

1. What is a raster scan display system? Draw a block diagram and explain it in detail.
2. How can you represent 3D viewing? Explain it with equation and practical application.
3. Explain the following terms with practical application.
 - (a) 3D Translation
 - (b) 2D Mirror
4. Where do you require ellipse clipping algorithm? Explain in detail about ellipse clipping algorithm.
5. How can you draw a circle? Explain it with algorithm.
6. Explain in detail about polygon table. How can you apply in the case of virtual reality?
7. What do you mean by solid modeling? Explain the process for solid modeling with example.
8. Hidden surface removal required in computer graphics is very important, justify it. Explain details about scan line method.

OR

Explain in detail about scan line method. Justify that it is better than plane equation method.

9. Consider 1024 pixels X 1024 pixels scan lines image with 24-bit true color. If 10minutes video is required to capture, calculate the total memory required? How can you incorporate shadow in the computer graphics?
10. Difference between diffuse reflection and specular reflection. Why do we require shading model? Explain it.

OR

Explain in detail about Phong shading model. Compare it with Gouraud Shading model.

Tribhuvan University
Institute of Science and Technology
2069
☆

Bachelor Level / Second Year/ Forth Semester/ Science
Computer Science and Information Technology (CSc.254)
(Computer Graphics)

Full Marks: 60
Pass Marks: 24
Time: 3 hours.

Candidates are required to give their answers in their own words as far as practicable.
All questions carry equal marks.

Attempt all the questions.

1. Explain the random scan display system with its advantages and disadvantages.
2. Why homogeneous coordinates are used for transformation computations in computer graphics? Explain.
3. Differentiate between window port and view port. How are lines grouped into visible, invisible and partially visible categories in 2D clipping? Explain.
4. Define polygon. What are the different types of polygons? Explain with example.
5. Differentiate between periodic B-spline curves with non-periodic B-spline curves.
6. Explain the z-buffer algorithm for removing hidden faces?
7. Differentiate between incremental algorithm over DDA with example.
8. Define the following terms (any two):
 - a) Video controller
 - b) 3D viewing
 - c) Raster graphics
 - d) list priority
9. Explain the simple illumination model with example.

OR

Explain the Gourand shading model with example.

10. Explain the virtual reality and its applications in the computer graphics.

Tribhuvan University
Institute of Science and Technology
2070
☆

Bachelor Level / Second Year/ Forth Semester/ Science
Computer Science and Information Technology (CSc.254)
(Computer Graphics)

Full Marks: 60
Pass Marks: 24
Time: 3 hours.

*Candidates are required to give their answers in their own words as far as practicable.
All questions carry equal marks.*

Attempt all the questions.

1. What is random scan system? Explain the operation of simple random scan with architecture.
2. Write a procedure to fill the interior of a given ellipse with a specified pattern.
3. Show that two successive reflections about any line passing through the coordinate origins equivalent to a single rotation about the origin.
4. What do you mean by line clipping? Explain the procedures for line clipping.
5. Illustrate the windows to view point transformation with an example.

OR

Write a procedure to implement highlighting as a blinking operation.

6. Why polygon description is consider as standard graphics objects? Explain the importance of polygon table.
7. Model the Bezier curve. Explain the importance of Bezier curve in graphical modeling.

OR

Write a procedure to perform a two-point perspective projection of an object.

8. What is solid modeling? Explain the basic procedures for solid modeling.
9. Explain the area subdivision method for visible surface detection.
10. Explain the basic steps for computer animation.

Tribhuvan University
Institute of Science and Technology
Introduction to Cognitive Science
2070

Full Marks : 60

Pass Marks : 24

Time : 3 hrs.

Attempt all questions :

- 1.) Define the cognitive science and its applications in computer science. Compare cognitive science with other science.
- 2.) Explain the architecture of an expert system and its applicability in different areas.
- 3.) Explain the various approaches and issues in knowledge representation and also explain the various problem in representing knowledge.
- 4.) Differentiate between procedural and declaration knowledge with an example.

OR

Explain A* search algorithm with example.

