

M-190146**B.Tech. EXAMINATION, 2019**

Semester VI (CBS)

COMPILER DESIGN

CS-603

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Time : 3 Hours

Maximum Marks : 60

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/continuation sheet will be issued.

Note : Attempt *Five* questions in all, selecting at least *one* question from each Section A, B, C and D, while Section E is compulsory.

Section A

1. (a) Explain the concept of bootstrapping with an illustrative example. 5
- (b) Construct a DFA accepting the language $(a|b)^*abb$. 5

2. (a) Explain in detail the role of lexical analyzer during compilation. 5
- (b) What are the different types of compilers ? Explain them in detail. 5

Section B

3. (a) Consider the following grammar :
- $$E \rightarrow E + E \mid E * E \mid (E) \mid -E \mid id$$
- Construct leftmost and rightmost derivations (if exist) for the sentence $id + id * id$. Further construct the corresponding parse trees for the sentence. 5
- (b) Explain operator precedence parsing algorithm in detail. 5
4. (a) Explain recursive descent parsing in detail with an illustrative example. 5
- (b) Consider the following grammar :
- $$E \rightarrow E + T \mid T$$
- $$T \rightarrow T * F \mid F$$
- $$F \rightarrow (E) \mid id$$
- Construct predictive parsing table for the above grammar. 5

Section C

5. (a) Explain the dead code elimination technique with an illustrative example. 5
- (b) Discuss in detail various principle source of optimizations with illustrative examples. 5
6. Explain global data flow analysis with necessary equations. 10

Section D

7. Write a short note on code generation from DAG. 10
8. (a) Discuss about register allocation and assignment. 5
- (b) In the context of peephole optimization, explain the elimination of redundant code optimization technique. 5

Section E

(Compulsory Question)

9. (a) Give the format of a symbol table.
- (b) Write a regular expression over alphabet $\{a, b\}$ consisting of a least one a and at least one b . Explain your answer.
- (c) Discuss the properties of LR parser.

- (d) What are the benefits of intermediate code generation ?
- (e) Evaluate the following postfix expression using a stack :
- 1 3 2 * + 4 -
- Show all the steps.
- (f) Differentiate between LR and LALR parser.
- (g) What are the applications of DAGs ?
- (h) Discuss the limitations of recursive descent parser.
- (i) Differentiate between shift-reduce and operator precedence parser.
- (j) What is a machine independent code optimization ?

2×10=20