

CBCS SCHEME

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15CS61

Sixth Semester B.E. Degree Examination, Aug./Sept.2020 Cryptography, Network Security and Cyber Law

Time: 3 hrs.

Max. Marks: 80

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Explain Euclid's algorithm to find gcd of two integers with example. (07 Marks)
b. Explain the following Algebraic structures with example:
(i) Groups (ii) Rings (iii) Fields (09 Marks)

OR

- 2 a. Explain monoalphabetic and polyalphabetic ciphers with examples. (10 Marks)
b. Explain the DES construction with a neat diagram. (06 Marks)

Module-2

- 3 a. Explain RSA algorithm with suitable example. (10 Marks)
b. Explain Weak Collision Resistance and Strong Collision Resistance with examples. (06 Marks)

OR

- 4 a. Explain the following :
(i) Hash-based MAC (ii) Digital Signatures (08 Marks)
b. Explain Diffie-Hellman key exchange with an example. (08 Marks)

Module-3

- 5 a. Explain the different PKI architectures. (08 Marks)
b. Explain Mutual authentication using shared secret-based and asymmetric key-based authentication (08 Marks)

OR

- 6 a. How the sequence of messages exchanged between the client, the Kerberos servers and the requested servers? Explain with diagram. (08 Marks)
b. Explain the main mode and aggressive mode of Internet key exchange protocol. (08 Marks)

Module-4

- 7 a. Explain the authentication and master session key exchange in 802.11i with the help of diagram. (08 Marks)
b. List out and explain the different worm characteristics. (08 Marks)

OR

- 8 a. Explain the following technologies of web services with suitable examples:
(i) XML (ii) SOAP. (08 Marks)
b. Explain the different types of Intrusion Detection Systems. (08 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

15CS61

Module-5

- 9 a. What is the Information Technology Act? Discuss the aim and objectives. (06 Marks)
b. Describe the provisions of the IT Act as regards the following :
(i) Legal recognition of electronic records
(ii) Authentication of electronic records.
(iii) Retention of electronic records
(iv) Publications of rules, regulations etc., in the Electronic Gazette. (10 Marks)

OR

- 10 a. Who is a controller? Outline its functions and powers. (08 Marks)
b. Discuss the penalties and adjudication under section 43 of the IT Act 2000 for
(i) damage to a computer, computer system etc.
(ii) failure to furnish information, return, etc. (08 Marks)

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15CS62

Sixth Semester B.E. Degree Examination, Aug./Sept.2020 Computer Graphics and Visualization

Time: 3 hrs.

Max. Marks: 80

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. List and explain any six application of computer graphics. (06 Marks)
b. Explain Refresh Cathod Ray Tube with diagram. (10 Marks)

OR

- 2 a. Develop Bresenhams line drawing algorithm. (05 Marks)
b. Write circle drawing algorithm. Given circle radius $r = 10$, solve the midpoint circle algorithm by determining positions along the circle octant in the first quadrant from $x = 0$ to $x = y$. (11 Marks)

Module-2

- 3 a. Classify the polygons and describe fill area primitives with diagrams. (08 Marks)
b. Describe about Inside-Outside Tests. (08 Marks)

OR

- 4 a. Explain General Scan Line Polygon fill algorithm. (08 Marks)
b. Describe any two of dimensional composite transformation
i) 2D translation ii) 2D fixed point scaling. (08 Marks)

Module-3

- 5 a. Describe 3D translation and scaling. (08 Marks)
b. Explain window to viewport transformation. (08 Marks)

OR

- 6 a. Discuss the Cohen Sutherland line clipping with program. (10 Marks)
b. Explain RGB color model. (06 Marks)

Module-4

- 7 a. Explain Orthogonal Projections. (10 Marks)
b. Discuss the OpenGL visibility Detection functions. (06 Marks)

OR

- 8 a. Explain the Perspective projections. (06 Marks)
b. Discuss the Depth buffer method. (10 Marks)

Module-5

- 9 a. Describe the Menus with program. (06 Marks)
b. What is the necessity of programming event driven input? Describe window events and keyboard event. (10 Marks)

OR

- 10 a. Explain Rotating square in Animating interactive programs. (07 Marks)
b. Write short notes on Bezier surfaces. (09 Marks)

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15CS63

Sixth Semester B.E. Degree Examination, Aug./Sept.2020 System Software and Compiler Design

Time: 3 hrs.

