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Sixth Semester B.E. Degree Examination, July/August 2022 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 common attacks with respect to cyber space. (06 Marks)
b. Apply extended Euclidean algorithm to find the inverse of 12 modulo 79. (04 Marks)
c. Distinguish between the following:
(i) Stream and Block Cipher. (06 Marks)
(ii) Substitution and Transposition cipher (06 Marks)

OR

- 2 a. Explain different classes of vulnerabilities in the domain of network security. (06 Marks)
b. Describe the various kinds of cryptanalysis attack. (04 Marks)
c. With a neat diagram demonstrate the working of DES algorithm. (06 Marks)

Module-2

- 3 a. The modulus (n) in a toy implementation of RSA is 143 and the encryption key (e) is 11. Find the corresponding decryption key and encrypt plain text = 127. (08 Marks)
b. What is the common secret key if A and B perform Diffie-Hellman key exchange using $P = 53$ and $g = 2$. Assume the secret key of A is 10 and B is 33. (04 Marks)
c. Block of plain text has been encrypted using Elgamal encryption with $P = 131$, $g = 2$ and the recipient's public key (α) = 14. What is the plain text corresponding cipher text $C_1 = 103$ and $C_2 = 51$ [Sender's private key $a = 97$]. (04 Marks)

OR

- 4 a. Explicate the properties of hash algorithm. (04 Marks)
b. Elaborate on the practical issues of RSA. (08 Marks)
c. Narrate man-in-the-middle attack on Diffie Hellman key exchange. (04 Marks)

Module-3

- 5 a. With a neat diagram, explain function of SSL record layer protocol. (08 Marks)
b. Illustrate the various steps in Kerberos message sequence. (08 Marks)

OR

- 6 a. Explain AH and ESP in tunnel mode of IP security. (08 Marks)
b. Describe mutual authentication using shared secret. Also identify the solution to overcome the issues posed by it. (08 Marks)

Module-4

- 7 a. Define web services as defined by ω^3C . Discuss the entities involved in web services. (06 Marks)
b. Explain the functions of WS-security. (10 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

- 8 a. Differentiate Anamoly V/s Signature based IDS. (04 Marks)
b. Discuss the characteristics of worms. (06 Marks)
c. Depict four-way handshake in 802.11i. (06 Marks)

Module-5

- 9 a. Define the following terms under the IT Act 2000:
(i) Addressee
(ii) Subscriber
(iii) Adjudating officer.
(iv) Originator.
(v) Certifying authority. (05 Marks)
- b. What is Information Act? Discuss its aim, objective and scope of the act. (07 Marks)
- c. Outline any four functions of controller. (04 Marks)

OR

- 10 a. Discuss the provisions of IT Act with respect to Authentication of electronic record. (06 Marks)
- b. Explain the duties of subscriber. (06 Marks)
- c. Define the penalty for failure to furnish information return under section 43 of IT Act 2000. (04 Marks)

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Sixth Semester B.E. Degree Examination, July/August 2022 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 the applications of computer graphics. Explain any two in detail. (08 Marks)
 b. Explain: i) Color CRT monitors ii) Flat panel displays. (08 Marks)

OR

- 2 a. Explain the display window management using GLUT. (08 Marks)
 b. Given a radius $r = 10$, demonstrate midpoint circle algorithm in the first quadrant from $x = 0$ to $x = y$. The initial point is $(x_0, y_0) = (0, 10)$. (08 Marks)

Module-2

- 3 a. What is fill area? Explain polygon classification, identifying and splitting concave polygons. (08 Marks)
 b. Explain the scan line polygon fill algorithm. (08 Marks)

OR

- 4 a. What is homogeneous coordinate? Write the matrix representation for translation rotation and scaling. (08 Marks)
 b. What is raster operation? Explain the raster methods for geometric transformations. Explain different OpenGL functions used for raster operation. (08 Marks)

Module-3

- 5 a. Explain Cohen-Sutherland line clipping algorithm. (08 Marks)
 b. Explain the steps in Sutherland-Hudgeman polygon clipping algorithm. Apply the algorithm for the following object. (Ref. Fig.Q.5(b)). (08 Marks)

