CSIT Questions Collections 2068

Second year/Fourth Semester

Subject : Theory of Computation   FM : 80
Time   : 3 hours   PM : 32

Year: 2067

Attempt all the questions.

Group A (8x4=32)

1. Define Finite Automata with εmoves. Is ε NFA has more computation power than DFA?
2. Give the DFA accepting the strings over {a, b} such that each string does not start with ab.
3. Give the regular expression for the following languages.
   a. L= {SS ∈ {a, b}* and S starts with aa or b and does not contains substring bb .
   b. L= {S │ S ∈ {0, 1}* and 0 occurs in pairs if any and ends with 1.
4. Convert following regular grammar in to Finite Automata.
   S → aaB │ aB │ ε, B → bb │ bS │ aBB
5. Convert following grammar into a equivalent PDA
   S →AAC, A→aAb │ ε, C → ac │ b │ ab
6. What is a multi track Turing Machine? How it differs with single track machine?
7. Construct a Turing Machine that accepts the language of palindrome over {a, b}* with each string of odd length.
8. What is an algorithm? Explain on the basis of Church Hypothesis.

Group B (6x8=4)

9. How a ε- NFA can be converted into NFA and DFA? Explain with a suitable example.
10. Find the minimum state DFA equivalent to the following DFA.

State	0	1
→A	B	C
B	B	D
C	E	D
D	E	D
*E	A	D

11. Show that a language L is accepted by some DFA if and only if L is accepted by s.
12. Define the language of PDA that accepts by Final State. Explain how a PDA accepting empty stack can be converted into a PDA by final state.
13. Explain about multi tape TM. Show that every language accepted by a multi-tape Turning Machine is also accepted by one tape Turning Machine.
14. Write short motes on:
    a. Decidable Vs Un-decidable problems.
    b. Unrestricted Grammar
    c. NP-completeness
    d. CNF-SAT Problem.

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Attempt all the questions.

Group A (8x4=32)

1. What is DFA? How it differ with a NFA? Explain.
2. Give the DFA for language of strings over *{0, 1}* in which each strings end with 11.
3. For a regular expression **(a+b)*baa,** construct ε-NFA.
4. Define the term parse tree, regular grammar, sequential form and ambiguous grammar.
5. Give the formal definition of NPDA. How it differs with DPDA? Explain.
6. Construct a Turning Machine that accepts a language of strings over (a, b) with each string of even length. Show how it accepts string **abab**.
7. Give the formal definition of Turning Machine. How it differs from PDA?
8. Explain about the Unrestricted Grammar.

Group B (6x8=4)

9. Show that a language L is accepted by some DFA if and only if L is accepted by some NFA.
10. State and prove pumping lemma for regular language. Show by example how it can be used to prove a language is not a regular.
11. Define Context Free Grammar. Given the following CFG.
    $S \rightarrow 0AS \mid 0, A \rightarrow SIA \mid SS \mid 10$
    For the string 001001100, Give the left most and right most derivation and also construct a parse tree.
12. Define deterministic PDA. Design a PDA that accept a language $L = \{a^n b^n \mid n>0\}$. You may accept either by empty stack or by final state.
13. Describe a Universal Turing Machine and its operations. What types of languages are accepted by Universal TM?
14. Explain about the Chomsky Hierarchy of the language.

Subject : Computer Graphics   **FM : 60**
Time   : 3 hours   **PM : 24**
All questions carry equal marks.

Year: 2067

Attempt all questions.

1. What is a computer graphics? Explain in detail about the application of computer graphics.
2. Derive the window to viewport transformation coefficient matrix. Explain the application of this matrix.
3. Explain the following term with practical applications.
   (a) 3D Rotation
   (b) 2D Shear
4. Explain in detail about line clipping algorithm and its applications.
5. What is a digital differential analyzer (DDA)? How can you draw the line using this algorithm?
6. How can you represent 3D object? How can you draw the line using this algorithm?
7. How curves be generated? Explain it with any suitable algorithm.
8. Explain in detail about plain equation method. Explain which algorithm is better for hidden surface removal.