Max. Marks: 80

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Explain SIC Architecture in detail. (06 Marks)
b. Explain the data structures and Pass-1 algorithm of SIC/ME assembler. (06 Marks)
c. List out the differences between system software and application software. (04 Marks)

OR

- 2 a. List the different addressing modes used in SIC/XE. Give instructions format for each and explain the addressing mode. (08 Marks)
b. Generate the machine code for the following :

- (i) 0000 +JSUB RDREC
(ii) 0004 STL RETADR
(iii) 0008 LDB #LENGTH
(iv) 000A CLEAR X

Assume the opcodes are:

JSUB = 48_H, STL = 14_H, LDB = 60_H, CLEAR = B4_H

The LC value for : RDREC = 1036_H

RETA DR = 0030_H, LENGTH = 0033_H

The mnemonics values for registers are

A = 0, X = 1, L = 2, B = 3, S = 4, T = 5, F = 6, Pc = 8, SW = 9.

(08 Marks)

Module-2

- 3 a. With an example show how relocation and linking operations are performed. (08 Marks)
b. With source code, explain the working of boot-strap loader. (08 Marks)

OR

- 4 a. Explain machine independent loader features given an example with implementation. (08 Marks)
b. With a neat diagram, explain how object program can be processed using linkage loader and linkage editor. (08 Marks)

Module-3

- 5 a. With a neat diagram explain the different phases of the compiler. (10 Marks)
b. Explain the concept of input buffering with its implementation. (06 Marks)

OR

- 6 a. Describe language processing system with a neat diagram. (06 Marks)
b. Write the transition diagram for the following : (06 Marks)
(i) relop (ii) unsigned numbers (iii) identifiers
c. Differentiate between compiler and interpreter. (04 Marks)

Module-4

- 7 a. Compute : (i) First() and Follow()
 (ii) Predictive parsing table for the given grammar
 $D \rightarrow L ; T$
 $L \rightarrow L ; id | id$
 $T \rightarrow int | real$ (06 Marks)
- b. Consider the CFG with the production set,
 $E \rightarrow E + T | T$
 $T \rightarrow TF | F$
 $F \rightarrow F* | a | b$
 Compute the following,
 (i) FIRST() and FOLLOW()
 (ii) Set of LR(0) items
 (iii) SLR parsing table. (10 Marks)

OR

- 8 a. Compute the following for the given grammar.
 $S \rightarrow AA$
 $A \rightarrow a | b$
 (i) LR(1) items (ii) Canonical Parsing table (iii) Verify for any valid string. (10 Marks)
- b. Write a short note on shift reduce parsing with an example. (06 Marks)

Module-5

- 9 a. Write the annotated parse tree and its syntax directed definition to obtain
 $1 * 2 * 3 * (4 + 5)n$ for the grammar
 $L \rightarrow En$
 $E \rightarrow E + T | T$
 $T \rightarrow T * F | F$
 $F \rightarrow (E) | digit$ (06 Marks)
- b. Translate the arithmetic expression :
 $a * -(b + c)$ into
 (i) Quadruples (ii) Triples (iii) Indirect triples (06 Marks)
- c. Discuss various issues in the design of code generation. (04 Marks)

OR

- 10 a. By considering an array type $int[3][3]$, write syntax directed translation with semantic rules and its annotated parse tree. (06 Marks)
- b. Obtain the directed acyclic graph for the expression $x + x * (y + z) + (y + z) * w$, along with the steps. (06 Marks)
- c. Generate assembly level language code (target code) for the following three address sequence assuming that p and q are in memory locations:
 $y = *q$
 $q = q + 4$
 $*p = y$
 $p = p + 4$ (04 Marks)

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15CS64

Sixth Semester B.E. Degree Examination, Aug./Sept. 2020 Operating Systems

Time: 3 hrs.

Max. Marks: 80

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Define operating systems. What are multiprocessor systems? Explain their three main advantages. (05 Marks)
- b. Compare multi-programming and time sharing systems. (05 Marks)
- c. Point out and explain the various operating system services. (06 Marks)

OR

- 2 a. What are microkernels? Point out their advantages. (05 Marks)
- b. What are the two models of inter process communications? What are the strengths and weakness of the two approaches? (05 Marks)
- c. Compare and contrast, short term, medium term and long – term scheduling. (06 Marks)

Module-2

- 3 a. Point out and explain the various benefits of multi threaded programming. (04 Marks)
- b. Consider the five processes arrive at time 0, in the order given, with the length of the CPU burst given in milliseconds.

