USN | | | | | | | | | | 15CS61

Sixth Semester B.E. Degree Examination, Jan./Feb. 2021
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 different defence strategies and techniques.   **(10 Marks)**
    b. Explain Extended Euclidean Algorithm. Compute the inverse of 12 modulo 79 using Extended Euclidean Algorithm.   **(06 Marks)**

OR

2   a. Explain Hill Cipher polyalphabetic cipher method of plain text. Solve the same for block size of 2, where $K = \begin{bmatrix} 3 & 7 \\ 15 & 12 \end{bmatrix}$.   **(06 Marks)**
    b. With a neat diagram, explain DES construction.   **(10 Marks)**

Module-2

3   a. Explain RSA operations and compute the same for $p = 3$ and $q = 11$ as prime numbers.
                                                                                (06 Marks)
    b. Explain with a neat diagram computation of SHA-1 hash construction.   **(10 Marks)**

OR

4   a. Explain Diffie-Hellman key exchange protocol for more than two parties.   **(08 Marks)**
    b. Explain EL Gamal encryption for large prime numbers. Solve the same for $p = 131$, $q = 2$, private key = 97, m = 75.   **(08 Marks)**

Module-3

5   a. With a neat diagram, explain different PKI architectures.   **(10 Marks)**
    b. With a neat scenario, how mutual authentication can be performed using public key encryption.   **(06 Marks)**

OR

6   a. Explain Kerberos message sequence with steps involved.   **(06 Marks)**
    b. Explain SSL Handshake Protocol.   **(10 Marks)**

Module-4

7   a. Explain Worm characteristics.   **(10 Marks)**
    b. Explain firewall functionality and firewall types.   **(06 Marks)**

OR

8 a. Explain different technologies for web services. (10 Marks)
   b. Explain Security Assertions Markup Language (SAML) with Authentication Statement.
   (06 Marks)

Module-5

9 a. Give the aim and objectives of IT Act, 2000. (06 Marks)
   b. Explain briefly different regulations of Certifying Authorities. (10 Marks)

OR

10 a. Explain briefly Digital Signature Certificates necessary for an undertaking digitally sign a document. (08 Marks)
   b. Explain briefly any eight offences in IT. (08 Marks)

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Sixth Semester B.E. Degree Examination, Jan./Feb.2021
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.	What is computer graphics? List and explain application of computer graphics.	(05 Marks)
	b.	With a neat diagram, explain the refresh CRT monitors.	(06 Marks)
	c.	With a neat diagram, explain Raster Scan system.	(05 Marks)

OR

2	a.	Illustrate Display Window Management using GLUT.	(03 Marks)
	b.	List and explain OpenGL point and line functions with an example.	(05 Marks)
	c.	Explain Bresonhan's line algorithm with an example.	(08 Marks)

Module-2

3	a.	Write an OpenGL polygon Fill Attribute functions.	(05 Marks)
	b.	How you carryout General Scan-line polygon Fill Algorithm?	(06 Marks)
	c.	Construct two dimensional viewing pipeline with a neat diagram.	(05 Marks)

OR

4	a.	Explain translation, rotation and scaling of objects in 2 dimensions.	(07 Marks)
	b.	Explain matrix representation of homogeneous coordinates of 2 dimensions.	(04 Marks)
	c.	Describe the following : Reflection and Shearing.	(05 Marks)

Module-3

5	a.	Explain Cohen –Sutherland clipping algorithm with an example.	(08 Marks)
	b.	With a neat diagram, explain various light source.	(08 Marks)

OR

6	a.	Explain the RGB color models.	(04 Marks)
	b.	List and explain OpenGL geometric transformation function.	(05 Marks)
	c.	Describe the basic illumination models.	(07 Marks)

Module-4

7	a.	Explain the three dimension viewing coordinate parameters.	(08 Marks)
	b.	Explain the orthogonal projection.	(08 Marks)

OR

8	a.	Explain the Depth-Buffer method.	(05 Marks)
	b.	Explain perspective projection transformation matrix.	(07 Marks)
	c.	Explain three dimension viewing functions.	(04 Marks)

Module-5

9	a.	How Pop-up menus are created using GLUT? Illustrate with an example.	(08 Marks)
	b.	Write a program in C/C++ to draw a color cube and spin it using OpenGL transformation matrix.	(08 Marks)

