

END TERM EXAMINATION

FIFTH SEMESTER (BCA) JANUARY-2024

Paper Code: BCA-301

Subject: Operating System & Linux Programming
(Batch-2021 Onwards)

Time: 3 Hours

Maximum Marks :75

Note: Attempt five questions in all including question no.1 which is compulsory. Select one question from each unit.

Q1. Answer the following (any five)

(5x5=25)

- Explain the role of Operating System. Give example of each type of Operating System.
- What is Thrashing? Mention possible solutions for this problem.
- Explain Process State Transition with the help of diagram.
- Explain the scheduling and performance criteria of various scheduling algorithm.
- Explain the disk structure of secondary storage.
- Explain the three modes of vi Editor. Explain how to write, save and execute a shell script in vi Editor.
- Explain deadlock and four necessary conditions for its occurrence.

UNIT I

- Q2 a) Explain Multi Programming, Time sharing, Distributed System and Real Time System in terms of memory management, process management and processor scheduling. (6)
- b) Write a shell program to find the factorial of a number accepted from user. (6.5)

- Q3 a) Explain the Linux Architecture with diagram. Describe the basic directory structure of Linux. (6)
- b) Explain the following Linux commands with syntax and the output of the command. (6.5)
- i) cat ii) mv iii) who iv) pwd v) tty vi) apropos

UNIT II

- Q4 a) What is process synchronisation? Explain how reader-writer problem can be solved using semaphore with the help of pseudocode. (6)
- b) Consider the following five process, with the length of the CPU burst time given in milliseconds. (6.5)

Process	Arrival Time	Burst Time
P1	0	3
P2	1	2
P3	3	6
P4	4	5
P5	5	3

- i) Draw five Gantt charts that illustrate the execution of these process using the following scheduling algorithms: FCFS, SJF, Pre-emptive SJF(SRTN), RR (quantum=2).
- ii) What is average turnaround time and average waiting time for each of the scheduling algorithm in part a.

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- Q5 a) What is critical section problem? How it can be solved using semaphore. (3)
- b) Explain the Linux command to view currently running processes on the system. Explain Nice and Renice Command in Linux with Examples. (3)
- c) Explain three different types of schedulers in operating system with the help of neat diagram. Explain specific role of each type of scheduler. (6.5)

UNIT III

- Q6 a) Explain Continuous and Non-Continuous Memory Allocation with diagram. (6)
- b) Consider the following page reference string: 7,2,3,1,2,5,3,4,6,7,1,0 Assuming demand paging with four frames, how many page faults would occur for the following replacement algorithms?
- LRU replacement
 - FIFO replacement
 - Optimal replacement
- (6.5)
- Q7 a) Explain segmentation in memory management. With a neat diagram explain hardware required to implement segmentation. (6)
- b) Consider the following snapshot of a system at time T_0 . (6.5)

	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			

Answer the following questions using the banker's algorithm:

- What is the content of the matrix Need?
- Is the system in a safe state. If yes, mention the safe sequence?
- If a request from process P₁ arrives for (1,1,2) can the request be granted immediately?

UNIT IV

- Q8 a) Explain layered design of file system with diagram. (6)
- b) Explain the symbolic and numeric method of changing the permission of file and directory. What is the use of -R, -V options of the command. (6.5)
- Q9 a) Explain the file protection mechanism of operating system. (6)
- b) Explain three types of file access methods in operating system with diagram. (6.5)

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FIFTH SEMESTER [BCA] JANUARY 2024

Paper Code: BCA-303

Subject: Computer graphics

(Batch 2021 onwards)

Time: 3 Hours

Maximum Marks: 75

Note: Attempt five questions in all including Q.No.1 which is compulsory. Select one question from each unit.

- Q1 Answer the following (Any Five): (5x5=25)
- What is a video controller? Explain the working of a video controller.
 - Explain the terms- Vertical Retrace, Persistence, Frame Buffer. How much storage (in bytes) is required for a system if 24 bits per pixel are to be stored?
 - What is the purpose of using homogeneous coordinate in Computer Graphics? Write matrix representations for 3D transformations of Rotation and Scaling using homogeneous coordinates.
 - Point out the characteristics of a Bezier curve. Explain Convex hull property in detail.
 - Explain Phong model.
 - Write notes on - i) B-Spline curves ii) Hermite curves
 - Define world coordinate, viewing coordinate, normalized coordinate, and device coordinate in a viewing pipeline.
 - Discuss Z buffer method of hidden surface removal technique.