- 5.) Explain the breadth first search technique with example and also explain the benefits of it.
- 6.) Derive the mathematical model of neural network system with example and also explain about its importance.
- 7.) What are the steps in natural language processing? List and explain them briefly.
- 8.) Explain the Chomsky Hierarchy with example.
- 9.) Explain the pinker approach in the cognitive science. What is its relation with Descartes. Explain.
- 10.) Why lexicon and morphology are needed in natural language processing? Explain with example.

OR

Explain the parameter of natural language processing with its syntax and example.

Tribhuvan University
Institute of Science and Technology
2069
☆

Bachelor Level / Second Year/ Forth Semester/ Science
Computer Science and Information Technology (CSc.253)
(Database Management System)

Full Marks: 60
Pass Marks: 24
Time: 3 hours.

Candidates are required to give their answers in their own words as far as practicable.
The figures in the margin indicate full marks.

Attempt all the questions.

(5x2=10)

1. Answer the following questions in short:

- (a) Differentiate between two-tier and three-tier client/server architecture.
- (b) The null value attribute and its uses.
- (c) Difference between logical data independence and physical data independence.
- (d) When is the concept of a weak entity used in data modeling?
- (e) The difference among a relationship instance, a relationship type, and a relationship set.

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) In what sense does relational calculus differ from relational algebra, and in what sense are they similar? (4)

3. (a) Assume a database about Company.

EMPLOYEE(ss#, name)
COMPANY (cname, address)
WORKS (ss#, cname)
SUPERVISES(supervisor_ss#, employee_ss#)

Write relational algebra and SQL queries for each of the following cases.

- (i) Find the names of all the supervisors that work in companies whose address equals 'Biratnagar'.
- (ii) Find the names of all the companies who have more than 10 employees.
- (iii) Find the name of the supervisor who has the minimum number of employees. (5)

(b) What is constraint? How does SQL allow implementation of general integrity constraints? (1+4)

4. (a) Define first, second, and third normal forms with suitable example. (1+4)

(b) What is functional dependency? Describe full and partial functional dependency with suitable example. (1+4)

5. (a) Draw a state diagram, and discuss the typical state that a transaction goes through during transaction. (5)
- (b) Describe serial and serializable schedule? Why serializable schedule is considered correct? (5)
6. (a) How does the granularity of data items affect the performance of concurrency control? What factors affect selection of granularity size for data items? (5)
- (b) Describe write-ahead logging protocol. (5)

1. Answer the following questions in short: (5X2=10)
 - (a) Differentiate between program-data independence and program-operation independence.
 - (b) The ANSI/SPARC architecture with diagram.
 - (c) Differentiate between procedural and nonprocedural DMLs.
 - (d) The difference among an entity, an entity type, and entity set.
 - (e) When is the concept of a weak entity used in data modeling?
2. (a) Draw ER diagram for a database to keep track of the team and games in a sports league.

A team has a number of players, not all of whom participate in each game. It is desired to keep track of the players participating in each game for each team, the position they played in that game, and the result of the game.

 - (b) What is union compatibility? Define operations union, intersection, and difference on two union compatible relations R and S with suitable example.
3. (a) Describe the different clauses in the syntax of an SQL query, and show what type of constructs can be specified in each clause.
 - (b) What is a constraint? How does SQL allow implementation of general integrity constraints?
4. (a) Define Boyce-Codd normal form. How does it differ from 3NF? Why is it considered a stronger form of 3NF?
 - (b) What is functional dependency? Describe full and partial functional dependency with suitable example.
5. (a) Discuss the ACID properties of a database transaction with suitable example.
 - (b) What is a schedule? Define the concept of recoverable, cascadeless, and strict schedule, and compare them in terms of their recoverability.
6. (a) What is the two-phase locking protocol? How does it guarantee serializability?
 - (b) What do you mean by transaction rollback? What is meant by cascading rollback? Why do practical recovery methods use protocols that do not permit cascading rollback?

Tribhuvan University
Institute of Science and Technology
Database Management System
2070

Full Marks : 60

Pass Marks : 24

Time : 3 hrs.

