SASTRA DEEMED UNIVERSITY

(A University under section 3 of the UGC Act, 1956)

End Semester Examinations

Nov 2024

Course Code: **CSE320**

Course: **COMPILER DESIGN**

QP No. **:U127-5**

Duration: **3** hours

Max. Marks**:100**

PART - A

Answer all the question **10 x 2 = 20 Marks**

1. Define Cross compiler.
2. Write a regular expression to represent all possible numbers (integer, float, exponential).
3. How and why input buffering is occurring?
4. Prove that the given grammar S → aSbS | bSaS |ε is ambiguous.
5. Write the Context free grammar for conditional statements in C++.
6. Give the structure of an activation record.
7. Write down the SDD for the design of simple desk calculator.
8. How is the liveliness of the variable is calculated by the compiler?
9. Draw the Syntax tree and DAG for the expression a=b* -c + b * -c.
10. Can DAG be used for Optimization? Give Example.

PART – B

Answer all the question **4 x 15 = 60 Marks**

11. Elaborate on the different phases of compiler with a neat sketch. Show the output of each phase of the compiler when the following statement is passed as an input:
SI = (p*n*r)/100; where n should be an integer, p and r could be floating point numbers.

(OR)

12. Explain step by step procedure of constructing a minimized DFA directly from the given regular expression. Illustrate your procedure with the following regular expression (a|b) *a(a|b).

13. Check whether the following grammar can be implemented using a LL (1) parser. Also show the validation of the input string "ia<btd" by using the predictive parser.
S → iEtS | iEtSeS |d
E → id R id
R → < | >

(OR)

14. Construct LALR Parsing table for the following context free grammar. Parse the input string (id+id)*id is accepted by the LALR parser or not.
S → S + R | R
R → R * T | T
T → (S) | id

15. a) Write short notes on the various storage allocation strategies used by Run-Time memory management system during the translation and execution process. (9)

b) Discuss about the Error Recovery strategies adopted by the Parser and Error handler when transforming a code from the token stream to parse tree. (6)

(OR)

16. Define TAC Statement. Specify the different type of TAC Statements. Transform the following Boolean expression ((–(a+b)*(a+b)-(a+b)*d)>MAX) into the sequence of Three Address Code Statements and also represent the sequence with Quadruples, Triples and Indirect Triples structure.

17. a) Write notes on the various issues in the design of Code Generation phase during Compilation process. (8)

b) What are the characteristics of Peephole? Explain the transformations that can be performed on a Peephole window. (7)

(OR)

18. Translate the following snippet of PYTHON code into a sequence of Three Address Code Statements based on the Syntax Directed Translation schemes. Convert the sequence into a flow graph representing the flow of control between different basic blocks.

```
c=0
while((x+y)<=MAX-1):
    sum = sum + c
    if (x>0 && x<10):
            c=c+sum
            display(c)
    c=c+10
display(sum)
```

PART – C

Answer the following **1 x 20 = 20 Marks**

19. a) An online shopping site has set up the following criteria for setting the password for viewing their products and its features:
   i) Password should be 5 to 8 characters long using alphabets and numerals.
   ii) It should start with an alphabet.
   iii) Two special symbols (% and #) are permitted.
   iv) The last character should be a capital letter.

   Write the LEX specification to validate the password given by the user of the site. (5)

   b) Consider the following sequence of TAC statements in a Basic Block, in which all variables are integers and ** denotes exponentiation operation.

```
a=x**2
b=3
c=x
d=c*c
e=b*2
f=a+d
g=e*f
```

   Apply the following optimization techniques to the above basic block in order to compute the result of each transformation. (10)
   i) Algebraic simplification
   ii) Copy propagation
   iii) Common Sub expression elimination
   iv) Constant folding
   v) Specify the Nextuse information for every statement.

   c) Generate the target assembly code for the optimized code. (5)

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End Semester Examinations

Nov 2024

Course Code: **MGT133**

Course: **BUSINESS STRATEGY**

QP No. **:U317-5**

Duration: **3** hours

Max. Marks:**100**

PART – A

Answer all the questions **10 x 2 = 20 Marks**

1. What is the concept of strategy?
2. Define the term "strategic intent".
3. Outline the role of objectives in strategic management.
4. Compare and contrast general and relevant environment.
5. What are the pitfalls in using environmental scanning?
6. Infer low-cost focus strategy with example.
7. Summarize the barriers to entry in Porter's five force model.
8. List the advantages of cost-leadership strategy.
9. Compare the backward and forward integration.
10. Relate the reasons for using "Strategic alliance".