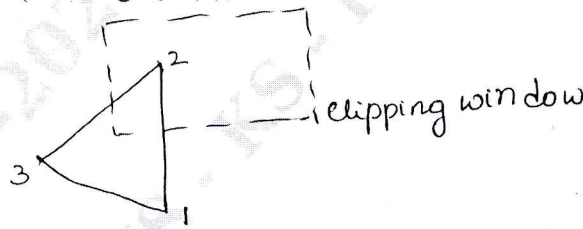


Fig.Q.5(b)

OR

- 6 a. Explain:
 i) OpenGL geometric transformation functions. (08 Marks)
 ii) OpenGL matrix operations. (08 Marks)
 b. Explain:
 i) RGB color model. (08 Marks)
 ii) CMY color model. (08 Marks)

Module-4

- 7 a. What is
i) Parallel projection (08 Marks)
ii) Perspective projection. (08 Marks)
- b. Explain the normalization transformation for an orthogonal projection.

OR

- 8 a. Explain:
i) gluLookAt() (08 Marks)
ii) gluFrustum(). (08 Marks)
- b. Explain OpenGL visibility detection functions.

Module-5

- 9 a. What are the major characteristics that describe the logical behavior of an input device? (08 Marks)
Explain the various classes logical input devices supported by OpenGL. (08 Marks)
- b. What is a display list? Explain definition and execution display list.

OR

- 10 a. What is double buffering? How it is implemented in OpenGL? (06 Marks)
- b. Explain OpenGL i) Quadric surface functions ii) Cubic surface functions. (04 Marks)
- c. Explain Bezier curve equations and properties of Bezier curve. (06 Marks)

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Sixth Semester B.E. Degree Examination, July/August 2022 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 the instruction formats and addressing modes of SIC/XE machine architecture. (08 Marks)
b. Write the algorithm for pass – 1 of two –pass assemblers. (08 Marks)

OR

- 2 a. Define Macro. Briefly explain the various data structures used in the design of macro processor. (06 Marks)
b. Generate the object code for each statements write the object program for the following SIC/XE. Given that : CLEAR = B4 : LDA = 00, LDB = 68, ADD = 18, TIX = 2C, JLT = 38, STA = 0C.

```
SUM      START      0000
FIRST    CLEAR      X
          LDA        #0
          +LDB      #TOTAL
          BASE      TOTAL
LOOP     ADD        TABLE, X
          TIX       COUNT
          JLT       LOOP
          STA       TOTAL
COUNT  RESW       1
TABLE   RESW       2000
          TOTL     RESW 1
          END      FIRST
```

(10 Marks)

Module-2

- 3 a. Define loader? Write an algorithm for absolute loader. (05 Marks)
b. Write SIC/XE source code for a simple bootstrap loader. (06 Marks)
c. Explain the facilities available in MS-DOS linker for program linking. (05 Marks)

OR

- 4 a. Define program relocation? Explain the different ways of doing program relocation. (05 Marks)
b. With an algorithm, explain Pass – 1 of linking loader. (06 Marks)
c. Explain how loading and calling of a subroutine done using dynamic linking. (05 Marks)

Module-3

- 5 a. Explain the various phases of compiler with the help of neat diagram. (08 Marks)
b. List and explain reasons for separating analysis portion of a compiler into lexical analysis and syntax analysis phases. (04 Marks)
c. Construct a transition diagram for recognizing unsigned numbers. (04 Marks)

OR

- 6 a. Write look ahead with sentinels for input buffering strategy used in lexical analysis phase. (06 Marks)
 b. How to handle reserved words and identifiers during recognition of tokens? Explain. (05 Marks)
 c. Enlist the algebraic laws for regular expression. (05 Marks)

Module-4

- 7 a. Give the rules for constructing FIRST and FOLLOW sets. (06 Marks)
 b. Construct predictive parsing table for the following grammar.
 $S \rightarrow aABb$
 $A \rightarrow Ac/\epsilon$
 $B \rightarrow d/\epsilon$ (08 Marks)
 c. Enlist the conditions to test whether a given grammar is LL(1). (02 Marks)