Attempt all questions :

- 1.) a.) what is database management system? Discuss the advantages of using database management system over file system. (2+3=5)
b.) what is data abstraction? Discuss three levels of this abstraction. (1+4)
- 2.) a.) Construct an ERD to record the marks that students get in different exams of different course offerings. (5)
b.) Define integrity constraint. Discuss domain constraint with suitable example. (1+4)
- 3.) a.) with the information given below, calculate any three members of F^+ (6)
 $R = (A, B, C, G, H, I)$
 $F = \{A \rightarrow B, A \rightarrow C, CG \rightarrow I, B \rightarrow H\}$
b.) Discuss 2NF and 3NF with suitable example. (4)
- 4.) Consider the following supplier database, where primary keys are underlined : (20)

suupplier (supplier_id, supplier-name, city)
supplies (supplier-id, part-id, quantity)
parts (part-id, par-name, color, weight)

Construct the following relational algebra queries for this relational database

a.) find the name of all suppliers located in city "Kathmandu".
b.) Find the name of all parts supplied "ABC Company".
c.) Find the name of all parts that are supplied in quantity greater than 300.
d.) Find the number of parts supplied by "ABC Company".
e.) Find the name of all suppliers who supply more than 30 different parts.
- 5.) a.) what is serializable schedule? How can you test a schedule for conflict serializability? (2+3)
b.) Discuss recovery technique base on deferred update with concurrent execution in multi-user environment.(5)

Tribhuvan University
Institute of Science and Technology
 2070
 ☆

Bachelor Level / Second Year/ Forth Semester/ Science
Computer Science and Information Technology (CSc.253)
 (Database Management System)

Full Marks: 60
 Pass Marks: 24
 Time: 3 hours.

*Candidates are required to give their answers in their own words as far as practicable.
 The figures in the margin indicate full marks.*

Attempt all the questions.

1. (a) What is database management system? Discuss the advantages of using database management system over file system. (2+3=5)
- (b) What is data abstraction? Discuss three levels of this abstraction. (1+4=5)

2. (a) Construct an ERD to record the marks that students get in different exams of different course offerings. (5)
- (b) Define integrity constraint? Discuss domain constraint with suitable example. (1+4=5)

3. (a) With the information given bellow, calculate any three members of F^+ . (6)
 $R = \{A, B, C, G, H, I\}$
 $F = \{A \rightarrow B, A \rightarrow C, CG \rightarrow I, B \rightarrow H\}$
- (b) Discuss 2NF and 3NF with suitable example. (4)

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 - (c) Find the name of all parts that are supplied in quantity greater than 300.
 - (d) Find the number of parts supplied by "ABC Company".
 - (e) Find the name of all suppliers who supply more than 30 different parts.
5. (a) What is serializable schedule? How can you test a schedule for conflict serializability? (2+3=5)
 - (b) Discuss recovery technique base on deferred update with concurrent execution in multi-user environment. (5)

CSIT Questions Collections 2068

Second year/Fourth Semester

Second year/Fourth Semester

Subject : Theory of Computation
Time : 3 hours

FM : 80
PM : 32

Year: 2067

Attempt all the questions.

Group A (8x4=32)

1. Define Finite Automata with moves. 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. $L = \{SS \mid S \in \{a, b\}^* \text{ and } S \text{ starts with } aa \text{ or } b \text{ and does not contains substring } bb\}$.
 - b. $L = \{S \mid S \in \{0, 1\}^* \text{ and } 0 \text{ occurs in pairs if any and ends with } 1\}$.
4. Convert following regular grammar in to Finite Automata.
 $S \rightarrow aaB \mid aB \mid \epsilon, B \rightarrow bb \mid bS \mid aBB$
5. Convert following grammar into a equivalent PDA
 $S \rightarrow AAC, A \rightarrow aAb \mid \epsilon, C \rightarrow ac \mid b \mid ab$
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=48)

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
$\rightarrow A$	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 Turing Machine is also accepted by one tape Turing Machine.
14. Write short notes on:
 - a. Decidable Vs Un-decidable problems.
 - b. Unrestricted Grammar
 - c. NP-completeness
 - d. CNF-SAT Problem.

Source: www.csitnepal.com

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=48)

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.
 $S \rightarrow 0AS \mid 0A \rightarrow S1A \mid SS \mid 10$
 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.

Second year/Fourth Semester

Subject : Computer Graphics

Time : 3 hours

FM : 60

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?

Source: www.csitnepal.com

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.