   OR

   Explain in detail about depth buffer method. Justify that is better than plane equation method.
9. Consider 256 pixel X 256 scan lines image with 24-bit true color. If 10 minutes video is required to capture, calculate the total memory required? Why intensity assignment is required?
10. Why shedding is required in the computer graphics? Explain in detail about constant intensity shading.

    OR

    List the different type of shading models. Explain in detail about Gouraud shading model.

Year: 2067

Attempt all questions.

1. What is a random scan display system? Draw its block diagram and explain it in detail.
2. What do you mean by homogeneous coordinates? Explain it with equation and practical application.
3. Explain the following terms with practical applications.
   a. 3D Mirror
   b. 2D Rotation
4. Explain in detail about circle clipping algorithm. Where do you require circle clipping algorithm?

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5. How can you draw circle? Explain with algorithm.
6. Explain in detail about polygon table. How can you apply in the case of computer animation?
7. What is a polygon mesh? Explain the application of polygon mesh with example.
8. Justify that hidden surface removal is required in computer graphics. Explain in detail about depth buffer method.

OR

Explain in detail about scan line method. Just that it is better than depth buffer method.
9. Consider 256 pixels X 512 scan lines image with 24-bit true color. If 20 minutes video is required to capture, calculate the total memory required? What is the color intensity model?
10. Explain in detail about Phong shading. How can you modify Phong shading model?

OR

Explain in detail about Gourand shading model. Compare it with Phong shading model.

Subject : Database Management System   **FM : 60**
Time   : 3 hours   **PM : 24**
All questions carry equal marks.

Year: 2066
Attempt all questions.

1.   Answer the following questions in short:
     a) Differentiate between logical data independence and physical data independence.
     b) Three-schema architectures.
     c) Differentiate between database schema and a database state.
     d) Different type of data attributes.
     e) The difference among a relationship instance, a relationship type, and relationship set.

2.   a) Draw an ER diagram for database showing Bank. Each Bank can have multiple branches, and each branch can have multiple accounts and loans.
     b) In what sense does a relational calculus differ from relational algebra, and in what sense are they similar?

3   Assume a database about Company.
     EMPLOYEE (ss#, name)
     COMPANY (cname, address)
     WORKS (ss#, cname)
     SUPERVISE (superviser_ss#, employee_ss#)
     a) Write relational algebra and SQL queries for each of the following cases.
        i)   Find the names of all supervisors that work in companies whose address equals 'pokhara'.
        ii) Find the name of all the companies who have more than 4 supervisors.
        iii) Find the name of supervisor who has the largest number of employees.
     b) What is a view in SQL and how it is defined? Explain how vies are typically implemented.

4   a) Define a first, second, and third normal forms with suitable examples.
     b) What is a functional dependency? When are two sets of functional dependencies equivalent? How can we determine their equivalence?

5.   a) Discuss the ACID properties of a database transaction with suitable example.
     b) Describe the serial and serializable schedule? Why serializable schedule is consider correct?

6.   a) How does the granularity of data items affects the performance of conurrency control? What factors affect selections of granularity size for data items?
     b) Describe the two-phase commit protocol for database transaction.

Year: 2066
Attempt all questions.

1.   Answer the following questions is short.   (5x2=10)
     a   Advantage of DBMS approach over file system approach.
     b   Differentiate between two-tier and three-tier client/server architecture.

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    c   What is weak entity, owner entity type and identifying relationship?

    d   The null value attribute and its uses.

    e   Recursive relationship type with suitable example.

2.   a) Draw an ER diagram for a database showing Hospital system. The Hospital maintains data about Affiliated Hospitals, type of Treatments facilities given at each hospital, and Patients   (6)

    b) What is join operation? Differentiate between equijoin and natural join with suitable example.   (4)

3.   Assume database about **Company**

    EMPLOYEE (ss#, name)

    COMPANY (cname, address)

    WORKS (ss#, cname)

    SUPERVISES (supervisor_ss#, employee_ss#)

    a) Write relational algebra and SQL queries for each of the following cases.   (5)

        i)   Find the names of supervisors that work in companies whose address equals '**Kathhmandu'**

        ii) Find the names of all the companies who have more than 4 supervisors.

        iii) Find the name of the supervisor who has the largest number of employees.

    b) How can define view in SQL? Explain the problems that may arise when one attempts to update a view.   (1+4)

4.   a) What are different update anomalies? Explain each in with suitable examples.