PART – B

Answer any Four questions **4 x 15 = 60 Marks**

11. Explain the process of strategic management. Draw a neat chart showing comprehensively the different elements in the strategic management process.

12. Appraise the different aspects of environmental scanning necessary for identifying opportunities and threats in a company's environment.

13. Discuss Michael Porter's five force model and his approach to defining generic competitive strategies.

14. Determine the major concerns of functional level strategy. Show the significance of each functional area's plans and policies for strategy implementation.

15. Categorize the types of corporate level strategies with suitable examples.

16. Analyze the concept of BCG and GE matrix. Explain how it is applied in framing a corporate portfolio.

PART – C

Answer the following **1 x 20 = 20 Marks**

17. Assume yourself as a business consultant; you are requested to do the following for an automobile manufacturing company.
    a) Design SWOT analysis
    b) Propose the strategies need to be implemented based on industry life cycle.
    c) Formulate a suitable strategic control system.

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SASTRA DEEMED UNIVERSITY

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End Semester Examinations

Nov 2024

Course Code: **CSE316**

Course: **SOFTWARE DESIGN WITH UML**

QP No. **:U052-5**

Duration: **3** hours

Max. Marks:**100**

PART – A

Answer any Four questions **4 x 20 = 80 Marks**

1. Apply the Waterfall model for the development of web-based Train ticket reservation system.
   a) Analyze the possible problems faced and software crisis while implementing a software development project using Waterfall Model. (10)
   b) How does the software engineering principle help in the software development process? (5)
   c) Which design pattern would you use it for web-based Train ticket reservation system? (5)

2. You've been tasked with designing the class structure for the software required to manage a pizza restaurant. First you will be working on the core Pizza / Recipe / Oven / Chef sub system.
   a) You decide to create a class Pizza, with methods such as Bake (), and a class Chef responsible with creating Pizza classes. Draw the UML diagram for the two classes, and explain which association you would use? (5)
   b) Draw the UML diagram explaining how you would support the creation of multiple types of pizza, and name the design pattern you would use? (5)

c) Which design pattern would you use to enable the recipe of the pizza, captured e.g. in a Recipe class, to be used in the creation of the Pizza class? Draw the class diagram for your design? (5)

d) Use UML diagrams to explain how the Composite design patterns and the Flyweight design patterns works? (5)

3. To design a use case scenario for students registering and taking an NPTEL (National Programme on Technology Enhanced Learning) four weeks course and register for examination. The use case focuses on the registration process, assignment submission, exam scheduling, and certification upon completion. No course can have less than 250 students or it reserves right to be cancelled. This will be the same functionality as available to other internal users of the system. When registration is complete, the registration system sends a message to the payment system to send out a payment bill to the student. Tutors use the system to find which course they are teaching and who the students are. The NPTEL admin will administer the system. The tutor posts the assignments and students will submit assignments in the given time. Students must be allowed to access the system to register for more courses and a time. If the students failed to register for examinations, students will not get Hall Ticket to write the examination.

a) Analyze the 'NPTEL Course Registration' requirements and represent them as a Use Case Diagram with preconditions, trigger, etc. (5)

b) Write the importance of use case diagram and when and where the use case diagram is used? (5)

c) Draw a suitable Collaboration diagram to show how the objects communicate with each other? (5)

d)Write down the steps to draw Collaboration Diagram? (5)

4. Create a domain class diagram for an Online Shopping Mart.

a) Identify potential classes and determine attributes for each class and draw the class diagram? (5)

b) Write down the steps of how to model the collaborations and logical database schema using class diagram? (5)

c) Illustrate the process of creating a Package Diagram? (5)

d) How packages are defined, connected and organized. Discuss the benefits of using Package Diagrams? (5)

5. a) Create an activity diagram for the Hotel Reservation System and how would you depict this process in an activity diagram for the following scenario? (10)

