CHAROTAR UNIVERSITY OF SCIENCE & TECHNOLOGY

Seventh Semester of B. Tech. Examination (CE)
May 2013
CE401 Compiler Construction (CC)

Date: 07.05.2013, Tuesday Time: 10:00 a.m. To 01:00 p.m. Maximum Marks: 70

Instructions:

1. The question paper comprises of two sections.
2. Section I and II must be attempted in separate answer sheets.
3. Make suitable assumptions and draw neat figures wherever required.
4. Rough work is to be done in the last page of main supplementary, please don't write anything on the question paper.
5. Indicate clearly, the option(s) you attempt along with its respective question no.
6. Figures to the right indicate marks.

SECTION-I

Q-1 **Answer the following questions.**

1. Identify the phase(s) of a compiler detecting following types of errors/warnings. Justify your answer. **3**
   a) Unreachable code
   b) Inappropriate number of actual arguments given while calling a function
   c) Function prototype not specified
2. Which language will be generated by the following grammars? **6**
   a. S→0S1 | 01
   b. S→aSbS | bSaS | ε
   c. S→ a | s+s | ss | S* | (S)
3. Construct a DFA for given regular expression (010+00)*(10)* **2**

Q-2

[A] What are the advantages and disadvantages of reducing the number of passes in compilation? State and justify whether it is desirable to have more or few passes in compilation. **3**

[B] Differentiate the following: **6**
   a) Phase and Pass
   b) Lexeme and Token
   c) Top-Down and Bottom-Up Parsers

OR

[B] Explain non-recursive predictive parsers. Draw the block diagram of it. **6**

[C] How does RDP work? What are the properties of the grammars, which can be parsed by RDP? **3**

Q-3

[A] Explain Syntax Directed Translation Scheme. How it differs from Syntax Directed Definition. **4**

[B] What are the advantages of converting a source code into intermediate form of a program? Explain N-tuple notation. **4**

OR

[B] Consider the following augmented grammar: **4**
S'→ S
S →CC
C →cC|d
Prepare the goto graph for it.

[C] Write a note on Target Code Generation. **4**

OR

[C] Compare: Static Memory Allocation with Dynamic Memory Allocation. **4**

SECTION-II

Q-4

1. What is left recursion and left factoring? How to eliminate left recursion and left factoring? 4
2. Explain the following concept with their usefulness.
   a) Static Memory allocation 4
   b) Control Stack
   c) Peephole optimization
   d) Types of 3 address statements
3. How LR parsers are more attractive than LL parsers? 3

Q-5

[A] The concept of Handle is associated with Top Down parsing or Bottom Up parsing? Explain Handle pruning. 4

[B] How symbol table differs from other data structures? Explain: Symbol Table Management. 4

OR

[B] Explain the structure of an activation record with all its components. 4

[C] Test whether the following grammar is LL (1) or not. Construct predictive parsing table for it. 4

S→ 1AB | Є
A→ 1AC | 0C
B→ 0S
C→ 1

OR

[C] What are the goals of optimization? What is peephole optimization? What is parser optimization? 4

Q-6

[A] Show that the following grammar is LL (1) but not SLR (1). 4

S→AaBb | BbBa
A→ ε
B→ε

[B] Find out FIRST & FOLLOW set. 4

S→ AcB | cbB | Ba
A→ da | BC
B→ g | Є
C→ h | Є

OR

[B] Parse the string abbcde using S/R technique for the following Grammar: 4

S→aABe
A→Abc| B
B→d

[C] Construct a Syntax Directed Translation Scheme that verifies that the parentheses in an input string are properly balanced. 4

OR

[C] Construct canonical LR (0) parsing states for following grammar: 4

S→ L=R
S→R
L→*R
L→id
R→L