                                    (1+4)

    b) Define functional dependency. Describe the closure of a set of functional dependencies with an example.   (1+4)

5.   a) Draw a state diagram, and discuss the typical state that a transaction goes through during transaction.   (5)

    b) Which of the following schedule is (conflict) serializable? For each serializable schedule, determine the equivalent serial schedules.   (5)

    i) $r1(x);r3(x); w1(x);r2(x);w3(x);$

    ii) $r1(x);r3(x); w3(x);w1(x);r2(x);$

    iii) $r3(x);r2(x); w3(x);r1(x);w1(x);$

    iv) $r3(x);r2(x); r1(x);w3(x);w1(x);$

6.   a) Discuss the problems of deadlock and starvation, and the different approaches to dealing with these problems.   (5)

    b) Describe write-ahead logging protocol   (5)

Subject : System analysis and Design   **FM : 60**
Time   : 3 hours   **PM : 24**
All questions carry equal marks.

Year: 2066

Group A
Long Answer Questions:

Attempt any two: (2x10=20)

1. What do you mean by system analysis? Explain the system development life cycle with example.
2. Draw a DFD diagram of following up to level 2.

    Customer sends enquiry to commercial department, receives quotations from the sales department and places an order. Based on the customer order, the work order is sent to the planning department for planning scheduling and control, in turn, the planning department raises a job order on the "shop floor". On completion, delivery note and invoice are made out costing department also prepares an orderwise comparative statement of estimated and actual costs.
3. How can you transforming E-R diagram into relations? Explain with suitable example.

Group B
Short Answer Questions:

Attempt any eight: (8x5=40)

4. What are the system analyst and design tools?
5. Design the E-R diagram of the following.
    a) Customer with draws money from his account.
    b) Student attends classes.
6. Explain the data dictionaries with example.
7. Explain the cost-benefit analysis with example.
8. What is the difference between a 2 NF and 3NF relations?
9. What do you mean by file organization?

Year: 2067

Group A
Long Answer Questions:

Attempt any two: (2x10=20)

1. Explain the steps in the maintenance process and contrast them with the phase of the systems development life cycle.
2. Draw a DFD diagram of the following up to level 2.

    Front office of Hotel is responsible for all room reservations, room allocations and final settlement of bills. Any company or person can reserve rooms for their future stay. They have to indicate from what date to what day they need the room. They also have to indicate how many rooms are required. Sometimes the reservations could be cancelled or the dates or number of rooms changed. For

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reservation, cancellation or modification or rooms, customer receives an acknowledgement from the hotel.

3. Explain the steps of creating a decision table. How can you reduce the size and complexity of a decision table? Explain with example.

Group B
Short Answer Questions:

Attempt any eight: (8x5=40)

4. Differentiate between transaction processing system (TPS) and management information system (MIS).
5. What are the management skills needed by system analysts?
6. What are the three relationship types of E-R diagrams? How are these relationships paired to build an E-R diagram?
7. Describe the commonly used methods for performing economic cost-benefit analysis.
8. What is the normalization of a relation? Explain with example.
9. Explain the six types of files used in information systems.
10. What is the role of software application testing?
11. Explain the factors that influence the cost of maintenance.
12. What managerial issues can be better understood by measuring maintenance effectiveness? Explain.
13. Differentiate between state diagrams and sequence diagrams in object oriented analysis and design.

Second year/Fourth Semester

Subject : Technical writing   **FM : 60**
Time   : 3 hours   **PM : 24**

Candidates are required to give their answer in their own words as for as practicable.
Attempt all the questions.