Second year/Fourth Semester

Subject : Database Management System

Time : 3 hours

FM : 60

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 (supervisor_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 views 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 considered correct?
6.
 - a) How does the granularity of data items affect the performance of concurrency 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 in short. (5x2=10)
 - a) Advantage of DBMS approach over file system approach.
 - b) Differentiate between two-tier and three-tier client/server architecture.

Source: www.csitnepal.com

- 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)

Second year/Fourth Semester

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

reservation, cancellation or modification of 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 far 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

- 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 far 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 breadth 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 set of states as q_0 , q_1 , and q_2 , alphabets are "a" and "b", initial state is q_0 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?

Source: www.csitnepal.com

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.

OR

- 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.

OR

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

Tribhuvan University
Institute of Science and Technology
2069



Bachelor Level / Second Year/ Forth Semester/ Science
Computer Science and Information Technology (CSc.255)
(Introduction to Cognitive Science)

Full Marks: 60
Pass Marks: 24
Time: 3 hours.

Candidates are required to give their answers in their own words as far as practicable.
All questions carry equal marks.

Attempt all the questions.

1. Explain the cognitive science and its applications.
2. Explain the artificial intelligence task domains with example.
3. Explain the steps involved in building a system to solve an artificial intelligence problem.
4. What do you mean by AO* algorithm? Explain with example.

OR

Differentiate between procedural and declarative knowledge.

5. Explain with block diagram of the components of a typical expert system.
6. Differentiate between depth-first search and breadth first search with example.
7. Explain the tuning machine with suitable example.
8. Mention the types of all Chomsky hierarchies and explain two of them with practical example.
9. Define the terms:
 - a) Gelernter
 - b) Pinter
10. Explain the parameters of natural language processing with its syntax and suitable example.

OR

Mention the steps of natural language processing and explain them in briefly.

Tribhuvan University
Institute of Science and Technology
2070
☆

Bachelor Level / Second Year/ Forth Semester/ Science
Computer Science and Information Technology (CSc.255)
(Introduction to Cognitive Science)

Full Marks: 60
Pass Marks: 24
Time: 3 hours.

Candidates are required to give their answers in their own words as far as practicable.
All questions carry equal marks.

Attempt all the questions.

1. Define the cognitive science and its application in computer science. Compare cognitive science with other science.
2. Explain the architecture of an expert system and its applicability in different areas.
3. Explain the various approaches and issues in knowledge representation and also explain the various problem in representing knowledge.
4. Differentiate between procedural and declaration knowledge with an example.

OR

Explain A* search algorithm with example.

5. Explain the breadth first search technique with example and also explain the benefits of it.
6. Derive the mathematical model of neural network system with example and also explain about its importance.
7. What are the steps in natural language processing? List and explain them briefly.
8. Explain the Chomsky hierarchy with example.
9. Explain the pinker approach in the cognitive science. What is its relation with Descartes? Explain.
10. Why lexicon and morphology are needed in natural language processing? Explain with example.

OR

Explain the parameter of natural language processing with its syntax and example.

Tribhuwan University
Institute of Science and Technology
System Analysis and Design

2070

Full Marks : 60

Pass Marks : 24

Time : 3 hrs.

Group A

Attempt any two :

(2*10=20)

- 1.) Mention the key steps of system development life cycle and explain each steps with example.
- 2.) What are the key steps for designing E-R diagram? Explain with example.
- 3.) Develop a decision tree and a decision table for the following :

The gatekeeper at ABC park is given the following instructions for admitting persons to the park:

- If the person is under three years of age, there is no admission fee.
- If a person is under 16, half the full admission is charged and this admission is reduced to a quarter of full admission if the person is accompanied by an adult (the reduction applies only if the person is under 12).
- Between 16 and 18, half the full admission fee is charged if the person is a student; otherwise the full admission is charged.
- Over 18, the full admission fee is charged.
- A discount of 10 percent is allowed for a person over 16 if they are in a group of 10 or more.
- There are no students concessions during weekends. On weekdays under -12s get one free ride.

