Candidate Seat no…….

CHAROTAR UNIVERSITY OF SCIENCE & TECHNOLOGY

Seventh Semester of B. Tech (IT) Examination

November-December 2014

IT404 Language Processor

Date: 05.12.2014, Friday **Time: 10.00 a.m. To 01.00 p.m.** **Maximum Marks: 70**

Instructions:

1. The question paper comprises 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. Use of scientific calculator is allowed.

SECTION – I

Q - 1 **Answer the following questions.** **[07]**

a. Define the term: lexeme.

b. List out the criteria for any grammar to be operator grammar.

c. List out the fields of activation record.

d. Which phase of compiler set the attributes of token in a symbol table?

e. What is the significance of look-ahead symbol in parsing?

f. Define: Ambiguous Grammar.

g. Write an example for constant propagation technique in code optimization.

Q – 2.a Define macro. Write a nested macro for calculating average of three integer numbers. **[04]**

Q – 2.b **Answer any TWO questions.** **[10]**

(i) What is language processor? Why do we need language processor? List out the different types of language processor.

(ii) Define DFA. Draw DFA for (0 + 1)* (00 + 11) regular expression.

(iii) Explain two phases of an assembler in detail.

Q - 3 **Answer any TWO questions.** **[14]**

a. What is a function of compiler? Discuss the action taken by every phase of the compiler on the following string. Assume A, B, C and D are of float type variable.

$$A = B * C + D$$

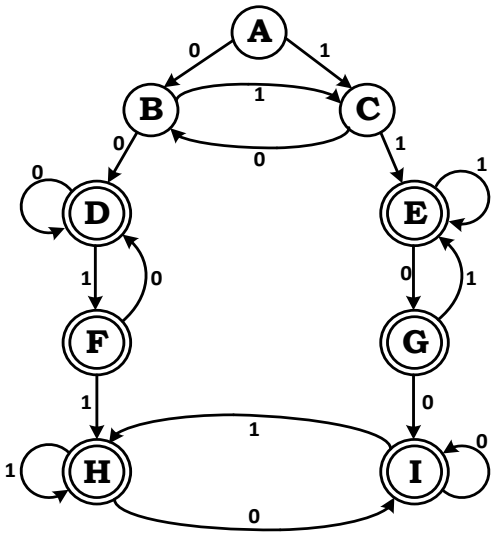
b. What is the significance of Code Optimization phase in compiler? Explain peephole optimization techniques with suitable examples.

c. Attempt following.

(i) Construct NFA-^ for following regular expression using Thompson's Construction.

(0+1)(01)*(011)*

(ii) Minimize the following DFA. Each Node indicates state of the DFA.



SECTION – II

Q - 4 Answer the following questions. **[07]**

a. Parsing is also known as _____.

(a) Lexical Analysis (b) Syntax Analysis

(c) Semantic Analysis (d) Code generation

b. TII stands for _____.

(a) Table of Information Instructions (b) Translations of Instructions Information

(c) Translation of Information Instructions (d) Table of Incomplete Instructions

c. Bottom up Parsing involves _____.

(a) Shift reduce (b) Handle Pruning

(c) Operator check (d) Both (a) and (b)

d. In a two pass assembler the object code generation is done during the _____.

(a) Second pass (b) First pass

(c) Zeroth pass (d) Not done by assembler

e. A system program that sets up an executable program in main memory ready for execution is _____.

(a) Assembler (b) Linker

(c) Loader (d) All of the above

f. The regular expression (0 / 1) * denotes the set of all strings _____.

(a) with zero or more occurrences of 0 or 1 (b) with one or more occurrences of 0 or 1

(c) equal to regular expression (0* 1*) (d) None of the above

g. A top-down parser generates _____.

(a) left most derivation (b) right most derivation

(c) right most derivation in reverse (d) left most derivation in reverse

Q – 5.a **Answer the following questions.** **[05]**

(i) Eliminate the left recursion from the following grammar: [03]

$S \rightarrow Aa \mid b$

$A \rightarrow Ac \mid Sd \mid \epsilon$

(ii) Perform the Left factoring on following Grammar: [02]

$A \rightarrow ad \mid a \mid ab \mid abc \mid b$

OR

Q – 5.a Consider the following operator grammar. **[05]**

$E \rightarrow E + E \mid E * E \mid id$

Check the following string is valid or not using operator precedence parsing technique:

id + id * id

Q – 5.b List the different types of error generated during each phase of compiler. Explain the different error recovery strategies used in the compiler. **[05]**

OR

Q – 5.b List the different types of actions performed during shift-reduce parsing technique. Explain "shift-reduce" and "reduce-reduce" conflicts with suitable example. **[05]**

Q – 5.c Which phase of compiler is responsible for memory allocation? Discuss memory allocation techniques in detail. **[04]**

Q – 6.a Generate the canonical LR(0) item set for following grammar: **[05]**

$E \rightarrow E + T \mid T$

$T \rightarrow T * F \mid F$

$F \rightarrow (E) \mid id$

Q – 6.b Construct the LL(1) parsing table for the following grammar: **[05]**

$E \rightarrow T\ E'$

$E' \rightarrow + T\ E' \mid \epsilon$

$T \rightarrow F\ T'$

$T' \rightarrow * F\ T' \mid \epsilon$

$F \rightarrow (E)$

$F \rightarrow id$

Q – 6.c Generate Quadruple and Triple for following statement. **[04]**

a = (b + c) / d + -e

OR

Q – 6.a Generate the canonical LR(1) item set for following grammar: **[05]**

$S \rightarrow C\ C$

$C \rightarrow c\ C \mid d$

Q – 6.b Which layer is responsible for generating three address code? Why the name is given Three Address code? Generate three address code for following statement. **[05]**

x = (3 + a * (b – c / d)) / e

Q – 6.c Write down basic functionalities of Loader and Linker. **[04]**

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