



# **Bachelor of Computer Applications**

## **SEMESTER IV**

1. English-IV
2. Data Communication & Computer Networks
3. Computer Oriented Numerical Analysis & Statistical Methods
4. Data Warehousing & Data Mining
5. Computer Graphics
6. DBMS Lab

## 4BCA6: Computer Graphics

### UNIT-1

**Introduction** – applications of computer graphics, operations of computer graphics, graphics software packages.

**Graphical input – output devices**- graphical input devices, graphical output devices, raster scan video principles- raster scan monitors, color raster scan systems, plasma panel display, LCD panels, hard copy raster devices. Random scan devices- monitor tube displays, plotters.

**Scan conversion** – scan conversion methods, polynomial method for line, polynomial method for circle, DDA algorithm for line, circle and ellipse, Bresenham's algorithm for line drawing and circle. Midpoint methods for line and circle, problems of scan conversion.

### UNIT-1

**Scan conversion for solids**- solid areas or polygons, inside-outside test – odd even method, winding number method. Solid area filling algorithms- boundary fill algorithm, scan line fill algorithm, scan line seed fill algorithm, ordered edge list algorithm.

**2D geometrical transformations** – basic transformations- translation, rotation, scaling, homogeneous coordinate system – transformations in homogeneous notation, inverse of basic transformations, scaling about a reference point, rotation about an arbitrary point. Other transformations – reflection about any arbitrary line, shearing, combined transformation- computational efficiency, visual reality, inverse of combined transformations.

**3D geometrical transformations**- basic 3D transformation- 3D translation, 3D scaling. 3D rotation, rotation about an arbitrary axis in space, other 3D transformations- 3D reflection, reflection about any arbitrary plane, 3D shearing.

### UNIT-1

**Projection** – introduction, parallel projection- orthographic projection, axonometric projection, oblique projection, perspective projection – standard perspective projection, vanishing points. Image formation inside a camera.

**2D viewing and clipping**- windows and viewports, viewing transformation, clipping of lines in 2D- Cohen-Sutherland clipping algorithm, midpoint subdivision method, polygon clipping – Sutherland – Hodgman polygon clipping.

**Curve design** – classical techniques for designing curves and object surfaces, modern curve representations.

### Reference Book:

1. Computer Graphics, Multimedia and Animation by Malay K Pakhira
2. Computer Graphics, Donald Hearn, M. Pauline Baker, Prentice-Hall
3. Computer Graphics, Roy A. Plastock, Gordon Kalley, Schaum's Outlines, McGraw Hill

## 4BCA4: Computer Oriented Numerical Analysis and Statistical Methods

### UNIT-1

**Computer Arithmetic:** Floating point representation of numbers, arithmetic operations with normalization, consequences of normalized floating point representation of numbers, Errors in numbers

**Finding the roots of an equation:** Iterative method: Introduction, Beginning an iterative method, Bisection method, Newton Raphson method, Regula Falsi method, Secant Method. Comparison of Iterative methods, Order of Convergence of Newton Raphson Method and Secant Method.

**Ordinary differential equations:** Euler's method, Taylor series method, Range Kutta II and IV order methods.

### UNIT-2

**Numerical Integration:** Simpson's 1/3 and 3/8 rule, Trapezoidal rule.

**Solving simultaneous linear equations:** Introduction, Gauss Elimination method, pivoting, illconditioned equations, Gauss Jordan method, LU Decomposition method and Gauss-Seidel iterative method. Comparison of direct and iterative methods.

**Interpolation:** Introduction, Lagrange interpolation, Difference Tables- Newton-Gregory Forward and Backward interpolation, Truncation error in interpolation.

### UNIT-3

**Statistical methods:** Introduction, definitions, classifications, frequency distribution, mean- arithmetic mean for grouped and ungrouped data, continuous frequency distribution(step deviation method), Geometric mean for grouped and ungrouped data.

Standard deviation -meaning standard deviation for actual mean method, assumed mean method and step deviation method using discrete series and continuous series.

Coefficient of variation – meaning and problems

Median – meaning, calculations of median for ungrouped, Discrete series, continuous series

Mode- meaning calculations of mode for discrete series and continuous series

Correlation – meaning, types, rank correlations and problems.