Scenario: You need to model a hotel room reservation process where:

- The user searches for available rooms.
- The system checks availability.
- If rooms are available, the user selects a room and proceeds to book.
- If no rooms are available, the system offers an option to search again.
- Once the booking is confirmed, the system sends a confirmation email.

b) List out the components of Activity Diagram and when to use the Activity Diagram? (10)

6. Design an e-commerce platform that needs to support user registration, product browsing, shopping cart management, order processing and UPI payment. The system architecture includes several key components such as user interface, product catalog, shopping cart service, order processing service and payment gateway. such as e-commerce system by including the elements such as Components, Interfaces and relationships.

a) Develop a Component Diagram that represents the key components and its Relationships? (5)

b) Explain the purpose and when and where to use the Component Diagram? (5)

c) Convert the component diagram into deployment diagram? (5)

d) Identify the key element of deployment diagram? (5)

PART - B

Answer the following **1 x 20 = 20 Marks**

7. For the payroll system, some common requirements are as follows:
   - It should allow employees to record time card information electronically
   - It should automatically generate paychecks based on the number of hours worked & total amount of sales for commission-based employees
   - It should have a web-based interface to allow employees to interact with the system
   - It should allow employee to operate ONLY on their own data records
   - It should allow employees to choose payment type
   - For payment, employees can be paid by the hour or salaried
   - The calculated salary of the hourly workers must be paid every two weeks on the Friday, where for salaried employees, it should be paid at the end of the month (last Friday of the month)
   - The system must be able to provide various types of reports for employees and managers.

   a) Draw an overall class diagram. Clearly identify dependencies, associations (aggregation & composition) and multiplicities? (10)

   b) Draw a sequence diagram and how the system is interacted? (5)

   c) Draw the component diagram and convert into deployment diagram? (5)

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End Semester Examinations

Nov 2024

Course Code: **MGT132**

Course: **FUNDAMENTALS OF MANAGEMENT FOR ENGINEERS**

QP No. **:U234-5**

Duration: **3** hours

Max. Marks**:100**

PART – A

Answer all the questions **10 x 2 = 20 Marks**

1. Enumerate the primary focus of Elton Mayo's Hawthorne experiments.
2. State the significance of Corporate Social Responsibility (CSR) in modern businesses.
3. State the key dimensions and features of organizational design.
4. How does the neoclassical approach to organizational design differ from the classical approach?
5. State the main differences between intrinsic and extrinsic motivation with examples.
6. Write a short on the Delphi technique.
7. Differentiate between transactional leadership and transformational leadership.
8. Write a short on Group Think and Social Loafing.

9. Write a short on Eustress with an example.

10. Distinguish functional and dysfunctional conflict.

PART – B

Answer any FOUR questions **4 x 15 = 60 Marks**

11. Discuss the evolution of management theories and their relevance in today's business environment.

12. Describe the five functions of management and explain how each function contributes to achieving organizational goals.

13. Discuss the different types of contemporary organizational structures and analyze their strengths and weaknesses

14. Discuss the different theories of leadership. How can these theories and approaches be applied to other organizational scenarios to enhance leadership effectiveness?

15. Compare and contrast Abraham Maslow and Herzberg's theory of motivation with examples.

16. Discuss the elements of organizational culture and their influence on employee behavior.

PART – C

17. **Answer the following** **1 x 20 = 20 Marks**

Case Study:

Tata Group, one of India's largest and most respected conglomerates, is known for its ethical approach to business, employee welfare, and social responsibility. The group's culture has been deeply influenced by its founder, Jamshedji Tata, whose vision was to create an organization that balanced profitability with a

strong sense of social responsibility. The Tata Group's core values—integrity, commitment, excellence, pioneering, and unity—are ingrained in its culture and reflected in its business practices.

One of the notable examples of Tata's organizational culture is the company's approach to employee welfare. The group was one of the first in India to introduce pension schemes, maternity benefits, and medical facilities for its workers, which created a strong sense of loyalty and commitment among employees. This "people-first" culture is a cornerstone of Tata's organizational ethos.