OR

10	a.	Explain Beziel Spline curves.	(08 Marks)
	b.	Explain Quadric surface.	(08 Marks)

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15CS63

Sixth Semester B.E. Degree Examination, Jan./Feb. 2021
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.　What is System Software? Compare system software with application software and give examples. **(04 Marks)**
　　b.　Explain the instruction formats and addressing modes of SIC/XE Machine Architecture. **(08 Marks)**
　　c.　Write a sequence of instructions for SIC/XE to clear a 20 byte character string to all blank. **(04 Marks)**

OR

2　a.　What are the Fundamental functions that any Assembler must perform? Explain any six assembler directives with example. **(08 Marks)**
　　b.　What is MACRO? Briefly discuss various data structures required for design of MACRO PROCESSOR. **(08 Marks)**

Module-2

3　a.　Explain the working of Linkage editor and Linking loader. **(08 Marks)**
　　b.　What is a Loader? Develop an algorithm for Bootstrap loader. **(08 Marks)**

OR

4　a.　What is Relocation? Explain the methods for specifying relocation as a part of object program. **(08 Marks)**
　　b.　Describe the features of the Sun OS linkers for SPARC systems. **(08 Marks)**

Module-3

5　a.　Explain the various phases of compiler with a neat diagram. Show the transformation made by each of these phases for the statement $a = b + c * 20$, where a, b, and c are reals. **(10 Marks)**
　　b.　Construct a transition diagram for relational operator. Write the program segment to implement it showing the first state and one final state. **(06 Marks)**

OR

6　a.　What is printed by following 'C' program Fragment
　　　 # define a(x + 1)
　　　　int x = 2 ;
　　　　void b ( ) {int x = 1 ; printf("% d\n", a);}
　　　　void c ( ) {printf("% d/n", a);}
　　　　void main ( ) {b ( ) ; c ( );}. **(03 Marks)**
　　b.　Give the reasons, why the analysis portion of a compiler is separated into lexical analysis and parsing phases. **(03 Marks)**
　　c.　Explain the structure of Lex program and write a Lex program that recognize the tokens if, then, else, id , number and relational operator. **(10 Marks)**

Module-4

7 a. Construct a predictive parsing table for the following grammar by making suitable changes to it. $E \rightarrow E + E \mid E * E \mid (E) \mid id$. **(10 Marks)**

   b. What is Handle Pruning? Construct Bottom up parse tree for the input string $w = aaa * a++$ using the grammar $S \rightarrow S S + \mid S S * \mid a$. **(06 Marks)**

OR

8 a. Show that following grammar is not SLR (1).
   $S \rightarrow L = R \mid R$
   $L \rightarrow * R \mid id$
   $R \rightarrow L$. **(10 Marks)**

   b. What is a Shift – reduce Parsing? What are the actions of Shift – reduce Parser? Explain. **(06 Marks)**

Module-5

9 a. Write the SDD for simple type declaration and construct dependency graph for a declaration float id_1 , id_2 , id_3. **(08 Marks)**

   b. Translate the arithmetic expression $a + - (b + c)$ into
   i)   Syntax tree.
   ii) Quadruples.
   iii) Triples.
   iv) Indirect triples. **(08 Marks)**

OR

10 a. Discuss the various issues in the design of Code generator. **(10 Marks)**

   b. Give SDD for simple desk calculator and construct annoted parse tree for the expression $(3 + 4) * (5 + 6)n$. **(06 Marks)**

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Sixth Semester B.E. Degree Examination, Jan./Feb. 2021
Operating Systems

Time: 3 hrs.   Max. Marks: 80

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

Module-1

1   a. Define operating system. Discuss the services provided by operating system form user point of view and system point of view (services helpful to user and system). **(06 Marks)**
     b. Define system call. Explain various types of system call. **(06 Marks)**
     c. Compare the advantages and disadvantages of simple structured operating system with layered approach. **(04 Marks)**

OR

2   a. Define process. Explain different states of process with state diagram indicating the conditions for process to shift from one state to another. **(04 Marks)**
     b. Define scheduler. Explain the different types of schedulers. **(06 Marks)**
     c. Describe the implementation of IPC using shared memory with producer consumer problem. **(06 Marks)**

Module-2

3   a. State the need and benefits of multipthreading. Explain the different mutlithreaded models. **(05 Marks)**
     b. Consider the following set of processes :

