

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

PAPER ID : 110603 Roll No.

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B.Tech.

(SEM. VI) THEORY EXAMINATION 2013-14

COMPILER DESIGN

Time : 3 Hours

Total Marks : 100

Note :- (1) Attempt **all** questions. Each question carries equal marks.

(2) Be precise and to the point while answering.

1. Attempt any **four** parts : (5×4=20)

- (a) Describe the synthesis-analysis model of compiler.
- (b) What are different compiler tools ? Discuss any two.
- (c) Remove left recursion from the grammar

$E \rightarrow E(T) | T$

$T \rightarrow T(F) | F$

$F \rightarrow id$

- (d) What do you mean by ambiguous grammar ? Show that the following grammar is ambiguous.

$S \rightarrow a S b S | b S a S | \epsilon$

- (e) Define boot-strapping with the help of an example.
- (f) Explain the term token, lexeme and Pattern.

2. Attempt any **two** parts : (10×2=20)

- (a) What do you mean by operator precedence grammar ?

Compute the operator precedence table for the given grammar.

$E \rightarrow E + T \mid T$

$T \rightarrow T * F \mid F$

$F \rightarrow (E) \mid id$

- (b) Differentiate between Recursive Decent Parsing and Predictive Parsing. Derive the LL (1) parsing table for the following grammar

$bexpr \rightarrow bexpr \text{ or } bterm \mid bterm$

$bterm \rightarrow bterm \text{ and } bfactor \mid bfactor$

$bfactor \rightarrow \text{not } bfactor \mid (bexpr) \mid \text{true} \mid \text{false}$

- (c) Show that the following grammar

$S \rightarrow Aa \mid bAc \mid Bc \mid bBa$

$A \rightarrow d$

$B \rightarrow d$

is LR (1) but not LALR (1).

3. Attempt any two parts : (10×2=20)

- (a) Define Syntax Directed Translation. Construct an annotated parse tree for the expression $(4 * 7 + 1) * 2$, using the simple desk calculator grammar.

- (b) What are different ways to write three address code ? Write the three address code for the following code segment :

While $A < C$ and $B < D$ do

if $A = 1$ then $C = C + 1$

else while $A \leq D$ do $A = A + 2$.

- (c) Define backpatching and semantic rules for boolean expression. Derive the three address code for the following expression

$P < Q$ and $R < S$ and $T < U$

4. Attempt any two parts : (10×2=20)

- (a) What is the role of symbol table ? Discuss different data structures used for symbol table.

- (b) What are lexical phase errors, syntactic phase errors and semantic phase errors ? Explain with suitable example.

- (c) Why run-time storage management is required ? How simple stack implementation is implemented ?

5. Attempt any two parts : (10×2=20)

- (a) What is DAG ? How DAG is created from three address code ? Write algorithm for it and explain it with a relevant example.

- (b) What are different issues in code optimization ? Explain it with proper example.

- (c) Write short notes (any two) :

(i) Global Data Flow Analysis

(ii) Loop unrolling

(iii) Loop Jamming.