In addition to its employee-centric policies, Tata's culture places a strong emphasis on ethical business practices. For instance, during the 2008 global recession, when many companies laid off workers to cut costs, Tata Group, under the leadership of Ratan Tata, decided to retain its workforce. The group believed that it had a moral responsibility to its employees, even during tough economic times. This decision, though financially challenging in the short term, helped the company build long-term trust and loyalty among its employees and stakeholders.

Furthermore, Tata Group's emphasis on corporate social responsibility (CSR) is a key part of its culture. Through initiatives like Tata Trusts, the group has contributed significantly to education, healthcare, and rural development in India, reinforcing its commitment to nation-building alongside business success.

Questions:

a) How has Tata Group's commitment to employee welfare contributed to its organizational culture and long-term success?

b) Discuss the role of ethical decision-making in shaping Tata Group's corporate identity and reputation, especially during economic downturns such as the global recession.

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SASTRA DEEMED UNIVERSITY

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End Semester Examinations **Nov 2024**

Course Code: **EIE228M**

Course: **IOT FOR INDUSTRIAL AUTOMATION**

QP No. **:U011-M**

Duration: **3** hours

Max. Marks:**100**

PART – A

Answer all the questions **10x2=20 Marks**

1. Identify the key enabling factors of IoT.
2. Compare IoT with Industrial IoT (I-IoT).
3. How does the integration of Cyber-Physical Systems (CPS) in the Industrial Internet of Things (IIoT) align with the layers of the Automation Pyramid?
4. Outline the steps involved in the physical and logical design of an I-IoT system.
5. Describe the role of MQTT protocol in I-IoT communication.
6. Distinguish between Fieldbus and Modbus industrial automation protocols.
7. Explain the purpose of data virtualization in I-IoT platforms.
8. Differentiate Edge Data Analytics and Cloud Data Analytics in an industrial setting.

9. Summarize how 5G technologies enhance IoT in industrial automation.

10. Describe a real-world case study of autonomous robots in industrial automation.

PART – B

Answer any FOUR questions **4x15=60 Marks**

11. Explain the structure and levels of the Computer-Integrated Manufacturing (CIM) pyramid. Discuss how each level of the CIM Pyramid contributes to the overall efficiency and integration of manufacturing processes. Compare the role of the CIM Pyramid in traditional manufacturing environments with its relevance to modern Industrial IoT (I-IoT) systems. (8+7)

12. Identify and explain the specific IoT levels involved in the design of a smart agriculture system, including soil moisture monitoring and crop health management, and illustrate how each level is implemented to enhance the efficiency and productivity of agricultural practices. (7+8)

13. Analyze the I-IoT design methodology and describe how various communication models and APIs are employed in industrial environments. Evaluate the role of industrial protocols and automation networks in enhancing the efficiency of I-IoT solutions. (8+7)

14. Describe the different types of IoT enablement platforms (application, data analytics, and virtualization). Investigate the emergence ofEdge and Fog computing and explain how these architectures complement Cloud-based IoT environments in industrial automation. (8+7)

15. Explain the role of Machine-to-Machine (M2M) communication and discuss how 5G technology supports I-IoT in industrial automation. Evaluate the impact of Software-Defined Networks (SDN) and Network Function Virtualization (NFV) on industrial automation networks. (8+7)

16. Discuss a detailed case study on the implementation of autonomous robots in industrial automation. Evaluate the technologies involved, such as 5G, M2M communication, and edge computing, and evaluate the benefits as well as the challenges of these technologies within an industrial setting. (7+8)

PART – C

Answer the following **1x20=20 Marks**

17. You are tasked with designing an IoT-based solution for a smart healthcare system aimed at improving patient care through real-time monitoring, remote diagnostics, and efficient health data management. The system should integrate various IoT levels and technologies to enhance healthcare delivery and patient outcomes.
    a. Develop a detailed IoT architecture for this smart healthcare system, describing how various levels of deployment (sensors, gateways, cloud, and edge computing) work together to support real-time patient monitoring and diagnostics. (10)
    b. Outline the prototyping process and discuss the appropriate communication protocol used for data transmission between devices and the cloud. (5)
    c. Discuss how technologies such as 5G, edge computing, and Cyber-Physical Systems are integrated into the system to improve healthcare delivery and patient outcomes. (5)

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