Tribhuvan University

Faculty of Humanities & Social Sciences

OFFICE OF THE DEAN

2020

Bachelor in Computer Applications
Course Title: Operating System
Code No: CACS251
Semester: IV

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

Candidates are required to answer the questions in their own words as far as possible.

Group B

Attempt any SIX questions. **[6×5 = 30]**

2. What is an Operating System? Why is it known as the resource manager and the extended machine? [2+3]
3. What is Kernel? What role does it play in an Operating System? Differentiate between monolithic and micro kernel. [1+1+3]
4. Suppose that a disk has 200 cylinders (0-200). The head pointer is currently at 50 and previously at 35. The queue of pending request, in FIFO order is: 60, 190, 40, 125, 15, and 150. The time required to move per cylinder is 6 msec. starting from the current head position, what is the total seek time needed to satisfy all the pending request for each of the following disk scheduling algorithms? [2.5+2.5]
   a) FCFS b) SCAN
5. Define file and directory. Explain the concept of Access Control List (ACL) and Access Control Matrix (ACM). [2+3]
6. What is biometric password in authentication? Explain the various system threats. [2+3]
7. How distributed operating system is more applicable than centralized operating system? Explain the major goals of distributed operating system. [2+3]
8. Write short notes on any TWO: [2.5+2.5]
   a) Producer Consumer problem
   b) Coalescing and Compaction
   c) Ubuntu

Group C

Attempt any TWO questions. **[2×10 = 20]**

9. What is CPU scheduling? Write down the criteria for CPU scheduling? Consider the following set of processes, with the length of the CPU burst given in milliseconds, draw Gantt chart illustrating their execution and calculate average waiting time and turnaround time using:
   a) First Come First Serve
   b) Shortest Job First
   c) Non-preemptive priority (smaller number implies higher priority)
   d) Round Robin (quantum=1)

Process	Burst Time	Priority
P0	10	3
P1	1	1
P2	2	5
P3	1	4
P4	5	2

   The processes have arrived in the order P0, P1, P2, P3, P4 all at time 0. [1+1+2+2+2+2]
10. Define the terms: page fault and thrashing. Consider the following page reference string: 1, 3, 5, 1, 7, 1, 5, 5, 1, 4, 3, 7, 6, 3, 4, 1. How many page faults would occur for each of the following page replacement algorithms assuming 3 page frames?
    a) FIFO page replacement
    b) LRU page replacement
    c) Optimal page replacement [2+2+2+2+2]
11. Define deadlock. List out the conditions that can result in resource deadlock. Explain different

deadlock handling methods in detail. [2+1+7]

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2020

Bachelor in Computer Applications
Course Title: Scripting Language
Code No: CACS254
Semester: IV

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

Candidates are required to answer the questions in their own words as far as possible.

Group B

Attempt any SIX questions. **[6×5 = 30]**

2. What is JavaScript? What are the potential platforms where JavaScript can be used? [1+4]
3. Define JavaScript event. Illustrate how an event handler response particular event in web page. [1+4]
4. What is an Immediately Invoked Function in JavaScript? Explain with suitable example. [1+4]
5. Explain an array using suitable example and discuss how *foreach loop* accessing of elements is stored in an array using PHP. [2+3]
6. What is jQuery? illustrate different types of selectors in jQuery with appropriate example? [1+4]
7. What is the benefit of using AJAX? Discuss major methods that communicate with server-side scripting. [1+4]
8. Discuss about MVC architecture with appropriate diagram. [5]

Group C

Attempt any TWO questions. **[2×10 = 20]**

9. a) Write a program which includes a function sum(). This function sum() should be designed to add an arbitrary list of parameters. (For e.g., if you call the function sum() as sum (1, 2) it should return the result 3 and if again you call the function sum() as sum(1,3,4) it should return the result 8). [5]

   b) Write a program that displays the continuous time in the web page. The time should be in the format of HH:MM:SS. [5]

10. Define method overriding. Write a PHP program to handle the overriding situation. [2+8]
11. Design following form in HTML and write corresponding PHP and SQL code for CRUD operations based on user's data.

    Assume your own database and database connectivity related constrains if necessary. [10]

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2020

Bachelor in Computer Applications
Course Title: Numerical Methods
Code No: CACS252
Semester: IV

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

Candidates are required to answer the questions in their own words as far as possible.