Process	Burst Time	Arrival Time	Priority
P_1	10	0	2
P_2	5	2	1
P_3	2	3	0
P_4	20	5	3

Draw Gantt chart and calculate AWT, (Average Waiting Time) and ATT (Average Turnaround Time) using.
   i)   Non preemptive and pre-emptive SJF
   ii) Round Robin with TQ = 5msec. **(06 Marks)**
     c. Explain multiple processor scheduling. **(05 Marks)**

OR

4   a. State the requirements of critical section problem. Explain how Perterson's solution satisfies the above requirements with suitable code. **(08 Marks)**
     b. Define semaphore. Explain how synchronization is achieved using semaphore in reader writer's synchronization problem. **(08 Marks)**

Module-3

5 a. What is deadlock? Explain the necessary conditions for the occurrence of deadlock.
(04 Marks)
   b. Explain the Banker's algorithm for deadlock avoidance. (06 Marks)
   c. Consider the following snapshot of sysyem :

Process	Alloc				Max				Available			
	A	B	C	D	A	B	C	D	A	B	C	D
P_0	0	0	1	2	0	0	1	2	1	5	2	0
P_1	1	0	0	0	1	7	5	0				
P_2	1	3	5	4	2	3	5	6				
P_3	0	6	3	2	0	6	5	2				
P_4	0	0	1	4	0	6	5	6				

   i)   What is the content of need matrix
   ii) Is system in safe state?
   iii) If request from process P_1 arrives for (0 4 2 0) can the request be granted immediately?
(06 Marks)

OR

6 a. Explain paging with TLB with neat diagram. (04 Marks)
   b. List out contiguous memory allocation strategies. Give the memory partition of 100K, 500K, 200K, 300K and 600K how would each of allocation alg, place processes of 212K, 417K, 112K and 426K (in order). Which alg, makes most efficient use of memory? (06 Marks)
   c. Explain the following : i) Segmentation ii) Inverted page table. (06 Marks)

Module-4

7 a. Define page fault. Explain the steps involved in handling page fault with neat diagram.
(06 Marks)
   b. Consider the following reference string 1 2 3 4 2 1 5 6 2 1 2 3 7 6 3 2 1 2 3 6 for frame size of three. Find the number of page faults using FIFO, optimal, LRU. Which one is most efficient? (06 Marks)
   c. Describe the working set model. (04 Marks)

OR

8 a. Explain the various methods of accessing a file. (05 Marks)
   b. Define directory. Explain the various directory structures. (06 Marks)
   c. Explain the methods of keeping track of free space on disk. (05 Marks)

Module-5

9 a. Explain SSTF, SCAN, C – SCAN disk scheduling algorithm. (08 Marks)
   b. Explain access matrix model used for protection in a commuter system. (08 Marks)

OR

10 a. With neat diagram, explain in detail components of LINUX system. (08 Marks)
    b. Explain in detail the different IPC mechanism available in LINUX. (08 Marks)

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Sixth Semester B.E. Degree Examination, Jan./Feb. 2021
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 the computer hardware architecture with a neat sketch.   **(06 Marks)**
   b. Write a note on general types of errors.   **(06 Marks)**
   c. Write a program that uses input to prompt a user for their name and then welcomes them.
                                                                              (04 Marks)

OR

2 a. Write a program which prompts the user for a Celsius temperature, convert the temperature to Fahrenheit and print the converted temperature.   **(06 Marks)**
   b. Explain nested conditional statement with an example.   **(04 Marks)**
   c. Write a program with a function computer grade that takes a score as its parameter and returns a grade as a string.   **(06 Marks)**

Module-2

3 a. Analyze the use of break and continue statement with an example.   **(06 Marks)**
   b. Explain format operators in python with suitable examples.   **(03 Marks)**
   c. Define a file data structure. Illustrate reading and writing operation on files with examples.
                                                                              (07 Marks)

OR

4 a. Write a program to read numbers repeatedly until the user enters 'done'. Once 'done' is entered print out total, count and average of the numbers.   **(06 Marks)**
   b. Write a note on string methods.   **(07 Marks)**
   c. Write a program to read through a file and print the contents of the file (line by line) all in upper case.   **(03 Marks)**

Module-3

5 a. Explain list operations and list methods with examples.   **(05 Marks)**
   b. Write a program to count how many times each letter appears in a word. **(07 Marks)**
   c. Explain tuple assignment with examples.   **(04 Marks)**

OR

6 a. Write a program to open a file and read it line by line. For each line, split the line into list of words using split function. For each word check to see if the word is already in a list. If the word is not in the list, add it to the list.   **(06 Marks)**
   b. Explain advanced text parsing using dictionary.   **(07 Marks)**
   c. Why search and find all functions of regular expressions used? Explain with suitable examples.   **(03 Marks)**

Module-4

7 a. Define class. Explain classes and objects of python in detail with suitable examples.