Process	Burst time
P ₁	10
P ₂	29
P ₃	3
P ₄	7
P ₅	12

Consider the FCFS, SJF and RR (quantum = 10ms) scheduling, draw the Gantt chart for each of the scheduling. Determine average waiting time and turnaround time for all the 3 scheduling algorithm. Which algorithm would give the minimum average waiting time? (12 Marks)

OR

- 4 a. What is the critical section problem point out and explain its three requirements. (05 Marks)
- b. What are semaphores, explain how mutual exclusion is implemented with semaphores. (05 Marks)
- c. What is Dimming philosopher problem explain its monitor solution. (06 Marks)

Module-3

- 5 a. What are deadlocks? Point out and explain its necessary conditions. (04 Marks)
 b. Explain the various methods of recovery from deadlock. (05 Marks)
 c. Consider a system with five processes P_0 through P_4 and three resources types A, B and C. Resource type A has 10 instances, resource type B has 5 instances and resource type C has 7 instances suppose that, at time T_0 , the following snapshot of the system.

	Allocation			Max			Available		
	A	B	C	A	B	C	A	B	C
P_0	0	1	0	7	5	3	3	3	2
P_1	2	0	0	3	2	2			
P_2	3	0	2	9	0	2			
P_3	2	1	1	2	2	2			
P_4	0	0	2	4	3	3			

Draw the need matrix.

The sequence $\langle P_1, P_3, P_4, P_2, P_0 \rangle$ is safe state or not.

(07 Marks)

OR

- 6 a. Define paging. Explain paging hardware with a neat block diagram. (08 Marks)
 b. What is segmentation? Explain basic method of segmentation with an example. (08 Marks)

Module-4

- 7 a. What is demand paging? Explain the steps in handling a page fault with a neat diagram. (08 Marks)
 b. Consider the following sequence
 7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 3, 2, 1, 2, 0, 1, 7, 0, 1
 How many page faults occurs with three page frames :
 i) FIFO
 ii) Optimal page replacement
 iii) LRU page replacement algorithm. (08 Marks)

OR

- 8 a. What is a file? What are its attributes, explain file operations. (06 Marks)
 b. Explain what are the different types of files. (05 Marks)
 c. Explain file system mounting. (05 Marks)

Module-5

- 9 a. Explain various disk scheduling algorithm with an example. (10 Marks)
 b. Explain access matrix protection system of O.S. (06 Marks)

OR

- 10 a. Explain the various. Components of the Linux system. (08 Marks)
 b. Explain the process management in Linux. (08 Marks)

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15CS651

Sixth Semester B.E. Degree Examination, Aug./Sept.2020 Data Mining and Data Warehousing

Time: 3 hrs.

Max. Marks: 80

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. What is a Data Warehouse? Discuss various usage and trends in data warehousing. (08 Marks)
- b. Explain in detail the three – tier Data warehouse architecture. (08 Marks)

OR

- 2 a. Discuss the concept of star, snowflake and galaxy schemas for multidimensional databases. (08 Marks)
- b. Summarize the various OLAP operations in the multidimensional data model. (08 Marks)

Module-2

- 3 a. Identify the different indexing method used for OLAP data with brief explanation. (08 Marks)
- b. Differentiate ROLAP , MOLAP and HOLAP servers. (08 Marks)

OR

- 4 a. What is Data Mining? Explain various data mining tasks, with suitable examples. (08 Marks)
- b. Explain different steps involved in preprocessing steps. Write any 3 challenges faced in Data Mining. (08 Marks)

Module-3

- 5 a. What is Apriori Algorithm? How it is used to find frequent item sets? Explain. (08 Marks)
- b. Illustrate the advantages of using closed frequent itemsets, with an example. Show the relationships among frequent, maximal frequent and closed frequent itemsets. (08 Marks)

OR

- 6 a. Explain FP – growth algorithm for discovering frequent itemsets. (08 Marks)
- b. Briefly explain the Objective Measures of Interestingness for evaluating association patterns. (08 Marks)

Module-4

- 7 a. Define Classification. With a neat figure, explain the general approach for solving classification model. (08 Marks)

- b. Consider the following data set for a binary.