Group B

Attempt any eight :

(8*5=40)

- 4.) What are the types of information system?
- 5.) Differentiate between physical DFD and logical DFD.
- 6.) What do you mean by database normalization? Why is it important?
- 7.) Why feasibility analysis is necessary before designing a system?
- 8.) Explain modeling tools.
- 9.) Explain with example of tangible and intangible benefit.
- 10.) What do you mean by Quality assurance? Explain with example.
- 11.) Comparison between corrective, adaptive, perfective and preventive maintainance.
- 12.) Differentiate between object modeling and dynamic modeling.
- 13.) What are the main deliverable from testing and installation?

Tribhuvan University
Institute of Science and Technology
2069
☆

Bachelor Level / Second Year/ Forth Semester/ Science
Computer Science and Information Technology (CSc.252)
(System analysis and Design)

Full Marks: 60
Pass Marks: 24
Time: 3 hours.

Candidates are required to give their answers in their own words as far as practicable.
The figures in the margin indicate full marks.

Group A

Long Answer Questions:

Attempt any two:

(2x10=20)

1. Explain the types of information with example and compare each of them.
2. Draw a DFD diagram of student information system up to level 2.
3. Explain the process of maintaining the information system with example.

Group B

Short Answer Questions:

Attempt any eight:

(8x5=40)

4. Differentiate between decision support system (DSS) and Management Information System (MIS).
5. What do you mean by Joint application Design? Explain.
6. Explain the steps of E-R diagram design.
7. What do you mean by case tools? Explain the case tools in data modeling.
8. Explain the steps in Feasibility analysis.
9. What do you mean by normalization? Explain with example.
10. What are the two important things to remember about testing systems?
11. Differentiate between system documentation and V ser documentation.
12. What are the different types of main tenance?
13. Explain the Unified Modeling Language with example.

Tribhuvan University
Institute of Science and Technology
2070
☆

Bachelor Level / Second Year/ Fourth Semester/ Science
Computer Science and Information Technology (CSc.252)
(System analysis and Design)

Full Marks: 60
Pass Marks: 24
Time: 3 hours.

*Candidates are required to give their answers in their own words as far as practicable.
The figures in the margin indicate full marks.*

Group A

Long Answer Questions:

Attempt any two:

(2x10=20)

1. Mention the key steps of system development life cycle and explain each step with example.
2. What are the key steps for designing E-R diagram? Explain with example.
3. Develop a decision tree and a decision table for the following:
The gatekeeper at ABC park is given the following instructions for admitting persons to the park:
 - If the person is under three years of age, there is no admission fee.
 - If a person is under 16, half the full admission is charged and this admission is reduced to a quarter of full admission if the person is accompanied by an adult (the reduction applies only if the person is under 12).
 - Between 16 and 18, half the full admission fee is charged if the person is a student; otherwise the full admission is charged.
 - Over 18, the full admission fee is charged.
 - A discount of 10 percent is allowed for a person over 16 if they are in a group of 10 or more.
 - There are no student concessions during weekends. On weekdays under - 12s get one free ride.

Group B

Short Answer Questions:

Attempt any eight:

(8x5=40)

1. What are the types of Information System?
2. Differentiate between physical DFD and logical DFD.
3. What do you mean by database normalization? Why it is important?

✓ Why feasibility analysis is necessary before designing a system?

8. Explain modeling tools.

✓ 9. Explain with example of tangible and intangible benefit.

10. What do you mean by Quality assurance? Explain with example.

✓ 11. Comparison between corrective, adaptive, perfective and preventive maintenance.

12. Differentiate between object modeling and Dynamic modeling.

13. What are the main deliverable from testing and installation?

Tribhuvan University
Institute of Science and Technology
 2069
 ☆

Bachelor Level / Second Year/ Forth Semester/ Science
Computer Science and Information Technology (ENG.256)
 (Technical Writing)

Full Marks: 80
 Pass Marks: 32
 Time: 3 hours.

Candidates are required to give their answers in their own words as far as practicable.
 The figures in the margin indicate full marks.

Attempt all the questions.