OR

- 8 a. Define shift reduce parser? Explain its actions and conflicts by taking on example. (06 Marks)
 b. Write an algorithm for computation of CLOSURE of LR(0). (02 Marks)
 c. Consider the grammar $A \rightarrow (A)/a$ construct the DFA of sets of LR(0) items. Show the parsing actions for i/p string ((a)). Clearly show states and symbols on the stack. (08 Marks)

Module-5

- 9 a. Define inherited and synthesized attributes. Give examples. (05 Marks)
 b. Give SDD for simple Desk calculator. (05 Marks)
 c. Which are the common 3-address forms? Explain. (06 Marks)

OR

- 10 a. Construct and DAG and a 3-address code for the expression.
 $a + a * (b - c) + (b - c) * d$ (05 Marks)
 b. Discuss various issues in the design of a code generator. (06 Marks)
 c. Construct a dependency graph for the declaration float id₁, id₂, id₃. (05 Marks)

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Sixth Semester B.E. Degree Examination, July/August 2022 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. "OR is the art of winning wars without actually fighting them". Discuss. (02 Marks)
 b. Discuss the scope and limitation of OR. (06 Marks)
 c. A firm uses lathes, milling machines and grinding machines to produce two machine parts. Table 1(c) represents the machining times required for each part, the machining times available on different machines and the profit on each machine part.

Table 1(c)

Type of Machine	Machining time required for the machine part (minutes)		Maximum time available per week (minutes)
	I	II	
Lathes	12	6	3,000
Milling machines	4	10	2,000
Grinding machines	2	3	900
Profit per unit	Rs.40	Rs.100	

Find the number of parts I and II to be manufactured per week to maximize the profit.

(08 Marks)

OR

- 2 a. Discuss the various phases in solving an OR problem. (08 Marks)
 b. Solve the LPP by Graphical method
 Maximize $Z = 100x_1 + 40x_2$
 Subject to $5x_1 + 2x_2 \leq 1000$
 $3x_1 + 2x_2 \leq 900$
 $x_1 + 2x_2 \leq 500$
 where $x_1, x_2 \geq 0$. (08 Marks)

Module-2

- 3 a. Explain the concept of degeneracy in simplex method. How it is resolved? (08 Marks)
 b. Solve the following LPP by Big-M method
 Maximize $Z = 4x_1 + x_2$
 Subject to $3x_1 + x_2 = 3$
 $4x_1 + 3x_2 \geq 6$
 $x_1 + 2x_2 \leq 3$ and
 $x_1, x_2 \geq 0$. (08 Marks)

OR

- 4 a. Explain how to set up the simplex method with an example. (08 Marks)
 b. Solve the following LPP in Tabular form:
 Maximize $Z = 3x_1 + 2x_2$
 Subject to $4x_1 + 3x_2 \leq 12$
 $4x_1 + x_2 \leq 8$
 $4x_1 - x_2 \leq 8$ and
 $x_1, x_2 \geq 0$. (08 Marks)

Module-3

- 5 a. Explain the essence of duality theory and primal dual relationship in simplex method. (08 Marks)
 b. Use duality to solve
 Minimize $Z = 3x_1 + x_2$
 Subject to $x_1 + x_2 \geq 1$
 $2x_1 + 3x_2 \geq 2$
 where $x_1, x_2 \geq 0$ (08 Marks)

OR

- 6 a. Explain the Iterative procedure of the dual simplex method. (08 Marks)
 b. Use dual simplex method to solve the following LPP:
 Maximize $Z = 3x_1 - x_2$
 Subject to $x_1 + x_2 \geq 1$
 $2x_1 + 3x_2 \geq 2$
 where $x_1, x_2 \geq 0$ (08 Marks)

Module-4

- 7 a. Explain Hungarian Algorithm with example. (08 Marks)
 b. Priyanka iron and steel company has 3 open hearth furnaces and 5 rolling mills. Transportation cost (Rs. per quintal) for transporting steel from furnaces to rolling mills is shown in the Table 7(b) below.

Table 7(b)

		Rolling Mills					Capacity
		M ₁	M ₂	M ₃	M ₄	M ₅	
Furnaces	F ₁	4	2	3	2	6	8
	F ₂	5	4	5	2	1	12
	F ₃	6	5	4	7	3	14
Requirement		4	4	6	8	8	

What is the optimal schedule?