Instance	a ₁	a ₂	a ₃	Target class
1	T	T	1.0	+
2	T	T	6.0	+
3	T	F	5.0	-
4	F	F	4.0	+
5	F	T	7.0	-
6	F	T	3.0	-
7	F	F	8.0	-
8	T	F	7.0	+
9	F	T	5.0	-

Classification problem :

- What is the entropy of this collection of training examples, with respect to the positive class?
- What are the information gains of a₁ and a₂ relative to these training examples?
- For a₃, which is a continuous attribute, compute the information gain for every possible split. (08 Marks)

OR

- What is a rule – based classifier? Explain sequential covering algorithm in rule – based classifier. (08 Marks)
 - Write an algorithm for K – Nearest Neighbor (KNN) classification. List the characteristics of Nearest Neighbor classifiers. (08 Marks)

Module-5

- What is Cluster analysis? Discuss the different types of clusters with examples. (08 Marks)
 - Describe K – means clustering algorithm. What are its limitations? (08 Marks)

OR

- Discuss DBSCAN algorithm for clustering. (08 Marks)
 - Explain Agglomerative Hierarchical Clustering Algorithm, with different proximity between clusters. (08 Marks)

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Sixth Semester B.E. Degree Examination, Aug./Sept.2020 Operation Research

Time: 3 hrs.

Max. Marks: 80

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. What is an Operation Research? Explain the phases of OR. (08 Marks)
- b. A farmer has to plant two kinds of trees P and Q in a land of 4400sq.m area. Each P tree requires at least 15sq.m and Q tree requires 30sq.m area. The annual water requirement of P tree is 30 units and Q tree requires 20 units. A maximum of 3300 units of water is available annually. It is also estimated that the ratio of number of Q trees to the number of P trees should not be less than 6/19 and not more than 17/8. The return per tree from P is expected to be one and half times as much as from Q tree. Formulate the problem as a LP model. (06 Marks)
- c. Define the following terms: i) Feasible solution ii) Optimal solution. (02 Marks)

OR

- 2 a. Explain the assumptions of simplex method. (06 Marks)
- b. Use graphical method and solve following problem:
 Maximize $Z = 6x_1 + 5x_2$
 Subject to $x_1 + x_2 \leq 5$
 $3x_1 + 2x_2 \leq 12$
 $x_1, x_2 \geq 0$ (06 Marks)
- c. Define the following terms with an example: i) Slack variable ii) Surplus variable. (04 Marks)

Module-2

- 3 a. Explain the general formulations of the LPP. (06 Marks)
- b. Using simplex method, solve the following:
 Maximize $Z = 4x_1 + 3x_2 + 6x_3$
 Subject to $2x_1 + 3x_2 + 2x_3 \leq 440$
 $4x_1 + 3x_3 \leq 470$
 $2x_1 + 5x_2 \leq 430$
 where $x_1, x_2, x_3 \geq 0$ (10 Marks)

OR

- 4 a. Mention the basic steps of Big-M method. (04 Marks)
- b. Solve the following LPP using two-phase method
 Maximize $Z = -4x_1 - 3x_2 - 9x_3$
 Subject to $2x_1 + 4x_2 + 6x_3 \geq 15$
 $6x_1 + x_2 + 6x_3 \geq 12$
 where $x_1, x_2, x_3 \geq 0$ (12 Marks)

Module-3

- 5 a. What is duality? Explain the relationships between the primal and the dual problems. (08 Marks)
- b. Obtain the dual of the following primal problem:
 Maximize $Z = 5x_1 + 6x_2$
 Subject to $x_1 + 2x_2 = 5$
 $-x_1 + 5x_2 \geq 3$
 x is unrestricted, $x_2 \geq 0$ (08 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
 2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

OR

- 6 a. Write any 6 key relationship between primal to dual problems. (06 Marks)
 b. Find the dual of the following LPP, solve the dual and hence find the solution to the primal
 Minimize $Z = 2x_1 + 0x_2 + x_3$
 Subject to $x_1 + x_2 - x_3 \geq 5$
 $x_1 - 2x_2 + 4x_3 \geq 8$
 where $x_1, x_2, x_3 \geq 0$ (10 Marks)

Module-4

- 7 a. Find the initial basic feasible solution for the following problem, and also find the transportation cost using North West Corner Rule.