**Note:** Algorithmic approach for all statistical methods.

### Reference Books:

1. Computer Oriented Numerical Methods by Rajaraman. V.
2. Fundamentals of Mathematical Statistics by Gupta and Kapoor (Sultan Chand).
3. Probability and Statistics for engineers and scientists by Ronald E. Walpole and Raymond H Mayers.
4. Mathematical Statistics by John Freund (Prentice Hall India Pvt. Ltd.)
5. Numerical Methods by Jain M.K., S.R.K. Iyengar and R.K. Jain

# 4BCA3: DATA COMMUNICATION AND COMPUTER NETWORKS

## Unit 1:

Data Communication, Component and Basic Concepts –

- Introduction
- Characteristics – Delivery, Accuracy, Timeliness and Jitter
- Components – Message, Sender, Receiver, Transmission medium and protocol

Topology – Mesh, Star, Tree, Bus, Ring and Hybrid Topologies

Transmission modes – Simplex, Half Duplex, Full Duplex

Categories of networks – LAN, MAN, WAN

Network Components – Signal Transmission – Analog Signaling, concept of ASK, FSK, PSK, Digital Signaling, concept of Unipolar, Polar, Return-to-Zero(RZ), Biphasic, Manchester, Differential Manchester, Non-Return-to-Zero (NRZ), Bit Synchronization, Asynchronous Bit Synchronization and Synchronous Bit Synchronization, Baseband and Broadband Transmissions.

Guided Media – Twisted-Pair Cable, Coaxial Cable, Fiber-Optic Cable

Unguided Media – Radio Wave Transmission Systems, Microwave Transmission Systems, Infrared Transmission Systems and Satellite Communication System.

## UNIT – II

The OSI Model – Functions of all the Seven Layers

Networking Devices – Functions and Applications of Hub, Switches, Bridges, Repeaters

Internetworking Devices – Functions and Applications of Routers and Gateways

IP Addressing – Dynamic IP Addressing, Static IP Addressing, Types of IP Addresses

Protocols –TCP, UDP, IP, IPV4, IPV6, TCP/IP Suite, SMTP, POP3, SNMP, HTTP, FTP, DNS, ICMP, IGMP, ARP, RARP, OSPF, BGP, ALOHA

## UNIT – III

Packet Switching Networks – Network Services and Internal Network Operations, Packet Network Topology, Datagrams and Virtual Circuits, Connectionless Packet Switching, Virtual Circuit Packet Switching.

Routing Concepts – Routing Tables, Dijkstra's Shortest Path Routing Algorithm, Flooding, Distance Vector Routing, Congestion Control Algorithms-Leaky Bucket Algorithm.

Data Link Issues –Single bit error and Burst Error, concepts of Redundancy, Checksum, Single Bit Error correction and Hamming Code correction method.

## Reference Books:

1. Introduction to Data Communications and Networking by Behrouz Forouzan.
2. Computer Networks by Andrew S Tanenbaum.
3. Networking Essentials – Third Edition – Jeffrey S. Beasley, Piyasat Nilkaew

## **4BCA5: Data Warehousing and Data Mining**

### **UNIT-I**

**Introduction:** What is Data Warehouse? Data Warehouse Modeling: Data Cube and OLAP, Data Warehouse Implementation, Data Mining, What kinds of Data can be Mined, What kinds of patterns can be Mined, Data cleaning, Data integration: ( Entity, Identification Problem, Redundancy & Correlation Analysis), Data Reduction: (Wavelet Transforms, Attribute Subset Selection, Histogram, Clustering, Sampling, Data Cube Aggregation),

Data Transformation: Strategies Overview, Data Transformation by Normalization.

### **UNIT-II**

Mining Frequent Patterns, Associations & Correlations: Basic Concept, Frequent Itemset mining methods, pattern evaluation methods.

Classification, Decision tree Induction, Attribute Selection Measures, Tree Pruning, Bayes Classification Methods.

### **UNIT-III**

**Cluster Analysis:** What is a cluster analysis? Requirement for Cluster Analysis, Partitioning methods, Hierarchical methods.

**Data Mining Applications & Trends:** Mining Sequence Data; Time Series, Symbolic, Biological; Statistical Data Mining, Visual & Audio Data Mining, Data Mining Applications, Data Mining Trends.

### **Reference Books:**

1. Jiawei Micheline Kamber, ‘\_Data Mining Concepts and Techniques’, Morgan Kauf Mann Publishers.
2. George M. Marakas, ‘\_Modern Data Warehousing, Mining and Visualization’, Pearson Education, 2003.
3. W.H. Inmon, ‘\_Building the Data Warehouse’, Wiley dreamtech, 3<sup>rd</sup> Edition.
4. Mastering Data Mining – Michael J.A. Berry & Gordon S. Linoff (Wiley Pub.).
5. Data Warehousing (Pearson Ed.) – Sam Anahory & Dennis Murray.