1. Prepare a newspaper article in about 250 words making a comparison (and contrast) between writing with and without a computer. [10]
2. Write a job application on the basis of the given advertisement. Give your recent resume along with the application. [15]

IMMEDIATELY WANTED
 Aakriti International has a vacancy for a Computer
 Engineer to work on contract for five years
 Interested candidates with qualification and experience are
 Requested to apply within a week to
 The Executive Manager
 Aakriti International Lazimpat
 Kathmandu
 E-mail: aakritinepal@gmail.com

3. Write two paragraphs on advantages and disadvantages of wireless communication (devices such as Bluetooth, Wi-Fi) using these expressions: *in short, in other words, namely, that is, for instance, however, finally, such as, otherwise, whereas.* [15]
4. What is graphic presentation technique? What are the advantages of the use of graphs, charts, pictures, and tables in technical communication? [15]
5. Imagine you are the Head of the Department of Computer Science and Information Technology and also imagine that you have conducted a Departmental meeting of all teaching staff. Now prepare a formal minute of the meeting with agenda and resolutions. [15]
6. Write a technical description of your new laptop with its special features. [10]

Tribhuvan University
Institute of Science and Technology
2070
☆

Bachelor Level / Second Year/ Forth Semester/ Science
Computer Science and Information Technology (ENG.256)
(Technical Writing)

Full Marks: 80
Pass Marks: 32
Time: 3 hours.

Candidates are required to give their answers in their own words as far as practicable.

All figures in the margin indicate full marks.

Attempt all the questions.

1. Describe a few ways of organizing information. Why is it important to organize information? (10)
2. Discuss briefly how you can choose and use table, graphs and charts. (15)
3. Critique your friend's Web page and recommend revisions to prepare it for use in a job search. (15)
4. What is a summary? Describe the steps to follow to write informative summaries. (10)
5. Write a brief proposal to convince your manager to purchase a new computer for your use in the office. (15)
6. Write short notes on any two of the following: (15)
 - (a) Writing minutes
 - (b) Readability
 - (c) E-mail etiquette
 - (d) Technical communication

Tribhuvan University
Institute of Science and Technology
2069



Bachelor Level / Second Year / Fourth Semester / Science
Computer Science and Information Technology (CSE-251),
(Theory of Computation)

Full Marks: 80
Pass Marks: 32
Time: 3 hours

Candidates are required to give their answers in their own words as far as practicable.
The figures in the margin indicate full marks.

Attempt all the questions.

Group A

(8x4=32)

1. What do you mean by finite automata? Explain deterministic finite automata with example.
2. Explain the finite automata with Epsilon-Transition.
3. Explain the closure properties of context free languages with example.
4. Differentiate between deterministic and non deterministic PDA.
5. Explain the non-deterministic Turing machines with practical example.
6. Define the Turing machine. What are the roles of Turing machines?
7. What is universal Turing machines?
8. Differentiate between class P and class NP.

Group B

(6x8=48)

9. Design a constructive method to prove that the complement of the language accepted by an NFA is accepted by a DFA.
10. What do you mean by regular expressions? Explain with example of pumping lemma for regular languages.
11. Define the non deterministic finite automata (NFA) and write down recursive definition of δ^* for NFA and A.
12. Draw Turing machine to accept palindromes over $\{a, b\}$.
13. Give a detailed description of ambiguity in context free grammar.
14. Explain the following:
 - a) Minimization of finite state machine.
 - b) Push down automata (PDA).
 - c) Halting problems.
 - d) computational complexity.

Tribhuvan University
Institute of Science and Technology
2070
☆

Bachelor Level / Second Year/ Forth Semester/ Science
Computer Science and Information Technology (CSc.251)
(Theory of Computation)

Full Marks: 80
Pass Marks: 32
Time: 3 hours.

*Candidates are required to give their answers in their own words as far as practicable.
The figures in the margin indicate full marks.
Attempt all the questions.*

Group A

(8x4=32)

1. Differentiate between deterministic and non-deterministic finite automata.
2. What do you mean by pumping lemma for regular languages?
3. Explain the non-deterministic PDA with example.
4. Define Turing machines. Draw NFA- Λ corresponding to following regular expression over $\Sigma = \{0, 1\}$.
 $010^* + 0(01 + 10)^* 11$
5. Explain about recursive enumerable and recursive language.
6. Explain the computational complexity with example.
7. Differentiate between class P and class NP.
8. Compare FA, NFA and NFA- Λ with illustration.

