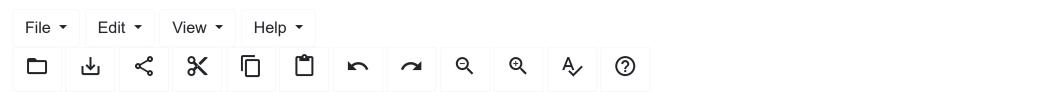
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Compiler Design and Construction (Model Question)

Course Title: Compiler Design and Construction Full Marks: 60

Course No: CSC365 Pass Marks: 24

Semester: VI Time: 3 Hrs.

Section A

Attempt any TWO questions. $(2 \times 10 = 20)$

1. Differentiate between top-down and bottom-up parsing methods. Construct SLR parse table for the following grammar.

S->aETe

E->Ebc

E->b

T->d

2. What are static and dynamic type checking? Write SDD to carry out type checking for the following expression.

E->id |E1 op E2 | E1 relop E2 | E1[E2] | E1↑

3. What is the role of intermediate code generation in the entire compilation process? Convert the following into three address code.

a+(b-c)*d

Section B

Attempt any EIGHT questions. $(8 \times 5 = 40)$

- 4. Define compiler. Explain analysis phase of compiler.
- 5. "Symbol table is a necessary component of compiler", justify this statement with examples.
- 6. Given a regular expression $(\epsilon + 0)*10$. Construct the DFA recognizing the pattern described by this regular expression using syntax tree based reduction.
- 7. Define the terms token, pattern and lexeme. How input buffer can be used for scanner. Explain.
- 8. Find first and follow of all the non terminals in the following grammar.
- $E \Box TA$; $A\Box + TA|\epsilon$; $T\Box FB$; $B\Box *FB|\epsilon$; $F\Box (E)|id$
- 9. What is Syntax Directed Definition? Define synthesized and inherited attributes with example.
- 10. What do you mean by runtime storage allocation? Differentiate static and dynamic allocation.
- 11. Why is it necessary to optimize code? Explain any two code optimization techniques with example.
- 12. Explain about the factors affecting code generation.

Tribhuvan University Institute of Science and Technology 2078

Bachelor Leve	l / sixth-semester	/ Science
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Full Marks: 60 + 20 + 20

Computer Science and Information Technology(CSC365)

Pass Marks: 24 + 8 + 8

Compiler Design and Construction

Time: 3 Hours

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks.

Section A

Attempt all questions.

What are the task performed in lexical analysis. Define DFA. Given regular expression:

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

1

Difference between LR(0) and LR(1) algorithm. Construct LR(1) parse table for s->AA ,A-

2 >aA/b

Type checking is the process of verifying that the types of expressions and variables used in a program are consistent and adhere to languages type system rules. The primary goal of type checking is to identify and prevent type-related errors before the program is executed.

Difference between compiler and interpreter.



3

_	What are th	e typical	entries	made in	symbol	table?	Explain
5	vviiat are ti	ie typicai	CHILICS	made in	Syllibol	table:	∟∧piaii i.

Define Left recursive grammar. Remove left recursion from the following grammar.

S→SB | Ca

 6 B→Bb | c

C→aB | a

What are the disadvantages of shift reduce parsin perform shift reduce parsing of string

 $_7$ w=(x-x)-(x/x) for grammar

E=E-E/E/E/(E)/x

- 8 Define attribute grammar with example of inherited and synthesized attributes
- 9 Define three address code. Write down Quadruples for a=-b*(c+d)/e
- 10 List out the different types of runtime storage management techniques.
- What are the advantages of code optimization. Define Dead-code elimination.
- 12 Factors affecting (target code generator) code generator/code generator design issues



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The figures in the margin indicate full marks.

Section A

Attempt all question.

1	Explain briefly about different phases involved in compiler, with a block diagram.
2	Given a regular expression (ϵ + 0)*10. Construct the DFA recognizing the pattern described by this regular expression using syntax tree based reduction.
3	What is shift reduce parsing techniques? Show shift reduce parsing action for the string (x+x)*a, given the grammar
4	Construct SLR parsing table for the following grammar. S -> aAa bAb ba

Define Syntax directed definition. Construct annotated parse tree for the input expression (5*3+2)*5 according to the following

syntax directed definition.



5

Production	Semantic Rule
L -> En	Print E.val
$E \rightarrow E_1$	E.val -> E ₁ .val +
+ T 1	T.val
E -> T	E.val ->T.val
$T \rightarrow T_1 *$	T.val -> T ₁ .val *
F 1	F.val
T -> F	T.val -> F.val
F -> (E)	F.val -> (E.val)
F ->	F.val -> digit.lexval
digit	9

Write Syntax Directed Definition to carry out type checking for the following expression.

- ⁶ E -> id | E1 op E2 | E1 relop E2 | E1[E2] | E1 \uparrow
- Explain with example about different methods of intermediate code representation.
- What is the purpose of code optimization? Explain different types of loop optimization techniques with example.
- Discuss about different factors affecting the process of target code generation.

Discuss the importance of error handler in compiler. How is it manipulated in the different phases of compilation?