Unit-I

- Q2 a) Describe Digital Differential Analyzer (DDA) algorithm for line drawing. Find out all the valid activated pixels from (0,0) to (10,5) using DDA. (7)
- b) Elucidate the advantages of interactive Graphics. Explain the differences between raster and random scan display devices. (5.5)
- Q3 a) What is rasterization? Explain the steps to scan convert a circle using midpoint algorithm. (6.5)
- b) What are the disadvantages of DDA line drawing algorithm? Compare DDA with Bresenham's line drawing algorithm. (6)

Unit-II

- Q4 a) Let W be a rectangular window whose coordinates are L(-3,1) and R(14,6). Find the visible portion of the line segment joining the points (-10,5) to (10,5) using Cohen-Sutherland line clipping algorithm. (6)
- b) Deduce Window-to-Viewport transformation with proper diagram. (6.5)
- Q5 a) What is composite transformation? Magnify the triangle with vertices P(0,0), Q(1,1) and R(5,2) to twice its size keeping R(5,2) fixed. (6.5)
- b) What are shearing and reflection in 2D transformation? Write the matrix representations of -

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- ij) Xshear ii) Yshear iii) X-Y shear using homogeneous coordinates. (6)

Unit-III

- Q6 a) Given a Bezier curve with 4 control points- $P_0(1,0)$, $P_1(3,3)$, $P_2(6,3)$, $P_3(8,1)$. Find any 5 points lying on the curve and draw a rough sketch of the curve. (12.5)

- Q7 a) Explain different types of parametric continuities of a curve? (6)
- b) Define surface rendering in Computer Graphics. Distinguish between Gourard shading and Phong shading. (6.5)

Unit-IV

- Q8 a) Explain Painter's algorithm for hidden surface removal with proper sketch. Discuss how it is different from depth buffer method. (6.5)
- b) Write notes on - (2x3=6)
- B-representation
 - Spatial partitioning representation
- Q9 Discuss various types of projections in 3D graphics with suitable diagrams. (12.5)

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END TERM EXAMINATION

FIFTH SEMESTER (BCA) JANUARY-2024

Paper Code: BCA-305

Subject: Cloud Computing

Time: 3 Hours

Maximum Marks: 75

Note: Attempt five questions in all including Q.no.1 which is compulsory.

Select one question from each unit.

- Q1 Answer the following questions in brief:- (2.5x10=25)
- Which are the different layers that define cloud architecture?
 - What are the characteristics of Cloud Computing?
 - What is the difference between parallel and distributed computing?
 - What are the disadvantages of virtualization?
 - What is the difference between distributed objects and RPC?
 - Describe the different categories of options available in a PaaS market.
 - Classify the various types of clouds. Give an example of the public cloud.
 - What fundamental advantages does cloud technology bring to scientific applications?
 - What is the innovative characteristic of cloud computing?
 - How is cloud development different from traditional software development?

UNIT-I

- Q2 a) What pros and cons of Cloud computing in comparisons of Distributed and Grid computing? (6)
b) What is the major advantage of Cloud Computing. Briefly Summarize the cloud computing Reference Model. (6.5)
- Q3 a) What are Web desktops? What is their relationship to cloud computing? (6.5)
b) What is the major revolution introduced by Web 2.0? Give some examples of Web 2.0 applications (6)

UNIT-II

- Q4 a) Explain the Cloud Service Model (6)
b) Describe the fundamental features of the economic and business model behind cloud computing. (6.5)
- Q5 a) Suppose a company A decides to set up a cloud to deliver Software as a Service to its clients through a remote location. Answer the following:
i) What are the security risks for which a customer needs to be careful about?
ii) What kind of infrastructural set up will be required to set up a cloud?
iii) What sort of billing model will such customers have? (6)
b) Which are the basic components of an IaaS-based solution for cloud computing? (6.5)

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UNIT-III

- Q6 a) What is service-oriented computing and market-oriented cloud computing? (6)
b) Discuss RPC and how it enables interprocess communication. (6.5)
- Q7 a) What are the most relevant technologies for distributed objects programming? (6)
b) Describe the different levels of parallelism that can be obtained in a computing system. (6.5)

UNIT-IV

- Q8 a) Discuss the reference model of full virtualization. (4.5)
b) What is hardware Virtualization? Write difference between para and full virtualization. (8)
- Q9 a) What is VMWare? Discuss its elements for virtualization. (6.5)
b) Discuss classification or taxonomy of virtualization at different levels. (6)

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FIFTH SEMESTER [BCA] DECEMBER 2023 - JANUARY 2024

Paper Code: BCAT-311 Subject: Machine Learning with Python

Time: 3 Hours

Maximum Marks: 75

Note: Attempt any five questions in all including Q. No. 1 which is compulsory. Select one question from each unit.

- Q1 Write short notes on the following (Any Five) (5x5=25)
- Explain different types of machine learning techniques.
 - Differentiate overfitting and underfitting problems encountered during machine learning.
 - What is ROC curve? How is it constructed?
 - What do you mean by Rule-based classification?
 - Explain logistic regression and its applications.
 - Write down the applications of Neural Networks.
 - Write a short note on Principal Component Analysis.

UNIT-I

- Q2 (a) Consider a two-class classification problem of predicting whether a photograph contains a man or a woman. For the given test dataset of 10 records with expected outcomes and a set of predictions from a classification algorithm, (6)
- Compute the confusion matrix for the data.
 - Compute the accuracy, precision, recall, sensitivity, and specificity of the data.