Group B

(6x8=48)

9. Define finite automata and draw FA for the strings:
10. For the following Regular expression draw an NFA- Λ recognizing the corresponding languages.
 - (i) $(00 + 1)^* (10)^*$
 - (ii) $001^* 0^* 11$
11. Define CFG. Prove the following CFG is ambiguous.
 $S \rightarrow S * S \mid S \wedge S(S)a$
Write the unambiguous CFG for the above grammar.
12. Draw Turing Machine (TM) to accept Palindromes over $\{a, b\}$. (Even as well as odd Palindromes).
13. Prove that any regular language can be accepted by a finite automata with all details.
14. Explain the following:
 - a) Regular grammar.
 - b) Halting problem.
 - c) Chomsky Hierarchy.
 - d) NP-complete problem.

Question Collection-Fourth Semester-TOC

Tribhuvan University

FM:80

Institute of Science and Technology

PM:32

2068

Theory Of Computation

Attempt all questions

Group A

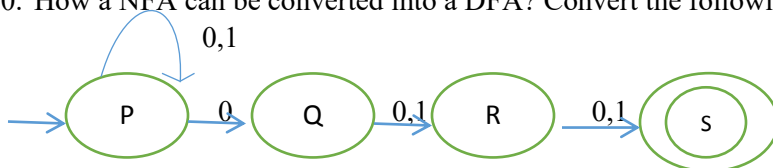
(8X4=32)

1. Define finite automata. Give the formal definition of deterministic finite automata with example.
2. Give the DFA for language of strings over $\{a,b\}$ where no two consecutive a.'s occurred.
3. Show that language of palindrome over $\{a,b\}$ is not a regular language.
4. What do you mean by a CNF grammar? Convert following grammar in CNF.
 $S \rightarrow AC/\varepsilon, A \rightarrow aS/a, c \rightarrow BC/aC/b.$
5. Define Deterministic Push Down Automata. How it differs with a Finite Automata.
6. Give formal definition of Turing Machine. Explain the roles of Turing Machine.
7. Construct a Turing machine that accepts the language of palindrome over $\{a,b\}^*$ with each strings of even length.
8. What is universal language? Explain.

Group B

(6X8=48)

9. Show that for any regular expression, there is a ε NFA that accepts the same language represented by r. Convert the regular expression $(a+b)(aa+ba)^* + ab(a+b)^* bba$ into ε NFA.
10. How a NFA can be converted into a DFA? Convert the following NFA into equivalent DFA.



11. Define CFG. Convert the following CFG into Chomsky Normal Form.
 $S \rightarrow |Sbb|aabb|Aa|Bb|$
 $A \rightarrow Aa|a,$
 $B \rightarrow Bb|b|\varepsilon$
12. Define the language of PDA that accepts by Final state. Explain, how a PDA accepting by empty stack can be converted into a PDA final state.
13. Explain about multi tape TM. Show that every language accepted by a multi-tape Turing Machine is also accepted by one tape Turing Machine.
14. Explain the following terms.
 - (a) Big Oh and Big Omega
 - (b) Class P and NP
 - (c) CNF SAT Problem
 - (d) Turing Decidable and Acceptable problems.

Theory of Computation

2070

Full Marks : 60

Pass Marks : 24

Time : 3 hrs.

Attempt all questions :

Group A

(8*4=32)

- 1.) Differentiate between deterministic and non-deterministic finite automata.
- 2.) What do you mean by pumping lemma for regular languages?
- 3.) Explain the non-deterministic PDA with example.
- 4.) Define Turing Machines. Draw NFA - \wedge corresponding to following regular expression over $\Sigma = \{0,1\}$
 $010^* + 0(01+10)^* 11$
- 5.) Explain about recursive enumerable and recursive language.
- 6.) Explain the computational complexity with example.
- 7.) Differentiate between class P and class NP.
- 8.) Compare FA, NFA and NFA- \wedge with illustration.