					Supply
	4	6	8	8	40
	6	10	6	7	60
	5	7	6	8	50
Demand	20	30	50	50	

(05 Marks)

- b. Write the procedure of Vogel's approximation method. (06 Marks)
 c. Solve the following problem using Vogel's approximation method:

					Supply
	4	6	8	8	40
	6	8	6	7	60
	5	7	6	8	50
Demand	20	30	50	50	

(05 Marks)

OR

- 8 a. Three jobs are to be done by 4 machines: Each job can be assigned to one and only one machine. The cost of each job on each machine is given in the following table:

		Machine			
		M ₁	M ₂	M ₃	M ₄
Job	J ₁	18	24	28	32
	J ₂	8	13	17	19
	J ₃	10	15	15	22

What are the job assignments which will minimize the total cost? (08 Marks)

- b. Obtain the optimum solution for the given problem using MODI method.

2	3	11	7	6
1	0	6	1	1
5	8	15	9	10
7	5	3	2	

(08 Marks)

Module-5

- 9 a. What is a saddle point? Give an example. (04 Marks)
 b. Explain the maximin-minimax principle. Give an example. (06 Marks)
 c. Solve the following game, determine the optimum strategies and value of the game:

8	-3
-3	1

(06 Marks)

OR

- 10 Write the short note on the following:

- a. Metaheuristics
 b. Tabu search
 c. Simulated Annealing
 d. Genetic Algorithms.

(16 Marks)

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Sixth Semester B.E. Degree Examination, Aug./Sept. 2020 Python Application Programming

Time: 3 hrs.

Max. Marks: 80

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Explain types of error with examples. (04 Marks)
b. Explain various Names, Keywords and expressions with examples. (06 Marks)
c. Write a python program using try and except, so that your program handles non-numeric input gracefully by printing a message and exiting the program the following shown two execution of the program
Enter Hours : 20
Enter Rate : nine
Error, please enter numeric input
Enter hours : forty
Error, please enter numeric input. (06 Marks)

OR

- 2 a. Explain conditional execution, Alternative execution chained conditionals and nested conditionals with examples. (08 Marks)
b. Explain break and continue statement with examples in python. (04 Marks)
c. Explain with an example what are fruitful functions and void functions. (04 Marks)

Module-2

- 3 a. Explain while and for loops with examples. (04 Marks)
b. Write a python program to find the largest value from the given set of accepted values. (06 Marks)
c. Discuss the string handling methods in python with examples. (06 Marks)

OR

- 4 a. Write a python program to check whether a given string is palindrome or not. (06 Marks)
b. Explain with example the syntax of read (), write () methods for a file. (04 Marks)
c. Develop a python program for creating a copy an existing file. (06 Marks)

Module-3

- 5 a. Explain the difference between a list and a dictionary. (04 Marks)
b. Make a list of first ten letters of the alphabet then using the slice operation do the following:
i) Print the first three letters from the list
ii) Print any three letters from the middle
iii) Print the letters from 5th letters to the end of the list. (04 Marks)
c. Discuss the lists handling functions in python with example. (08 Marks)

OR

- 6 a. Differentiate between list and dictionary. (08 Marks)
 b. Define tuple, explain DSU pattern. Write a python code to determinate tuples by sorting a list of words from longest to shortest using loops. (04 Marks)
 c. Explain the need of Regular expressions in python language. (04 Marks)

Module-4

- 7 a. Explain classes and attributes in python language with examples. (05 Marks)
 b. Explain pure functions and modifiers with examples. (05 Marks)
 c. Write a program that uses class to store the name and marks of students. Use list to store the marks in three subjects. (06 Marks)

OR

- 8 a. Explain initialization method with example. (04 Marks)
 b. Write a class Rectangle that has attributes length and breadth and a method area which returns the area of the rectangle. (06 Marks)
 c. What is operator overloading? Write python code to overload “+” “-” and “*” operator by providing the methods `__add__`, `__sub__` and `__mul__`. (06 Marks)

Module-5

- 9 a. Write a python code for retrieving the romeo.txt file from the web and compute the frequency of each word in the file. (06 Marks)
 b. Write a note on XML. (05 Marks)
 c. Explain with a neat diagram of Service Oriented Architecture. (05 Marks)

OR

- 10 a. Describe creation of database table using database cursor architecture. (08 Marks)
 b. Write a python code for creating employee database, inserting records and selecting the employees working in the company. (08 Marks)