(10 Marks)

   b. What is a pure function? Explain with an example. (06 Marks)

OR

8 a. Write a program with a function print_time that takes a time object and prints it in the form hour:minute:second. Write another function is_after that takes two time objects t_1 and t_2 and resume True if t_1 follows t_2 chronologically and False otherwise. (08 Marks)

   b. Write a note on operator overloading with an example. (08 Marks)

Module-5

9 a. How to retrieve web pages using urllib? Explain how to compute frequency of each word in the file retrieved. (08 Marks)

   b. What is an API? Explain with a neat sketch. (08 Marks)

OR

10 a. Write a program to read binary files. (08 Marks)

    b. Explain keys in a database model. (08 Marks)

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Sixth Semester B.E. Degree Examination, Jan./Feb. 2021
File Structures

Time: 3 hrs.   Max. Marks: 80

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

Module-1

1   a.   Implement 'wc' unix command in C++.   **(08 Marks)**
    b.   Suppose it is needed to store a backup of a large file with 1 million records of 100 bytes
         records on a 6250 bpi tape that has an
         (i)   Internal block gap of 0.1″ with blocking factor 10
         (ii) Internal block gap of 0.2″ with blocking factor 20
         for each case calculate the space required to store file on the tape, effective recording density
         and effective data transmission rate with a tape speed of 200 ips.   **(08 Marks)**

OR

2   a.   Implement "Fixed length Field" Method of field structure using "#" as a record delimiter in
         the file.   **(04 Marks)**
    b.   Implement "Delimited Field" method of field structure using " ¦ " as a field delimiter and
         "#" as a record delimiter in a file.   **(04 Marks)**
    c.   Explain organization of disks and cost of disk access.   **(08 Marks)**

Module-2

3   a.   Write a C++ program to reclaim the Free space resulting from the deletion of records using
         linked list.   **(10 Marks)**
    b.   Explain the key sorting technique and their limitations.   **(06 Marks)**

OR

4   a.   Explain operations required to maintain an Indexed file.   **(08 Marks)**
    b.   Explain the Improving of secondary Index structure.   **(08 Marks)**

Module-3

5   a.   Write a C++ program to read K-list of names and merge them using K-way merge algorithm
         with K = 8.   **(10 Marks)**
    b.   Using c-sequential match based on a single loop demonstrates inter section of two lists.
                                                                                (06 Marks)

OR

6   a.   Write a Formal definition of B – Tree and explain the worst case search depth of the tree.
                                                                                (08 Marks)
    b.   With an order 4 construct a B – Tree for the following set of keys and show the operation of
         merging and redistribution.
         M N A B J K L C R S D E O → set of keys.   **(08 Marks)**

Module-4

7   a.   Explain simple prefix B + – Tree and its maintenance.   **(10 Marks)**
    b.   Write a note on Indexed sequential Access.   **(06 Marks)**

OR

8 a. Explain the block splitting and merging due to Insertion and deletion in the sequence set with examples. **(10 Marks)**

   b. Differentiate between B –Tree and B+ Tree **(06 Marks)**

Module-5

9 a. Define Hashing. Prove that the performance of chained progressive overflow is more then the progressive overflow Collision resolution technique. **(10 Marks)**

   b. Suppose that 1000 locations are allocated to hold 700 records in a randomly hashed file and that each address can hold 2 records.
   Compute the following values.
   - (i)   Packing density
   - (ii) Expected number of address with no records
   - (iii) Expected number of addresses with exactly one record
   - (iv) Expected number of overflow records **(06 Marks)**

OR

10 a. Explain working of Extendable Hashing. **(06 Marks)**

   b. Write a C++ program to store and retrieve student data from file using Hashing. Use any collision resolution technique. **(10 Marks)**

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