OS

09/10/22

Sem - III

Reg.

Instructions:

1) All questions are compulsory.
2) Mixing of sub-questions are not allowed.
3) Write in clear and legible writing.

Q I Attempt any **FOUR**   (20)

A) . What are Operating Systems? Explain the components of OS.

B) . Explain the types of Operating Systems.

C) . Explain the different architecture of OS.

D) . Explain the Service of Operating Systems.

E) . Briefly Explain the Process Life Cycle.

F) . Short Notes: - **(ATTEMPT ANY TWO)**

   A) Multicore Programming.

   B) System Call.

   C) Process Control Block.

   D) Operation on Processes.

   E) Thread.

Q II Attempt any **FOUR<from all unit Ii>**   (20)

A) Explain what is a deadlock? explain the different methods of handling a deadlock.

B) . Explain different types of schedulers.

C) . What is a Critical Section problem? Give the conditions that a solution to the critical section problem must satisfy.

D) . Difference between following

   a   Preemptive Scheduling and Non-Preemptive Scheduling

   b. Bounded Buffer and Reader Writer problem

E) .   Q Consider the following processes with burst time (CPU Execution time) Calculate the average waiting time and average turnaround time?

Process id	Arrival time	Burst time/CPU execution time
P1	0	2
P2	1	3
P3	2	5
P4	3	4
P5	4	6

If the CPU scheduling policy is SJF pre-emptive, calculate the average waiting time and average turnaround time.

F) . An operating system uses the banker's algorithm for deadlock avoidance when managing the allocation of three resource types X, Y, and Z to three processes P0, P1, and P2. The table given below presents the current system state. Here, the Allocation matrix shows the current number of resources of each type allocated to each process and the Max matrix shows the maximum number of resources of each type required by each process during its execution.

	Allocation			Max		
	X	Y	Z	X	Y	Z
P0	0	0	1	8	4	3
P1	3	2	0	6	2	0
P2	2	1	1	3	3	3

There are 3 units of type X, 2 units of type Y and 2 units of type Z still available. Consider the following independent requests for additional resources in the current state-

i   REQ1: P0 requests 0 units of X, 0 units of Y and 2 units of Z

ii   REQ2: P1 requests 2 units of X, 0 units of Y and 0 units of Z

Which of the following is DONE

- Check system in a safe state or not
- Only REQ1 can be permitted
- Only REQ2 can be permitted

Q III Attempt any FOUR   (20)

A) . Consider the reference string: 7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 3, 2, 1, 2, 0, 1, 7, 0, 1
   for a memory with three frames. Trace FIFO, optimal, and LRU page
   replacement algorithms.

B) . Discuss the procedure for handling the page fault in demand paging.

C) . Briefly explain single-level, two-level, and Tree-Structured directories.

D) . Explain and compare the Look and SCAN disk scheduling algorithms.

E) . Discuss the Indexed File allocation method with an example.

F) . A disk drive has 200 cylinders, numbered 0 to 199. The drive is currently serving

   a request at cylinder 53. The queue of pending requests, in FIFO order, is

   98, 183, 37, 122, 14, 124, 65, 67,25,68,45,55

   Starting from the current head position, what is the total distance (in cylinders) that the

   disk arm moves to satisfy all the pending requests for each of the following disk-scheduling

   algorithms? 1) LOOK 2) C-SCAN 3) C-LOOK.

Q IV Attempt any FIVE   (15)

A) . What is the purpose of paging the page tables?

B) . Discuss the Safe, unsafe, and deadlock state spaces.

C) . What is a File? Describe the attributes of a file.

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D) . What is the Dining Philosopher's problem? Discuss the solution to the Dining philosopher's problem using monitors.

E) . Distinguish between counting and binary semaphores. Show when the semaphore definition requires busy waiting. Suggest a solution to overcome this problem.

F) . Explain Inter-Process Communication.

Max Time: 2½ hrs   **SYBSc CS**   Max Marks: 75

Linear Algebra

Instructions:
1) **All questions are compulsory.**
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Q I Attempt any FOUR   (20)

A) . Explain Vector space and its postulates

B) . Prove that $\{(x, y, z): x, y, z \in R, x +y +z=0\}$ is a vector space

C) . Find a square root of $Z=3-4i$

D) . Convert $z=(-1\neq i\sqrt{3})$ into polar and exponential form

E) . If u= (1,2,3) and v = (2,7, -5). find the length of u and v and also calculate the angle between them.

F) . Define Generators of a vector Space. Show that $\{(5,0,0), (0,8,0), (0,0,3)\}$ is a generating set for R^3

G) . Define Linear Span. Find the span of subset S = $\{(1,0,0), (0,1,1)\}$ of vector space V_3

Q II Attempt any FOUR   (20)

A) . Explain types of matrices

B) . Explain Inverse of Matrix with suitable examples

C) . Explain singular and non-singular matrix

D) . Define linear function and show that f: R^2 to R f (x, y) = x +y is a linear function

E) . Check whether the set of Vectors $\{(1,1,0), (0,1,1), (1,1,1)\}$ is linearly independent or not.