Year: 2067

1. Describe how you can use the online help or manual to find how to add a customized dictionary for technical words in your computer, and once added, how to open or close the dictionary.
2. What is communication? What are the factors to consider in technical communication?
3. Arrange the following transition words into the categories of sequence, Examples, Contrast, and Conclusion, and then use the transition words in your own sentences.
   then, nevertheless, consequently, let us say, for instance, however, instead, in addition, therefore, finally, particularly, in short, thus, such as, for example, otherwise.
4. Write a sample cover letter to accompany your resume for a position in your field to the following person.
   Mr. R. C. Shrestha
   Uni Tech International
   GPO Box 00000
   Kathmandu
5. Give instructions for operating a personal computer.
6. Explain computer –aided writing or explain what informative summaries are.

Year: 2067

1. Write a one-paragraph description of how you can improve your writing. Begin with a topic sentence. In the rest of paragraph, add the details that support your topic sentence.
2. Edit the adjectives in the following sentences to make them correct and clear
   a) Blue looks more better on you than gray.
   b) The reception was a really nice part.
   c) My manager is really a nice person.
   d) That is the baddest-looking outfit I have ever seen.
   e) Meeting the president was a most unique experience for me.
   f) We had the seriousest conversation of the evening
   g) I think she was more sharp than anyone else in the party
   h) The clock is much more slower than my watch.
3. Write five common acronyms in your area of study and their expanded meanings.
4. Describe briefly the layout of a business letter
5. Write short notes on (**any two**):
   a) Writing with a computer
   b) Writing in examinations
   c) The use of headings
   d) Language and style
   e) Transition words

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f) The use of commas and semicolons
6. Write a letter to a business associate thanking him for referring a customer to you.

Second year/Fourth Semester

Subject : Introduction to cognitive science   **FM : 60**
Time   : 3 hours   **PM : 24**
Candidates are required to give their answer in their own words as for as practicable.
Attempt all the questions.
All questions carry equal marks.

Year: 2067
Attempt all the questions.

1. Why cognitive science is important in the computer science? Compare it with philosophy and explain it with suitable examples.
2. Define and explain artificial intelligence. Act rationally is an important part of artificial intelligence, justify it with suitable example.
3. The object based system can represent knowledge, explain it with practical examples.
4. Explain the algorithm of breath first search with suitable example. How can you modify it, explain.

OR

What do you mean by A* search? Explain it with an algorithm and suitable example.
5. Why Turing machine is required? Design a Turing machine with finite west of states as q0, q1, and q2, alphabets are "a" and "b", initial state is q0 and assume 5 suitable transitions.
6. List down the all Chomsky hierarchies. Explain in detail about type 0 with practical examples.
7. Explain the mathematical model of neural network system with suitable example. Also explain the importance of neural networks.
8. Explain the perceptron with suitable practical example and algorithm.
9. Explain penrose approach in the cognitive science. What is its relations with Descartes, explain with suitable example.
10. Why lexicon and morphology are required in natural language processing, explain suitable example?

OR

What are the parameters of language processing? Explain in detail about syntax with suitable example.

Year: 2067
Attempt all the questions.

1. Compare cognitive science with sociology and explain it with examples. Differentiate between linguistics of artificial intelligence?
2. Differentiate between think humanly and act humanly with suitable examples. What are the applications of artificial intelligence?

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3. What do you mean by first order predicate logic? Explain it with practical example
4. Differentiate between depth first search and breadth first search with example.

<p style="text-align:center">**OR**</p>

Differentiate between hill-climbing search and A* search with example.
5. Design a Turing machine with finite set of states as q_0 and q_1, alphabets are 'a', 'b', and 'c', initial state is q_0 and assumes 5 suitable transitions. What are the practical applications of Turing machine
6. Differentiate between types I and type II Chomsky hierarchies with examples. Explain the role of Chomsky hierarchy in the computation?
7. Explain the biological neuron. Explain the mathematical model of neural network system with suitable example.
8. Explain the back propagation practical example and algorithm.
9. Explain Searle approach in the cognitive science. What is its relation with Descartes, explain with example.
10. How can you generate parse tree in the natural language processing? Explain it with example.

<p style="text-align:center">**OR**</p>

Differentiate between syntax and semantics in the natural language processing. How can you modify it with pragmatic approach?