INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)
(Dundigal-500043, Hyderabad)

B.Tech V SEMESTER END EXAMINATIONS (REGULAR) - DECEMBER 2022
Regulation:UG20
COMPILER DESIGN

Time: 3 Hours   (Common to CSE | AIML | CSIT | IT)   Max Marks: 70

Answer ALL questions in Module I and II
Answer ONE out of two questions in Modules III, IV and V
All Questions Carry Equal Marks
All parts of the question must be answered in one place only

MODULE – I

1. (a) What is meant by input buffering? Write an algorithm for look ahead code with sentinels.
   [BL: Understand| CO: 1|Marks: 7]

   (b) Consider the following fragment of C code: float i, j; i = i*70+j+2; and construct the output at all phases of the compiler. [BL: Apply| CO: 1|Marks: 7]

MODULE – II

2. (a) Write about handle pruning. Explain the common conflicts that can be encountered in a shift-reduce parser. [BL: Understand| CO: 2|Marks: 7]

   (b) Develop an algorithm to construct a predictive parsing table. Construct the predictive parsing table, considering the grammar:
   E→E+T|T
   T→T*F|F
   F→(E)|id [BL: Apply| CO: 2|Marks: 7]

MODULE – III

3. (a) Compare synthesized and inherited attributes. Explain S-attributed and L-attributed definitions in detail with suitable example. [BL: Understand| CO: 3|Marks: 7]

   (b) Write quadruple, triples, and indirect triples for the expression: (x + y) * (y + z) + (x + y + z).
   [BL: Apply| CO: 3|Marks: 7]

4. (a) Summarize the three address code and draw the abstract syntax tree for the following expressions.
   (a-b)*c+m-n [BL: Understand| CO: 4|Marks: 7]

   (b) Construct production rules and semantic actions for the following grammar along with annotated parse tree for the string (3+4)*(5+6)?
   L→E
   E→ T   E→ E+T   F→ (E)
   T→ F   T→ T*F   F→ digit [BL: Apply| CO: 4|Marks: 7]

MODULE – IV

5. (a) List different data structures used for symbol table. Explain the activation record along with all its elements. [BL: Understand| CO: 5|Marks: 7]

   (b) Describe about reusing the storage space for names. Distinguish between static and dynamic storage allocation. [BL: Apply| CO: 5|Marks: 7]

6. (a) Illustrate how hash table is used in implementation of symbol table using suitable example.
   [BL: Understand| CO: 5|Marks: 7]

   (b) Suppose that the type of each identifier is a sub range of integers, for expressions with operators +, -, *, div and mod, as in Pascal. Explain type checking rules that assign to each sub expression.
   [BL: Apply| CO: 5|Marks: 7]

MODULE – V

7. (a) Summarize the following terms
   i) The principle sources of optimization
   ii) Issues in the design of a code generator, [BL: Understand| CO: 6|Marks: 7]

   (b) Construct the DAG for the following basic block.
   E:=A+B
   D:=B*C
   B:=B+C
   A:=E-D [BL: Apply| CO: 6|Marks: 7]

8. (a) With an example, explain common sub expressions and dead code elimination.
   [BL: Understand| CO: 6|Marks: 7]

   (b) Build the intermediate code for the following source code:
   for i from 1 to 10 do
   for j from 1 to 10 do
   a[I,j]=0.0;
   for I from 1 to 10 do
   a[I,j]=1.0;
   and identify basic blocks [BL: Apply| CO: 6|Marks: 7]

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