

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BSc DEGREE EXAMINATION MAY 2024
(Fifth Semester)

Branch – COMPUTER SCIENCE

PRINCIPLES OF COMPILER DESIGN

Time: Three Hours

Maximum: 50 Marks

SECTION-A (5 Marks)

Answer ALL questions

ALL questions carry EQUAL marks (5 x 1 = 5)

- 1 Which one generates the target program from the intermediate representation?
a) Analysis b) Scanning c) Synthesis d) Parsing
- 2 Name the one have, for each state and for each symbol of its input alphabet exactly one edge with that symbol leaving that state.
a) DFA b) NFA c) SLR d) LALR
- 3 Shift reduce parsers are _____.
a) Top down Parser b) Bottom Up parser
c) May be top down or bottom up d) None of the mentioned
- 4 The _____ produces the target program from the transformed intermediate code.
a) loop optimization b) dead-code
c) code motion d) copy propagation
- 5 A _____ is a graphical representation of three address statements.
a) Basic Block b) Flow Graph
c) Dependency Graph d) Directed Acyclic Graph

SECTION - B (15 Marks)

Answer ALL Questions

ALL Questions Carry EQUAL Marks (5 x 3 = 15)

6. a) Write short notes on preprocessor.
(OR)
b) State any three differences between interpreter versus compiler.
7. a) Describe the symbol table and its uses with an example.
(OR)
b) Construct NFA for the regular expression $(0|1)(1|0)$.
8. a) Find whether the following grammar is LL(1) or not.
 $S \rightarrow abSa / aaAb$
 $A \rightarrow baAb / b$
(OR)
b) Narrate the uses of type checking.
9. a) Explain the role of intermediate code generator in compilation process.
(OR)
b) Bring out the common sub-expression elimination for the following three-address code.
 $a := b + c$
 $b := a - d$
 $c := b + c$
 $d := a - d$

Cont...

10. a) Show the three primary tasks of a code generator.
(OR)
b) Discuss about the global register allocation scheme.

SECTION -C (30 Marks)

Answer ALL questions

ALL questions carry EQUAL Marks

(5 x 6 = 30)

11. a) With neat diagram, express the different phases of compiler in detail.
(OR)
b) Discuss about the various compiler construction tools.
12. a) Illustrate the different implementations of input buffering technique.
(OR)
b) Construct optimized DFA for the regular expression $(a|b)^*a(a|b)$.
13. a) Construct operator precedence parsing for the following grammar.
 $E \rightarrow E + T$
 $E \rightarrow T$
 $T \rightarrow T * F$
 $T \rightarrow F$
 $F \rightarrow (E)$
 $F \rightarrow id$
 (OR)
 b) Explain in detail the various styles of syntax-directed translation scheme.
14. a) Generate the three address code and syntax directed definition for the given assignment statement. $w := (x + y) * (-z + v)$
(OR)
b) Elucidate the Peephole optimization technique with an example.
15. a) For the flow graph shown below, write the three-address statements and construct the DAG.
1. $t_1 = 4 * i;$
 2. $t_2 = a[t_1];$
 3. $t_3 = 4 * i;$
 4. $t_4 = a[t_3];$
 5. $t_5 = t_2 * t_4;$
 6. $t_6 = prod + t_5;$
 7. $prod = t_6;$
 8. $t_7 = i + 1;$
 9. $i = t_7;$
 10. $if\ i \leq 20\ goto(1)$

(OR)

- b) Elucidate in detail the global register allocation technique.

Z-Z-Z

END