(08 Marks)

OR

- 8 a. What do you understand by a balanced and an unbalanced transportation problem? How an unbalanced transportation problem is tackled? (08 Marks)
- b. Solve the transportation cost for minimization

		Godowns				Supply
		1	2	3	4	
Factories	1	40	29	21	19	1200
	2	35	28	27	24	4800
	3	36	30	26	18	3000
	4	30	25	20	15	700
Demand		5000	2500	1200	1000	

(08 Marks)

Module-5

- 9 a. Explain the simulated annealing and genetic algorithm in the context of metaheuristics. (08 Marks)
- b. Solve the following 2×5 game by graphical method

		Player B				
		1	2	3	4	5
Player A	1	-5	5	0	-1	8
	2	8	-4	-1	6	-5

(08 Marks)

OR

- 10 a. Explain maxmin, minmax principle and two persons, zero sum games in the theory of game. (08 Marks)
- b. Explain the characteristics of games. (08 Marks)

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Sixth Semester B.E. Degree Examination, July/August 2022 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 Computer Hardware Architecture with neat diagram. (05 Marks)
- b. Explain in detail the building blocks of a program. State the need for functions in Python. (05 Marks)
- c. Explain Syntax errors, logic errors and semantic errors. List out the differences between compiler and interpreter. (06 Marks)

OR

- 2 a. Explain keywords, variable names with rules, operators, operands and order of operations in Python with examples. (08 Marks)
- b. Explain the concept of short circuit evaluation of logical expression in Python. Write a program to prompt the user for a score between 0.0 and 1.0. If the score is out of range print an error. If the score is between 0.0 and 1.0. Print a grade using the following table:

Score	Grade
≥ 0.9	A
≥ 0.8	B
≥ 0.7	C
≥ 0.6	D
≥ 0.6	F

Use try and Except so that your program handles non-numeric input gracefully by printing a message and exit the program. (08 Marks)

Module-2

- 3 a. Explain string slices, string methods, format operator with examples in Python. (06 Marks)
- b. Write a program which prompts the user for a Celsius temperature, convert the temperature to Fahrenheit and print out the converted temperature. (05 Marks)
- c. Explain break and continue statements with examples in Python. (05 Marks)

OR

- 4 a. "Strings in Python are immutable". Explain this statement with example. Write pythonic code to find the factorial of any number entered by the keyboard. (08 Marks)
- b. Explain with a neat diagram, a file handling operations in Python. Write a Python program to read the file, count and print the lines that start with the word "From". Prompt the user for the file name. (08 Marks)

Module-3

- 5 a. Explain list operations and methods in Python. "List are mutable". Explain this statement with example. (08 Marks)
- b. How are dictionaries and tuples used together? Demonstrate the use of tuple assignment with dictionaries to traverse the keys and values of dictionary. (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. Define tuple. Explain DSU pattern. (06 Marks)
 b. Why do you need regular expressions in Python? Write a program to look for lines of the form New Revision : 39772
 And Extract the number from each of the lines using a regular expression and the find all () method. Compute the average of the numbers and print out the average. (10 Marks)

Module-4

- 7 a. Explain Polymorphism in Python in detail with examples. (08 Marks)
 b. What is Operator overloading? Write pythonic code to overload "+", "-" and "*" operators by providing the methods `_add_`, `_sub_` and `_mul_`. (08 Marks)

OR

- 8 a. Explain `init` method and `__str__` method? Write a `str` method for the point class. Create a point object and print it. (08 Marks)
 b. What are classes and objects in Python? Explain attributes and object diagram with an example. (08 Marks)

Module-5

- 9 a. Define Socket. Show and explain with neat diagram, Socket connection. Write a Python program to retrieve an image over HTTP. (10 Marks)
 b. State the need for `Urllib` in Python. Explain why data is retrieved in blocks. (06 Marks)

OR

- 10 a. Define XML. Construct a simple XML document and represent it with a diagram. Write Python code to loop through XML nodes in the document. (08 Marks)
 b. Define JSON. Construct a simple JSON document. Bring out the differences between XML and JSON. Write Python code to Parse JSON document. (08 Marks)
