow E + E$

(ii) $E \rightarrow E - E$

(iii) $E \rightarrow E * E$

(iv) $E \rightarrow E/E$

(v) $E \rightarrow id$

4. (a) Explain top down and bottom up parsing with the help of diagram.

(b) Construct the parsing table for the following LL(1) grammar :

(i) $S \rightarrow aA/B$

(ii) $A \rightarrow bB/a$

(iii) $B \rightarrow c/bAc$

5. Explain and analyses the working of LL and SLR parser.

6. Explain code optimization its utility with example.

7. What do you mean by three address code quadruples and triples ? Explain with example.

8. Write the short notes on the following :

(a) Translator,

(b) Error Handling,

(c) Loop unwinding.

B.E. 7th Semester (CSE) Examination, May–2012

COMPLIER DESIGN

Paper–CSE–405-E

Time allowed : 3 hours] *[Maximum marks : 100*

Note : *Attempt any five questions.*

1. (a) What do you mean by compiler ? Explain various phases of compiler. 14

   (b) What is the use of cross compiler ? Differentiate between compiler and interpreter. 6

2. (a) Construct a minimal state DFA for the following regular expression : 14

   a . (a + b)* . b.b

   (b) Obtain regular expression equivalent to the following finite automata : 6

3. (a) Remove the unit production from the following grammar : 10

$S \dashrightarrow AB$

$A \dashrightarrow a$

$B \dashrightarrow C \mid b$

$C \dashrightarrow D$

$D \dashrightarrow E$

$E \dashrightarrow a$

(b) Consider the following grammar : 10

$S \dashrightarrow ABC$

$A \dashrightarrow Aa \mid d$

$B \dashrightarrow Bb \mid e$

$C \dashrightarrow Cc \mid f$

Eliminate left recursion from the above grammar.

4. Construct a predictive parsing table for the following grammwer where S| is a styart symbol and # is the end marker. 20

$S| \dashrightarrow S\#$

$S| \dashrightarrow qABC$

$A \dashrightarrow a|bbD$

$B \dashrightarrow a \mid \in$

$C \dashrightarrow b \mid \in$

$D \dashrightarrow c \mid \in$

5. Construct an SLR (1) parsing table for the following grammer :

$S \dashrightarrow 0S0|1S1|10$ 20

6. (a) What do you mean by intermediate code generation ? Explain various intermediate code generation schemes. 10

(b) Convert the following statement into the Quadruple, Triple and indirect triple representation :

$X = (a - b)^* c - (x + y) + a$ 10

7. (a) What is the use of symbol table ? Explain the various data structures associated with symbol table. 10

(b) Explain the various types of errors generated during the various phases of the compiler. How do we recover from these errors ? 10

8. Write short notes on the following :

(a) Cross Compiler

(b) Loop Unrolling

(c) YACC

(d) Parse Tree.

Roll No. .....

2416

B. E. (7th Semester) (CSE)

Examination – December, 2011

COMPUTER DESIGN

Paper : CSE - 405 - E

Time : Three hours] *[Maximum Marks : 100*

Before answering the question, candidates should ensure that they have been supplied the correct and complete question paper. No complain in this regard, will be entertained after examination.

Note : Attempt any *five* questions.

1. (a) What do you mean by complier ? Explain various phases of complier. 14

(b) Explain various complier construction tools. 6

2. (a) Construct a minimal state DFA for the following regular expression : 14

(a| b)* | (ab)*b | a* (bb)*

(b) Obtain regular expression equivalent to the following finite automata : 6

3. (a) Remove the useless symbol from the following grammer : 10

A --→ xyz | Xyzz

X--→ Xz | xYx

Y--→ yYy | XZ

Z--→ Zy | z

(b) Consider the following grammar : 10

S --→ ABC

A --→ Aa | d

$B \dashrightarrow Bb \mid e$

$C \dashrightarrow Cc \mid f$

Eliminate left recursion from the above grammar

4. Test whether the grammar is LL (l) or not, and construct a predictive parsing table for it. 20

$S \dashrightarrow AaAb \mid BaBa$

$A \dashrightarrow \in$

$B \dashrightarrow \in$

5. Construct an SLR(l) parsing table for the following grammer : 20

$S \dashrightarrow xAy \mid xBy \mid xAz$

$A \dashrightarrow aS$

$B \dashrightarrow q$

6. (a) What do you mean by intermediate code generation ? Explain various intermediate code generation schemes. 10

(b) Convert the following statement into the Quadruple, Triple and indirect triple representation : 10

$$X=(A+B)*(C-D)/E$$

7. (a) What is the use of symbol table ? Explain the various data structures associated with symbol table. 10

(b) Explain the various types of errors generated during the various phases of the compiler. How does we recover from these errors ? 10

8. Write short note on the following : 20

(a) Loop Optimization,

(b) Loop Jamming,

(c) LEX,

(d) Code Generation.

B.E. 7th Semester (CSE) Examination, May–2011

COMPUTER DESIGN

Paper - CSE-405-E

Time allowed : 3 hours] *[Maximum marks :100*

*Note : Attempt any **five** questions. All questions carry equal marks.*

1. (a) What is a compiler? Write short note on LEX tool. 2,4

   (b) Differentiate between compilation and interpretation. 4

   (c) Explain how different phases of compilation will operate and convert following statement 10

   interest= principal * rate / 100

   assuming data type of rate is float.

2. (a) What is the rôle of lexical analyzer in compilation process? What are patterns, lexemes and tokens? 2,6

(b) Construct the transition diagram for the following regular expressions.

(i) $ab(a^* | b^*)$

(ii) $((\varepsilon | a)b^*)^*$

(iii) $(a | b)^*ab(ab | c)$ 4,4,4

3. (a) Construct a Non-recursive predictive parsing table for the following grammar 10

$E \rightarrow TE'$
$E' \rightarrow +TE' | \varepsilon$
$T \rightarrow FT'$
$T' \rightarrow *FT' | \varepsilon$
$F \rightarrow (E) | id$

(b) Explain algorithm for the shift-reduce parser. 10

4. (a) Explain what are left recursion and left factoring and remove left recursion from following grammar. 8,2

$E \rightarrow E + T | T$
$E \rightarrow E * T | T$
$T' \rightarrow (E) | id$

(b) Explain the working and algorithm of LR parser. 10

5. Construct the canonical LR parsing table for the following grammar. 20

$S \rightarrow L=R$

$S \rightarrow R$

$L \rightarrow *R$

$L \rightarrow id$

$R \rightarrow L$

6. (a) What is syntax directed definitions (SDDs), explain how an infix expression can be converted to postfix using SDDs. 4,8

(b) Create the syntax tree and DAG for the following expression. 8

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

7. (a) What are different types of errors in compilation process? Explain a typical error detection and recovery mechanism. 10

(b) Explain how intermediate code is optimized. 10

8. (a) List the various types of intermediate code, explain 3 address code in detail. 2,8

(b) What are basic blocks and flow diagram, explain PEEPHOLE optimization technique? 2,2,6