Q III Attempt any FOUR   (20)

A) . Explain Dimension of a vector space and subspace

B) . Show that vectors (1,2,1), (2,1,0), (1, -1,2) of R^3. Form a basis of R^3

C) . Explain Matrix representation of linear function.

D) . Explain Two Greedy Algorithm for finding a basis.

E) . Explain Change of basis.

F) . Define Orthogonal sets and Pythagorean Theorem.

Q IV Attempt any FIVE   (15)

A) . Define Galois field.

B) . Define Linear and Convex combination

C) . Define Kernel of a linear Function

D) . Define Linear Dependence and Independence of Vectors

E) . Define Rank of Matrix and Co-ordinate representation

F) . Define Annihilators and Dual space

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Data Structures

Regular
11/11/2022

Instructions:
1) **All** questions are **compulsory**.
2) Mixing of sub questions are not allowed.
3) Write in clear and legible writing.

Q I Attempt any **FOUR** (20)

A) Explain different types of data structures and give their classifications.

B) What is Linked List? Explain different types of ADT of Linked List.

C) What is Stack? Explain Advantages and Disadvantages of Stack.

D) Explain Application of Stack like prefix to postfix notation with the help of an Example.

E) What is Queue? Explain different types of ADT of Queue.

F) What is Circular Queue? Explain Advantages and Disadvantages of Circular Queue.

Q II Attempt any **FOUR** (20)

A) What is Doubly Linked List? Explain Advantages and Disadvantages of Doubly Linked List.

B) Explain Basic Operation carried out in Doubly Linked List

C) What is Tree? Explain different types of ADT of Tree.

D) What is Balanced BST? Explain with the help of an Example

E) Explain Implementation and Traversals of Tree's.

F) Explain Application of Heaps with the help of an Example.

Q III Attempt any **FOUR** (20)

A) What is Graph? Explain Advantages and Disadvantages of Graph.

B) Explain Basic Operation carried out in Graph.

C) Explain Graph Representation using adjacency matrix.

D) Explain Graph operations like deletion of nodes.

E) Explain Concept of Hashing.

F) Explain Collision? Explain Different types of Collision Avoidance techniques.

Q IV Attempt any **FIVE** (15)

A) What is ADT? How does the user Creates user-specific ADT?

B) Explain Application of Linked List like Polynomial Equation with the help of an Example.

C) What is Doubly Linked List? Explain different types of ADT of Doubly Linked List.

D) Explain Insertion and deletion of nodes at various positions in Doubly Linked List.

E) What is Graph? Explain different types of ADT of Graph.

F) Explain Graph Traversals with the help of BFS Algorithm.

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12|11|2022

[Advanced Database Concepts]

Q I Attempt any FOUR   (20)

A). Write a PL/SQL Program to Find the Greatest of four Numbers using the if Else statement.

B). Explain the while loop with syntax through examples.

C). Explain the role of Null value in Pl\SQL with an example.

D). Creating simple Sequences with clauses like START WITH, INCREMENT BY, MAX VALUE, MINVALUE, CYCLE NO CYCLE, CACHE | NOCACHE, ORDER | NOORECER.

E). Write a procedure that accepts a score (between 0 and 100) and then grades that
score according to the rules below. Give a suitable output message.

        80 -100: Grade A

        60 - 79: Grade B

        40 - 59: Grade C

        20 - 39: Grade D

        <20: Grade E

F). Explain the Stored Procedure? Discuss how to create procedures in PL\SQL with examples.

Q II Attempt any FOUR   (20)

A). What is Cursor? Explain the types of cursors. What do you understand by PL/SQL cursors?

B). Write a program in PL/SQL to display the cursor-based detail information of employees from employee tables.

C). What is a Collection? Explain types of collections in pl/SQL. Also, explain one type with an example.

D). What is the difference between Collection and Records?

E). Explain the difference between the cursor declared in procedures and the cursors declared in the package specification.

F). What is a Record? How to create a record and explain with examples.

Q III Attempt any FOUR   (20)

A). Explain the State cycle of the Transaction system.

B) . Explain Serializability? Explain types of Serializability.

C) . Explain the two-phase commit protocol.

D) . What is ACID? What does each property say with respect to the execution of the Transaction?

E) . Write a program on the insert clause used in the trigger using the before/after clause by giving example.

F) . Write a short note on using DDL statements in trigger by giving an example.

Q IV Attempt any FIVE   (15)

A) . Explain %type and record in PL\SQL with an example.

B) . Explain the Transaction System

C) . What is Deadlock

D) . What are the 3 modes of the parameter in the procedure?

E) Write a PL/SQL script to display the following series of numbers:
99,96,93......9,6,3.?

F) . How do you Create Varray Tables in PL/SQL. Explain with example

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Max Time: 2½ hrs   **SYBSc CS**   Max Marks: 75

[Java Based Application Development]

Instructions:

1) **All** questions are **compulsory**.
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Q 1 Attempt any **FOUR**   (20)

A) Explain the platform independence of Java.

