

(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 1074

Roll No.

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B.Tech.

(SEM. V) ODD SEMESTER THEORY
EXAMINATION 2010-11

COMPILER DESIGN

Time : 3 Hours

Total Marks : 100

Note : (1) Attempt all questions.

(2) All questions carry equal marks.

- Attempt any two parts of the following :— (10×2=20)
 - Explain the basic structure of compiler.
 - Explain the function of Bootstrapping a compiler to second machine.
 - Discuss the aspects of high level languages which make them preferable to machine or assembly language for problem solving.
- Attempt any two parts of the following :— (10×2=20)
 - Differentiate between :
 - Compiler and Interpreter.
 - Macroprocessor and Preprocessor.
 - Design a NFA for the language $L =$ all string over $\{0, 1\}$ that have at least two consecutive 0's and 1's.
 - Write context free grammar for the language $L = \{a^{2p} b^q \mid p > 0, q \geq 0\}$.

3. Attempt any **two** parts of the following :— (10×2=20)

(a) Consider the following grammar

$$V_N = \{\text{expr, term, rest}\}$$

$$V_T = \{+, -, 0, 1, 2, 3, 4, 5, 6, 7, 8, 9\}$$

$$\text{expr} \rightarrow \text{term rest}$$

$$\text{rest} \rightarrow + \text{term rest} \mid - \text{term rest} \mid \epsilon$$

$$\text{term} \rightarrow 0 \mid 1 \mid 2 \mid 3 \mid 4 \mid 5 \mid 6 \mid 7 \mid 8 \mid 9$$

show the construction of the parse tree for the input string $9 - 4 + 1$.

(b) What do you understand by an ambiguous grammar? How an ambiguous grammar can be made unambiguous grammar?

(c) Explain left factoring. Consider the following grammar. Check for left factoring.

$$s \rightarrow i C t s \mid i C t s e s \mid a$$

$$c \rightarrow b$$

Do left factoring if required.

4. Attempt any **two** parts of the following :— (10×2=20)

(a) Consider the grammar :

$$A \rightarrow BC \ x \mid y$$

$$B \rightarrow y A \mid \epsilon$$

$$C \rightarrow A y \mid x$$

where $\{A, B, C\}$ is the set of non terminal symbols, A is the start symbol $\{x, y\}$ is the set of terminal symbols and ϵ denotes the empty string. The grammar is not LL(1). Why?

(b) Give one advantage of SLR (1) grammars over LR (1) grammars; give one advantage of LR (1) grammars over SLR (1) grammars.

(c) Construct three address code for the following :
while : $a > 5$ do $a := b + 2$.

5. Write short notes on any **four** of the following :— (5×4=20)

(a) Induction variable elimination.

(b) Popular data structures used for designing symbol table.

(c) Loop unrolling and Loop jamming.

(d) Code optimization.

(e) Data flow analysis.

(f) Problem in code generation.