## Activity 2: (Select clause, Arithmetic Operators)

Database: employee

Create Following **tables** and insert **tuples** with suitable constraints

### EMPLOYEE

EMPID	FIRSTNAME	LASTNAME	Hire Date	ADDRESS	CITY
1001	George	Smith	11-May-06	83 first street	Paris
1002	Mary	Jones	25-Feb-08	842 Vine Ave	Losantiville
1012	Sam	Tones	12-Sep-05	33 Elm St.	Paris
1015	Peter	Thompson	19-Dec-06	11 Red Road	Paris
1016	Sarath	Sharma	22-Aug-07	440 MG Road	New Delhi
1020	Monika	Gupta	07-Jun-08	9 Bandra	Mumbai

### EMPSALARY

EMPID	SALARY	BENEFITS	DESIGNATION
1001	10000	3000	Manager
1002	8000	1200	Salesman
1012	20000	5000	Director
1015	6500	1300	Clerk
1016	6000	1000	Clerk
1020	8000	1200	Salesman

### Write queries for the following

1. To display FIRSTNAME, LASTNAME, ADDRESS AND CITY of all employees living in PARIS.
2. To display the content of employee table in descending order of FIRSTNAME
3. Select FIRSTNAME and SALARY of salesman
4. To display the FIRSTNAME, LASTNAME, AND TOTAL SALARY of all employees from the table EMPLOYEE and EMPSALARY. Where TOTAL SALARY is calculated as SALARY+BENEFITS
5. List the Names of employees, who are more than 1 year old in the organization
6. Count number of distinct DESIGNATION from EMPSALARY
7. List the employees whose names have exactly 6 characters
8. Add new column PHONE\_NO to EMPLOYEE and update the records
9. List employee names, who have joined before 15-Jun-08 and after 16-Jun-07
10. Generate Salary slip with Name, Salary, Benefits, HRA-50%, DA-30%, PF-12%, Calculate gross. Order the result in descending order of the gross.

### Activity 3: (Logical, Relational Operators)

#### Database: Library

Create Following **tables** and insert **tuples** with suitable constraints

#### Table: Books

Book_Id	Book_name	Author_Name	Publishers	Price	Type	Quantity
C0001	The Klone and I	Lata Kappor	EPP	355	Novel	5
F0001	The Tears	William Hopkins	First Publ	650	Fiction	20
T0001	My First C++	Brain & Brooke	ERP	350	Text	10
T0002	C++ Brainworks	A.W.Rossaine	TDH	350	Text	15
F0002	Thunderbolts	Ana Roberts	First Publ.	750	Fiction	50

#### Table : Issued

Book_Id	Quantity_Issued
T0001	4
C0001	5
F0001	2
T0002	5
F0002	8

#### Write queries for the following

1. To show Book name, Author name and price of books of **First Publ.** publisher
2. Display Book id, Book name and publisher of books having quantity more than 8 and price less than 500
3. Select Book id, book name, author name of books which is published by other than ERP publishers and price between 300 to 700
4. Generate a Bill with Book\_id, Book\_name, Publisher, Price, Quantity, 4% of VAT –Total”
5. Display book details with book id’s C0001, F0001, T0002, F0002 (Hint: use IN operator)
6. Display Book list other than, type Novel and Fiction
7. Display book details with author name starts with letter A
8. Display book details with author name starts with letter T and ends with S
9. Select BookId, BookName, Author Name , Quantity Issued where Books.BooksId = Issued.BookId
10. List the book\_name, Author\_name, Price. In ascending order of Book\_name and then on descending order of price

### Activity 4: (Date Functions)

#### Database : Lab

Create Following **table** and insert **tuples** with suitable constraints

#### Table : Equipment\_Details

No	ItemName	Costperitem	Quantity	Dateofpurchase	Warranty	Operational
1	Computer	30000	9	21/5/07	2	7
2	Printer	5000	3	21/5/06	4	2
3	Scanner	8000	1	29/8/08	3	1
4	Camera	7000	2	13/6/05	1	2
5	UPS	15000	5	21/5/08	1	4
6	Hub	8000	1	31/10/08	2	1
7	Plotter	25000	2	11/1/09	2	2

(Use date functions and aggregate functions)

1. To select the ItemName purchase after 31/10/07
2. Extend the warranty of each item by 6 months
3. Display Itemname , Dateof purchase and number of months between purchase date and present date
4. To list the ItemName in ascending order of the date of purchase where quantity is more than 3.
5. To count the number, average of costperitem of items purchased before 1/1/08
6. To display the minimum warranty , maximum warranty period
7. To Display the day of the date , month , year of purchase in characters
8. To round of the warranty period to month and year format.
9. To display the next Sunday from the date '07-JUN-96'
10. To list the ItemName, which are within the warranty period till present date

