UL(5)- Compiler Design

2021(A) New

Time Allowed : 3 Hours

Full Marks:70

Candidates are required to give their answer in their own words as far as practicable.
The figures in the margin indicate full marks.
Answer **any five** questions.

Q.1. Show the output of different phases of a compiler during the translation of a high level language assignment statement " a = b + c * 16". (14)

Q.2.(a) Why we need to do left factoring a grammar for top-down parser. Remove left recursion from the grammar- " A→Ac | Aad | bd" (7)

(b) Write Three-address code sequence for the following assignment statement. (7)

d := (a-b) + (a-c) + (a-c)

Q.3. Construct SLR parsing table for following grammar. (14)

$E \rightarrow E+T \mid T$
$T \rightarrow TF \mid F$
$F \rightarrow F* \mid a \mid b$

Q.4. What are the different storage allocation strategies? Explain. (14)

Q.5 Construct a predictive parsing table for the grammar

$S \rightarrow a \mid (L)$
$L \rightarrow L, S \mid S$

and show whether the string (a,(a,a)) will be accepted or not. (14)

Q.6. (a) Explain various errors encountered in different phases of a compiler. (7)

(b) Discuss the issues involved in designing Lexical Analyzer. (7)

Q.7. (a) Construct the DAG for the following Basic Block. (7)

1. $T_1 := 4*I_0$
2. $T_2 := a[T_1]$
3. $T_3 := 4*I_0$
4. $T_4 := b[T_3]$
5. $T_5 := T_2 * T_4$
6. $T_6 := prod + T_5$
7. $prod := T_6$
8. $T_7 := I_0 + 1$
9. $I_0 := T_7$
10. If I_0 <=20 goto (1)

(b) Explain in detail about optimization of basic Blocks. (7)

Q.8. Write short notes on any **two.** (2 x 7)

(a) Activation record (b) Simple Code Generator (c) Handle pruning (d) Copy Propagation

 UL(5)- PPL

2021(A) New

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1. (a) List the characteristics of a constructor. Write a C++ program to define a suitable parameterized constructor with default values for the class Distance with data members feet and inches. [7]

   (b) Write a C++ program to illustrate multiple inheritance. [7]

2. (a) Explain the different types of loops in C with syntax. [7]

   (b) Write a C program that reads N integer numbers and arrange them in ascending order. [7]

3. (a) What is function? Explain different classification of user defined functions based on parameter passing and return type with examples. [7]

   (b) What is recursion? Explain. Write a c-program using recursive function for finding factorial of a number. [7]

4. (a) What is structure? Explain C syntax of structure declaration with example. [6]

   (b) Write a c-program using structures to read, write, compute average - marks and display the students scoring above and below the average marks for a class of N students. [8]

5. (a) What is call-by-value and call-by-reference? Differentiate these two by taking the example of swapping of two numbers? [7]

   (b) What is dynamic memory allocation? Explain malloc(), calloc(), realloc() and free() function with a suitable example? [7]

6. (a) Write a C program to enter N no. of integers, then display how many +ve numbers, -ve numbers and zeros. Also display their percentage from the total numbers. [7]

   (b) Write a C program to find the root of a quadratic equation? [7]

7. (a) Compare C++ over ADA and LISP ? [7]
   (b) Differentiate between Structure and Union? [7]

8. Write short notes on: [3+3+4+4]
   (i) Object
   (ii) Inheritance
   (iii) Data Type

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2021 (A) -NEW

Time: 3 hours

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Answer any **Five** questions.

1. (a) Explain the following terms related to Document Type Definition: **[2×3 = 6]**
   i. elements
   ii. attributes & entities
   iii. internal & external entities.
   (b) How to link an external style sheet to an HTML document? Describe the various attributes used? **[4]**
   (c) Why the POST method more secure as compared to the GET method? Justify. **[4]**

2. (a)State the properties and methods of window object and array object with suitable example. **[7]**
   (b) Write the registration form for the creation of email account with all possible validations using JavaScript. **[7]**

3. (a) Draw and explain scenario of client accessing remote EJB. List some of the EJB clients. **[5]**
   (b) Differentiate the following: **[3×3 = 9]**
   i. Block Tags and Inline Tags
   ii. Applets and Applications
   iii. XML DTD and XML XSD

4. (a) Explain the following term with respect to JDBC API components: **[2×5 = 10]**
   i. DriverManager
   ii. SQLException
   iii. Connection
   iv. Statement
   v. ResultSet
   (b) Explain how to organize text using DIV and SPAN elements with relevant examples. **[4]**

5. (a) Explain how will you use animation and graphics while development of a web site? **[5]**
   (b) What is a session? Explain how client state is maintained using session and also explain about session tracking and session management using an example. **[9]**

6. (a) How a table is defined in HTML? Write HTML code for to defining a simple table of three rows and three columns from top bottom? **[7]**
   (b) Write a JavaScript program to read an integer value using prompt and display its square? **[7]**

7. (a) How does the use of cookies help in server-side scripting? Give examples for data stored using cookies. **[6]**
   (b) Explain the capabilities of web client and web server. **[4]**
   (c) 'JavaScript is referred to as Object based programming language'. Justify with an example. **[4]**

8. Write short notes on any **two** of the following: **[7×2 = 14]**
   (a) Java Applet Life Cycle
   (b) JSP Implicit Objects
   (c) JavaBeans component
   (d) RMI

 UL(5)- DBMS

2021(A) New

Time Allowed : 3 Hours **Full Marks:**70

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Answer **any five** questions.

Q.1. Draw an ER schema for **The BOOK Club.** It has members to whom the books are sold. The books are made available at different places in the city- called Book Club Chapter- to make it easy for the members. The books are identified by a book_id, the author and the publisher. An author can write more than one book and a book can have more than one author, Members have information such as Membership_id, Name, Phone# and Status. A member can place more than one order. Additional attributes can be taken to make the schema appropriate. Mention all the assumptions. Show minimum and maximum cardinality ratios based on the assumptions. (14)

Q.2.(a) What is the difference between logical data independence and physical data independence ? Which one is harder to achieve ? Why ? (7)

(b) Explain how the GROUP BY clause works. What is the difference between the WHERE and HAVING clause? (7)

Q.3.What is lossless decomposition? Consider the following relation R (A,B,C,D,E,F) and FD_s A → BC, C → A, D → E, F → A, E → D. Is the decomposition of R into R1(A,C,D) and R2(B,C,D) and R3(E,F,D) lossless? Explain the requirements of lossless decomposition. (14)

Q.4. For the following relations for a book club:

Members (Member_id, Name, Designation, Age)

Books (B_id, Btitle, BAuthor, Bpublisher, Bprice)

Reserves (Member_id, B_id,Date)

The attribute names are self –explanatory, like B_id is book identification and so on. Describe the following queries in SQL and Relational algebra. (14)

(a) Find the names of members who are professors older than 45 years.
(b) Find the authors and titles of books reserved on 22-April-2022.
(c) Find the name of members who have reserved all books.
(d) Find ID_s of members who have not reserved books that cost more than Rs. 500.

Q.5 (a). What is cascading rollback, and why is it avoided? Give an example where cascading rollback is required ? (7)

(b) Let R (A,B,C,D,E,P,G) be a relational schema in which the following functional dependencies hold:- AB → CD, DE → P, C → E, P → C and B → G. The relational schema R is in which Normal Form ? Explain answer. (7)