Printed Page:- 04 Subject Code:- ACSE0504

Roll. No:

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA

(An Autonomous Institute Affiliated to AKTU, Lucknow)

B.Tech.

SEM: V - THEORY EXAMINATION (2023 - 2024)

Subject: Compiler Design

Time: 3 Hours Max. Marks: 100

General Instructions:

IMP: Verify that you have received the question paper with the correct course, code, branch etc.

1. This Question paper comprises of three Sections -A, B, & C. It consists of Multiple Choice Questions (MCQ's) & Subjective type questions.
2. Maximum marks for each question are indicated on right -hand side of each question.
3. Illustrate your answers with neat sketches wherever necessary.
4. Assume suitable data if necessary.
5. Preferably, write the answers in sequential order.
6. No sheet should be left blank. Any written material after a blank sheet will not be evaluated/checked.

SECTION-A 20

1. Attempt all parts:-

1-a. Grammar of the programming is checked at _____ phase of compiler. (CO1) 1

(a) Syntax analysis

(b) Semantic analysis

(c) Code generation

(d) Code optimization

1-b. What is compiler? (CO1) 1

(a) A compiler is calculating device which is providing very efficient execution

(b) A compiler is a general purpose language providing very efficient execution

(c) A compiler converts the whole of a higher level program code into machine code in one step

(d) A compiler does a conversion line by line as the program is run

1-c. Parsing is categorized into how many types?(CO2) 1

(a) 2

(b) 3

(c) 1

(d) 4

1-d. CLR parsing is a type of _____ . (CO2) 1

(a) Bottom-Up

(b) Top-Down

(c) Both Bottom-Up and Top-Down

(d) None of above

1-e. In the compiler, the function of using intermediate code is (CO3) 1

(a) to increase the chances of re-using the machine-independent code optimizer in other compilers

(b) to improve the register allocation

(c) to increase the error reporting & recovery

(d) to make semantic analysis easier

1-f. The minimum number of variable required in the Three Address code (CO3) 1

(a) 3

(b) 4

(c) 2

(d) 5

1-g. Activation Record is a _____ (CO4) 1

(a) Attibute

(b) Non-Contiguous block of memory

(c) Contiguous block of memory

(d) None of above

1-h. Compiler makes use of (CO4) 1

(a) Symbol tree

(b) Symbol Table

(c) Symbol list

(d) None of the above

1-i. Optimization can be categorized broadly into ____ types (CO5) 1

(a) 2

(b) 3

(c) 4

(d) 5

1-j. A fragment of code that resides in the loop and computes the same value at each iteration is called a (CO5) 1

(a) Induction analysis

(b) Strength reduction

(c) loop-invariant code

(d) None of the above

2. Attempt all parts:-

2.a. Define Finite State automata as 5-Tuple. (CO1) 2

2.b. What is the difference between LR(0) and SLR(1) parsing? (CO2) 2

2.c. Define the term Annotating in terms of annotated parse tree. (CO3) 2

2.d.	Explain the main purpose of using symbol table. (CO4)	2
2.e.	What are the rules to determine the leaders of basic blocks? (CO5)	2

SECTION-B 30

3. Answer any five of the following:-

3-a.	Classify the concepts of compiler and Interpreter. (CO1)	6
3-b.	Explain language processing system with neat diagram (CO1)	6
3-c.	. Describe recursive descent parser with example.(CO2)	6
3-d.	Differentiate between CLR and LALR parsing, Explain with an example.(CO2)	6
3.e.	Define term array also write difference between one dimension and two dimension array with example.(CO3)	6
3.f.	Draw and explain a diagram to show the contents of activation records (CO4)	6
3.g.	Explain briefly about constant folding with suitable example. (CO5)	6

SECTION-C 50

4. Answer any one of the following:-

4-a.	Describe the Cross Compiler with example ? Explain the analysis-synthesis model of compilation. (CO1)	10
4-b.	Define term Lexeme ,Token and Pattern. also Explain the role of lexical analyzer in details.(CO1)	10

5. Answer any one of the following:-

5-a.	Write operator precedence parsing algorithm. Consider the following grammar : (CO2) E->E+T E->T T->T*F T->F F->(E) F->id Construct the operator precedence table to parse string id+(id*id) .	10
5-b.	Define parser and Explain the Top down and Bottom Up parser In details. (CO2)	10

6. Answer any one of the following:-

6-a.	How is the switch case statement translated into three address code? Illustrate with example. (CO3)	10
6-b.	Define Three Address Code. also Discuss the representations of three address code. (CO3) Write the quadruples, triples, Indirect Triples for the following expression (x + y)*(y + z) + (x + y + z)	10

7. Answer any one of the following:-

7-a.	Define lexical and semantic errors? How lexical errors are different from semantic errors? Explain with example.(CO4)	10

7-b. Explain the different Data Structures that can be used to implement Symbol tables.(CO4) 10

8. Answer any <u>one</u> of the following:-

8-a. Define the terms basic blocks, flow graphs and loop in flow graph. Generate the basic block and flow-graphs for the following expressions - (CO5) 10

1) r = 1
2) c = 1
3) t1 = 10 * r
4) t2 = t1 + c
5) t3 = 8 * t2
6) t4 = t3 - 88
7) a[t4] = 0.0
8) c = c + 1
9) if c <= 10 goto (3)
10) r = r + 1
11) if r <= 10 goto (2)
12) r = 1
13) t5 = c - 1
14) t6 = 88 * t5
15) a[t6] = 1.0
16) r = r + 1
17) if r <= 10 goto (13)

8-b. Explain Global data flow analysis with example.(CO5) 10