### Activity 5: ( Numeric, character functions)

#### Use Functions for the following

1. Find the mod of 165,16
2. Find Square Root of 5000
3. Truncate the value 128.3285 to 2 and -1 decimal places
4. Round the value 92.7683 to 2 and -1 decimal places
5. Convert the string '\_Department' to uppercase and lowercase
6. Display your address convert the first character of each word to uppercase and rest are in lowercase
7. Combine your first name and last name under the title Full name
8. A) Take a string length maximum of 15 display your name to the left. The remaining space should be filled with '\_'
9. Take a string length maximum of 20 display your name to the right. The remaining space should be filled with '#'
10. Find the length of the string '\_JSS College, Mysore'
11. Display substring '\_BASE' from '\_DATABASE'
12. Display the position of the first occurrence of character '\_o' in Position and Length
13. Replace string Database with Datatype
14. Display the ASCII value of ' ' (Space)
15. Display the Character equivalent of 42

### Activity : 6 (set operators)

#### Database : subject

Create Following table and insert tuples with suitable constraints

#### Table - Physics

Regno	Name	Year	Combination
AJ00325	Ashwin	First	PCM
AJ00225	Swaroop	Second	PMCs
AJ00385	Sarika	Third	PME
AJ00388	Hamsa	First	PMCs

#### Table – Computer Science

Regno	Name	Year	Combination
AJ00225	Swaroop	Second	PMCs
AJ00296	Tajas	Second	BCA
AJ00112	Geetha	First	BCA
AJ00388	Hamsa	First	PMCs

1. Select all students from physics and Computer Science
2. Select student common in physics and Computer Science
3. Display all student details those are studying in second year



4. Display student those who are studying both physics and computer science in second year
5. Display the students studying only physics
6. Display the students studying only Computer Science
7. select all student having PMCs combination
8. select all student having BCA combination
9. select all student studying in Third year
10. Rename table Computer Science to CS

### Activity 7: (views)

#### Database: Railway Reservation System

Create Following **table** and insert **tuples** with suitable constraints

**Table: Train Details**

Train_no	Train_name	Start_place	Destination
RJD16	Rajdhani Express	Bangalore	Mumbai
UDE04	Udhyan Express	Chennai	Hyderabad
KKE55	Karnataka Express	Bangalore	Chennai
CSE3	Shivaji Express	Coimbatore	Bangalore
JNS8	Janashatabdi	Bangalore	Salem

**Table : Availability**

Train_no	Class	Start_Place	Destination	No_of_s eats
RJD16	Sleeper Class	Banglore	Mumbai	15
UDE04	First Class	Chennai	Hyderabad	22
KKE55	First Class AC	Bangalore	Chennai	15
CSE3	Second Class	Coimbatore	Bangalore	8
JNS8	Sleeper Class	Bangalore	Salem	18

1. Create view **sleeper** to display train no, start place, destination which have sleeper class and perform the following
  - a. insert new record
  - b. update destination='Manglore' where train no='RJD16'
  - c. delete a record which have train no='KKE55'
2. Create view **details** to display train no, train name, class
3. Create view **total\_seats** to display train number, start place, use count function to no of seats , group by start place and perform the following
  - a. insert new record
  - b. update start place='Hubli' where train no='JNS8'
  - c. delete last row of the view
4. Rename view sleeper to class
5. Delete view details

### Activity 8 (group by, having clause)

#### Database: Bank system

Create Following **table** and insert **tuples** with suitable constraints

**Table: Account**

Account_no	Cust_Name	Brach_ID
AE0012856	Reena	SB002
AE1185698	Akhil	SB001
AE1203996	Daniel	SB004
AE1225889	Roy	SB002
AE8532166	Sowparnika	SB003
AE8552266	Anil	SB003
AE1003996	Saathwik	SB004
AE1100996	Swarna	SB002

**Table: Branch**

Branch_ID	Branch_Name	Branch_City
SB001	Malleswaram	Bangalore
SB002	MG Road	Bangalroe
SB003	MG Road	Mysore
SB004	Jainagar	Mysore

**Table: Depositor**

Account_no	Branch_Id	Balance
AE0012856	SB002	12000
AE1203996	SB004	58900
AE8532166	SB003	40000
AE1225889	SB002	150000

**Table: Loan**

Account_no	Branch_Id	Balance
AE1185698	SB001	102000
AE8552266	SB003	40000
AE1003996	SB004	15000
AE1100996	SB002	100000