B) Discuss public, private and protected access modifiers.

C) Discuss the following key words with examples: super, final.

D) How is inheritance implemented in Java? Explain with examples.

E) What is an interface in Java? Explain with examples.

F) Explain exception handling in Java.

Q 2 Attempt any **FOUR**   (20)

A) Write a short note on 'JFC'.

B) Explain BorderLayout with example.

C) Explain JComboBox component with example.

D) State the steps for making database applications using JDBC.

E) Give the hierarchy of interfaces and classes in Collection framework.

F) What is events? Explain Event Listener.

Q 3 Attempt any **FOUR**   (20)

A) Diagrammatically explain how the request-response works in context of Java web applications.

B) Explain two methods of each HTTPServletRequest class and HTTPServletResponse class.

C) Explain RequestDispatcher and its usage with code snippet.

D) Write a note on Session object.

E) Explain 8 implicit JSP objects.

F) Explain 8 JSP directives with examples.

Java

Q 4 Attempt any **FIVE** (15)

A) Write a program in Java to display the prime numbers between 100 and 999.

B) Write a program in Java to encapsulate a sqaure. It should have methods that return the perimeter and area of the square.

C) Explain the Resultset class with examples.

D) Explain five methods of ArrayList class with examples.

E) Explain exception handling/error handling in a JSP page.

F) Explain encoding of JSON using Java.

Q.1　Attempt any **FOUR**　　　　　　　　　　　　　　　　　　　　　　　(20)
　　A)　Explain text formatting tags in details.
　　B)　What are the types of lists? Explain with the help of example.
　　C)　What is an image map? Explain with the help of example.
　　D)　How to use audio – video files in HTML?
　　E)　Explain the term Inline, Internal and External CSS in detail.
　　F)　Write on CSS properties for positioning an element with the help of example.

Q.2　Attempt any **FOUR**　　　　　　　　　　　　　　　　　　　　　　　(20)
　　A)　Write a short note on scope of JavaScript variables.
　　B)　Discuss various looping statement in JavaScript.
　　C)　Explain switch case statement in detail.
　　D)　Explain the importance of jump statements in JavaScript.
　　E)　What is XML? What are the advantages and disadvantages of XML?
　　F)　What is DTD? Discuss the different types of DTD?

Q.3　Attempt any **FOUR**　　　　　　　　　　　　　　　　　　　　　　　(20)
　　A)　Explain in detail how AJAX works?
　　B)　Write a short note on XMLHttpRequest Object.
　　C)　What is control flow statement in PHP? Explain with the help of example.
　　D)　Define entry checking loop with the help of example.
　　E)　How to insert, update a record in database?
　　F)　Write a PHP program to generate all even numbers between 1 to 100.

Q.4　Attempt any **FIVE**　　　　　　　　　　　　　　　　　　　　　　　(15)
　　A)　Discuss how to handle asynchronous requests using AJAX?
　　B)　What is session? How to destroy it?
　　C)　What is a file? Give the various modes of opening a file.
　　D)　Write JavaScript code to find factorial of given number.
　　E)　Write note on for each, give example.
　　F)　Write JavaScript program to check given number is even or odd.

Max Time: 2½ hrs   **SY B.Sc CS**   Max Marks: 75

[Creative Content Writing] 16|11|2022

<u>Instructions:</u>
1) **All** questions are **compulsory**.
2) Mixing of sub questions are not allowed.
3) Write in clear and legible writing.

Q I Attempt any **FOUR**   (20)
 A) Explain the term 'Write with an Attitude' with example.
 B) Explain Common Grammatical Errors while writing content for digital media.
 C) How to Organize for Your Audience on social media.
 D) What is chunk information? Explain with example with reference to social media.
 E) What is Blog? What is the ideal length of a blog post?
 F) What is Podcast and how does it works? Give an example.

Q II Attempt any **FOUR**   (20)
 A) What is LinkedIn? How to make your LinkedIn profile more attractive?
 B) How to write for Homepage? What are the considerations keep in mind for writing for Homepage?
 C) How to write for about us and Contact us?
 D) What is Infographics? Write about 3 tools available for Infographics.
 E) How to process your idea into your Infographics?
 F) What is email? Write steps to for writing professional mails.

Q III Attempt any **FOUR**   (20)
 A) Explain Google authorship and Google scholar.
 B) Write about sources for free images for Infographics.
 C) Write about three website from you can download free images for content.
 D) What is IPR? Explain copyright in detail.
 E) What can be copyrighted and what can't be copyrighted?
 F) Explain Google authorship with example.

Q IV Attempt any **FIVE**   (15)
 A) Explain copyright infringement with example.
 B) Explain Plagiarism law in content writing.
 C) Explain research and knowledge management tools.
 D) How to write better Blog post?
 E) How to write Annual Reports? Explain in details
 F) How to create our story elegant and professional on social media.