	Expected/Actual	Predicted
1	man	woman
2	man	man
3	woman	woman
4	man	man
5	woman	man
6	woman	woman
7	woman	woman
8	man	man
9	man	woman
10	woman	woman

- (b) Compare Multiclass Classification with Multilabel Classification. Write down appropriate examples to explain the difference. (6.5)

OR

- Q3 (a) Under what circumstances Precision, or Recall are better performance metrics in comparison with Accuracy? Give an example each for the situations where "Recall is a more important evaluation metric than Precision". "Precision is a more important evaluation metric than Recall". (6)
- (b) Explain simple linear regression. What do you mean by least square method and Coefficient of Determination? (6.5)

UNIT-II

- Q4 (a) What do you mean by Decision tree? How does the decision tree algorithm work? Explain the attribute selection measure- Information gain. (6)

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- (b) Explain the working of Naïve Bayes' Classifier. For the dataset given below, check "If on a Sunny day, Player can play the game?" with the help of frequency table and likelihood table. (6.5)

	Outlook	Play
0	Rainy	Yes
1	Sunny	Yes
2	Overcast	Yes
3	Overcast	Yes
4	Sunny	No
5	Rainy	Yes
6	Sunny	Yes
7	Overcast	Yes
8	Rainy	No
9	Sunny	No
10	Sunny	Yes
11	Rainy	No
12	Overcast	Yes
13	Overcast	Yes

OR

- Q5 (a) What are ensemble learning models? Explain bagging and boosting in detail. (6)
- (b) Explain Support Vector Machine. Define the terms Hyperplane, Support Vectors, Kernel, Hard and Soft Margin. (6.5)

UNIT-III

- Q6 (a) What is the role of the Activation functions in Neural Networks? List down the names of some popular Activation Functions used in Neural Networks. (6)
- (b) Explain the architecture of the Multilayer Feed-Forward Neural Network. (6.5)

OR

- Q7 (a) Explain Gradient Descent and its types. What are the different steps used in Gradient Descent Algorithm? (6)
- (b) What is perceptron and what are its basic components? How does Perceptron work? (6.5)

UNIT-IV

- Q8 (a) Write down the algorithm for K-means Clustering technique. What are the Distance Metrics used for quantitative and qualitative attributes? (6)
- (b) What do you mean by Feature selection? Explain Filter methods, Wrapper methods and Embedded methods of feature selection. (6.5)

OR

- Q9 (a) Explain Hierarchical Clustering technique and its types. Draw appropriate diagrams to explain the same. (6)
- (b) What are Self-Organizing Maps? How do they perform the weight update of the winning vector in the process of learning? (6.5)

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FIFTH SEMESTER [BCA] DECEMBER 2023 - JANUARY 2024

Paper Code: BCAT315

Subject: Web Development with Java & JSP

Time: 3 Hours

Maximum Marks: 75

Note: Attempt any five questions in all including Q. No.1 which is compulsory. Select one question from each unit.

Q1 Write a short note on any of the following: (Any Five) (5x5=25)

- (a) Explain the types of servers in J2EE.
- (b) Compare between AWT controls and Swings.
- (c) Discuss the concept of JSTL.
- (d) Differentiate between JDBC and ODBC.
- (e) List out some advantages of using JSP.
- (f) What are servlets? What are its benefits?
- (g) Discuss the concept of Springs.
- (h) Explain the Web Application Directory Structure.

UNIT-I

Q2 (a) What is J2EE? With a neat block diagram, explain the architecture of J2EE. (6.5)
(b) What do you mean by web container? Discuss different types of Web architecture models. (6)

Q3 (a) Why Swing components are called lightweight components? Write a JAVA program to build a Calculator in Swings. (6.5)
(b) Discuss different technologies of J2EE application. (6)

UNIT-II

Q4 (a) What is JDBC? Discuss different steps for creating JDBC. Write a pseudo code program in Java for connecting front end applications with the backend database. (6.5)
(b) What are servlets? What are its benefits? Discuss the Servlet life cycle. (6)

Q5 (a) Discuss the steps for creating a servlet and the structure for creating Servlets. (6.5)
(b) Explain various JDBC drivers. (6)

UNIT-III

Q6 (a) Write down the steps to configure Apache Tomcat and write a program to demonstrate different directive in JSP. (6.5)
(b) Explain the term JSF? Discuss the architecture of JSF web application. (6)

Q7 (a) What is JSP? Discuss its life cycle in detail. (6.5)
(b) Differentiate between JSP and JSF. (6)

UNIT-IV

Q8 (a) Explain Inet address class. Write a program to find the IP address of any website using the methods of Inet address class. (6.5)
(b) What is Hibernate? Discuss its architecture in detail. (6)

Q9 (a) Explain the following terms: (6.5)
(i) Struts
(ii) Beans
(iii) Sockets
(b) Discuss Hibernate mapping types. (6)

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