1. Display Total Number of accounts present in each branch
2. Display Total Loan amount in each branch
3. Display Total deposited amount in each branch by descending order
4. Display max , min loan amount present in each city.
5. Display average amount deposited in each branch , each city
6. Display maximum of loan amount in each branch where balance is more than 25000
7. Display Total Number of accounts present in each city
8. Display all customer details in ascending order of brachid
9. Update Balance to 26000 where accno=AE1003996
10. Display Customer Names with there branch Name

**Activity 9: (Nested Query)**

Database : Book Dealer Table : Author

Author_id	A_Name	City	Country
EE10258	Sudaker Samuel	Bangalore	India
PE96358	Natarasu	Kolkata	India
LT45879	Tenenbaum	Toronto	Canada
PW56325	Sumitabha Das	Kolkata	India
KA56983	Galvin	Loss Angles	USA

**Table : Publisher**

Publisher_ID	Name	City	Country
21	TMH	Delhi	India
22	PHI	Kolkata	India
23	PEARSON	Mumbai	India
24	EEE	Singapore	Singapore
25	LPE	Banglore	India

**Table : Category**

Category_ID	Description
31	CSE
32	ISE
33	E&E
34	E&C

**Table : Catalog**

Book_id	Title	Author_ID	Publisher_ID	Category_ID	Year	Price
41	OS	PW56325	23	31	1998	275
42	CN	LT45879	22	32	2000	475
43	EC	EE10258	23	34	2002	380
44	SE	LT45879	24	32	2002	480
45	DBMS	PW56325	21	31	1999	650
46	EC	PE96358	25	33	2004	250

**Table : Order Details**

Order_no	Book_id	Qunatity
51	41	15
52	45	50
53	42	20
54	44	10
55	43	35
56	46	25

1. List the other publications located where PEARSON publication is located
2. List the book with maximum price
3. Display book details having quantity=25

4. Display the author details those who are publishing with PHI publisher
5. Display the Books details published for '\_CSE' category
6. Display the author details those who publish in Indian publications
7. Display book details those who have orders less than 20
8. Display all the books published under '\_CSE' & '\_ISE' category
9. Delete book details of order\_no=56
10. Alter table order details add new column order\_date & update the columns

**Activity 10:**

**Database: Mobile Shoppe (Using Joins)**

Create Following table and insert tuples with suitable constraints

**Table: Mobile Handsets**

Custno	Cname	Model	Handsetno	Amount
1010	Sita	Nokia	RM560	9500
1020	Ritesh	Samsung	SR12365	3200
1030	Reena	Nokia	RM236	1200
1040	Karan	Sony Ericsson	SE12334	8200
1050	Anu	LG	LT1255	2000

**Table: Connection Details**

Custno	Cname	Connection	ActivationDate	Validity	Amount	Phoneno
1010	Seetha	Airtel	11-May-09	365	650	9985632551
1020	Ritesh	Vodafone	10-Sep-08	180	400	9923033652
1030	Reena	Tata Docomo	12-Aug-09	100	150	9036225636
1040	Karan	Airtel	12-Jan-09	90	200	9896325415
1060	Anoop	Reliance	12-Sep-09	365	220	9342653326

1. Display Customer Name, Handset Model, connection, Validity of the connection
2. Display All Mobile Handsets along with Connection and Activation date
3. Display all Connection Details along with handset model and Handset purchase date
4. Display The Handset Details which is having highest amount than Samsung handset
5. Display Customer Name, Handset Model, connection, Validity which is having validity of one year
6. Display Customer number, customer name, connection and activation date of connections activated between 01-Jan-08 to 30-Dec-09
7. Display Customer number, Model, Connection which is having '\_Airtel' Connection
8. Display Customer number, Model, Connection which is having model is Nokia and connection is Airtel
9. Select Customer number, customer name and model which is having price more than model Samsung
10. Perform Cartesian join on Mobile Handsets and Connection details table

**University of Mysore**  
**Bachelor of Business Management**

**English- IV**

**Poetry:**

1. "Character of a Happy Life" – Henry Wotton
2. "The Dead Fox Hunter"- Robert Graves
3. "Refugee Blues" – W. H. Auden
4. "Bazaars of Hyderabad" – Sarojini Naidu
5. "Money Madness" – D. H. Lawrence

**Short Stories:**

1. "The Fly" – Katherine Mansfield
2. "Moonlight" (Clair de Lune) – Guy de Maupassant

**Essays:**

1. "Science and Tradition" – Bertrand Russell
2. "Stay Hungry, Stay Foolish" – Steve Jobs