Group B

(6*8=48)

- 9.) Define finite automata and draw FA for the strings.
- 10.) For the following regular expression draw an NFA - \wedge recognizing the corresponding languages .
 - i.) $(00+1)^*(10)^*$
 - ii.) 001^*0^*11
- 11.) Define CFG. Prove the following CFG is ambiguous.
 $S \rightarrow S+S \mid S*S \mid (S) \mid a$
Write the unambiguous CFG for the above grammar.
- 12.) Draw Turing Machine (TM) to accept palindromes over $\{a,b\}$. (Even as well as odd Palindromes).
- 13.) Prove that any regular language can be accepted by a finite automata with all details.
- 14.) Explain the following :
 - a.) Regular grammar
 - b.) Halting problem
 - c.) Chomsky hierarchy
 - d.) NP-complete Problem

Theory of Computation

2071

Full Marks : 80

Pass Marks : 32

Time : 3 hours

Attempt all questions :

Group A (8*4=32)

- 1.) Explain the extended transition function of NFA.
- 2.) Construct a DFA that accepts all the strings of alphabet {a,b} having each strings with even number of 0's and even number of 1's.
- 3.) How can you convert an ϵ -NFA into equivalent DFA? Explain.
- 4.) What are the regular operators applied to the regular languages? Explain with example.
- 5.) Simplify the following regular expressions.
 - a.) $1^*+1^*0(\epsilon+0+1)^*\emptyset$
 - b.) $\epsilon+0+1+(\epsilon+0+1)(\epsilon+0+1)^*(\epsilon+0+1)$
- 6.) what do you mean by a CNF grammar? Convert the following grammar into CNF.
 $S \rightarrow abSb \mid aa$
- 7.) what are unrestricted grammar? How they differ with CFG? Explain.
- 8.) Define the term Class P and Class NP with example.

Group B

(6*8=48)

- 9.) What are the algebraic rules for regular expressions? Also show that if L, M, N are any regular language then show that $L(M \cup N) = L.M \cup L.N$.
- 10.) Prove that for any given NFA N accepting a language L there exists a DFA D such that $L(N) = L(D)$.
- 11.) Define regular grammar. Show with suitable example that the language described by regular grammar are accepted by a finite automata.
- 12.) What do you mean by the Chomsky Hierarchy in the formal language theory? Explain in detail.
- 13.) Construct a PDA that accepts a language of palindrome of even length from an alphabet {a,b}.
- 14.) Show that a Turing Machine with one tape and a Turing Machine with multiple tape are equivalent.

Question Collection-2068 Fourth semester-TW

Tribhuvan University
Institute of Science and Technology
2068

FM:80

PM:32

Fourth Semester

B.Sc.CSIT (Eng.256)

Technical Writing

YEAR-2068

Attempt all the questions.

1. Write iconic symbols for the following situations. (10)
 - a) Please keep this item always in this position and not upside down
 - b) Please keep this item safe from rain
 - c) Please handle with care as this item is very fragile
 - d) Fresh-room for ladies
 - e) Please recycle this item
2. Prepare a newspaper article in about 250 words on "the Use and Misuse of Mobile Phone".(15)
3. Write instructions for installation and operation of the printer you have recently bought.(15)
4. Represent the following information in the pie chart (10)
 - i. Total number of cell phone users=8,50,000
 - ii. Users of Nepal Telecom(cell phone)=5,50,000
 - iii. Users of N Cell=2,50,000
 - iv. Users of UTL=50,000
5. Read the following advertising and write a job application suitable and attach latest bio data with it. (15)

Teacher Wanted

Swastik engineering College has a vacancy for a Teacher
(Computer) as a full time faculty.

Qualified candidate are suggested to apply

The Principal

Swastik engineering College Sitapaila Kathmandu

E-mail: swastikcollege@gmail.com

6. The growing use of soft-games in computer has diverted young people away from the real physical games in the field. Discuss some pros and cons of computer-mediated games.(15)

Technical Writing

2070

Full Marks : 60

Pass Marks : 24

Time : 3 hrs.

Attempt all questions :

- 1.) Describe a few ways of organizing information. Why is it important to organize information? (10)
- 2.) Discuss briefly how you can choose and use table, graphs and charts. (15)
- 3.) Critique your friend's webpage and recommend revisions to prepare it for use in a job search. (15)
- 4.) What is a summary? Describe the steps to follow to write informative summaries. (10)
- 5.) Write a brief proposal to convince your manager to purchase a new computer for your use in the office. (15)
- 6.) Write short notes on any two of the following : (15)
 - a.) Writing minutes
 - b.) Readability
 - c.) E-mail etiquette
 - d.) Technical communication