Group B

Attempt any SIX questions. **[6×5 = 30]**

2. Compute the root of equation $x^2 - 5x + 6 = 0$ in the vicinity of x = 5 using Newton-Raphson method.
3. Estimate the value of ln(2.5) using Newton-Gregory forward difference formula given the following data.

x	1.0	2.0	3.0	4.0
Ln(x)	0.0	0.6931	1.0986	1.3863

4. Write an algorithm to compute integration using Simpson's 1/3 rule. Evaluate integration of $\int_0^2 (3x^2 + 2x - 5)dx$ using Simpson's 1/3 rule. [2.5 + 2.5]

   What is meant by ill-conditioned system? Find the Cholesky decomposition of the following matrix. [5]

$$\begin{bmatrix} 4 & 1 & 1 \\ 1 & 5 & 2 \end{bmatrix}$$

[1 2 3]

6. Use the classical RK method to estimate y(0.4) of the equation $\frac{dy}{dx} = x^2 + y^2$ *with* $y(0) = 0$ assume h = 0.2. [5]
7. Solve the Poisson equation $\nabla^2 f = 2x^2y^2$ over the square domain $0 \le x \le 3$ and $0 \le y \le 3$ with f = 0 on the boundary and h = 1. [5]
8. Write a short note on (Any Two): [2.5 + 2.5]
   a) Types of Errors
   b) Convergent Methods
   c) PDE

Group C

Attempt any TWO questions. **[2×10 = 20]**

9. Write an algorithm and program to compute root of nonlinear equation using bisection method. [4 + 6]
10. Given then data points:

i	0	1	2
x_i	9	16	25
f_i	3	4	5

Estimate the function value of f at x = 14 using cubic splines. [10]

11. a) Solve the following system of equation by Gauss-Seidel method. [5]
    $2x - 7y - 10z = -17$
    $5x + y + 3z = 14$
    $X + 10y + 9z = 7$
    b) Write an expansion of Taylor's Theorem. Solve the equation $y'(x) = x^2 + y^2$, $y(0) = 1$ for x = 0.5 using Taylor method. [2.5 + 2.5]

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2020

Bachelor in Computer Applications
Course Title: Database Management System
Code No: CACS255
Semester: IV

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

Candidates are required to answer the questions in their own words as far as possible.

Group B

Attempt any SIX questions. **[6×5 = 30]**

2. What is database? Discuss the importance of DBMS. [1+4]
3. Define union compatibility. Given following relations, show the resulting relation of Director ∩ Actor and Actor ∪ Director? [2+3]

Director

Fname	Lname
Deepak	Giri
Bhuwan	KC
Dipendra	Khanal

Actor

Firstname	Lastname
Deepak	Giri
Rajesh	Hamal
Bhuwan	KC

5. How Order By and Group BY Having Clause in SQL are different? Illustrate with suitable examples. [3+2]
6. Why normalization is needed? When any relation is said to be in 1NF and 2NF? [1+4]
7. How cost of query is measured during query processing? Construct query expression tree for the relational algebra query; [3+2]

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8. How wait-for-graph is constructed? How can you use it to detect deadlock in a schedule of transactions? Support your answer with an example. [2+2+1]
9. How read and write operations are performed in a transaction? List the various states where transactions can enter into. [3+2]

Group C

Attempt any TWO questions. **[2×10 = 20]**

10. Given the schema as below, write relational algebra and SQL queries for following; [10]

    Sailors(sid, sname, rating, age)

Boats(bid, bname, colour)

Reserves(sid, bid, reservedate)

a) Find name, rating and age of all the sailors.

b) Find the name and color of boats having color blue.

c) Find name of the boats reserved on date 2021/07/20.

d) Find the names of boats and sailors who have reserved boats having color green.

e) Use Left and Right Outer Join between Sailors and Reserves.

11. a) Design an ER diagram of your choice. The ER diagram should contain at least five entities. Out of those entities, one should be weak entity. Your entities should have appropriate attributes including primary key attributes, if any. There should be presence of one to one relationship, one to many relationship and many to many relationships in your ER diagram.

b) Convert the ER diagram in Q. 19. a. into equivalent relational tables.

12. Define stored procedures and triggers. How they are applicable in database? Illustrate with examples, how can you create before and after triggers on INSERT query. [3+2+5]

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2020

Bachelor in Computer Applications
Course Title: Software Engineering
Code No: CACS253
Semester: IV

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

Candidates are required to answer the questions in their own words as far as possible.

Group B

Attempt any SIX questions. **[6×5 = 30]**

2. What is software engineering? Explain the challenges facing software engineering. [2+3]
3. What is extreme programming? Explain how the principles underlying extreme programming lead to the accelerated development of software. [1+4]
4. Define quality assurance? Under what circumstances would you recommend the use of staged representation of the CMM? [2+3]
5. What is architectural design? Explain layered model of software architecture with example. [1+4]
6. Differentiate between verification and validation. Explain why software inspection is an effective technique for discovering errors in software? [3+2]
7. What is software reengineering? List its advantages. Explain source code translation and reverse engineering approach in brief. [1+1+3]
8. What do you mean by software quality management? Explain software quality management activities in brief. [2+3]

Group C

Attempt any TWO questions. **[2×10 = 20]**

9. What is software process model? List different software process model. Explain how both the waterfall model of the software process and prototyping model can be accommodated in the spiral process model. [2+2+6]
10. What do you mean by software requirement? Differentiate between functional requirement and non-functional requirement. List the functional requirements of online examination system and represent it in use case diagram. [2+4+4]
11. a) What is risk management? Explain risk management process in software engineering with block diagram. [1+4]

b) List good programming practices. Explain CASE and its type with example. [2+2]