MASTER OF COMPUTER APPLICATIONS (MCA)

MCA/ASSIGN/SEMESTER-V

ASSIGNMENTS
(July - 2023 Onwards)

MCS-051, MCS-052, MCS-053, MCSL-054,

MCSE-003, MCSE-004, MCSE-011

SCHOOL OF COMPUTER AND INFORMATION SCIENCES
INDIRA GANDHI NATIONAL OPEN UNIVERSITY
MAIDAN GARHI, NEW DELHI – 110 068

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Important Notes

1. Submit your assignments to the Coordinator of your Study Centre on or before the due date.
2. Assignment submission before due dates is compulsory to become eligible for appearing in corresponding Term End Examinations. For further details, please refer to MCA Programme Guide.
3. To become eligible for appearing the Term End Practical Examination for the lab courses, it is essential to fulfill the minimum attendance requirements as well as submission of assignments (on or before the due date). For further details, please refer to the MCA Programme Guide.
4. The viva voce is compulsory for the assignments. For any course, if a student submitted the assignment and not attended the viva-voce, then the assignment is treated as not successfully completed and would be marked as ZERO.

Course Code	**:**	**MCS-051**
Course Title	**:**	**Advanced Internet technologies**
Assignment Number	**:**	**MCA(V)/051/Assignment**
Maximum Marks	**:**	**100**
Weightage	**:**	**25%**
Last Dates for Submission	**:**	**15th October (For July Session)** **15th April (For January Session)**

Answer all the questions in the assignment which carry 80 marks in total. 20 marks are for viva voce. You may use illustrations. Place go through the guidelines regarding assignments given in the Programme Guide for the format of presentation.

Q1: What is Java Bean ? Briefly explain the four categories of bean property. **(5 Marks)**

Q2: Create a simple JSP page for your study centre, which includes declaration, scriptlets, expressions and comments tag in it. **(5 Marks)**

Q3: (a) What is JDBC? Write and run a server program for online submission of an examination form for IGNOU MCA 5th Semester course. Make necessary assumptions. **(7 Marks)**

Q3: (b) Explain how an Applet is included in a JSP program with the help of a small code. **(3 Marks)**

Q4: Create a login page for a Learning Management System using JSP and JDBC. Create database is created in Oracle/MySql. Make provisions for retrieving and modifying login records using JSP. **(10 Marks)**

Q5: What is Java Bean ? Briefly explain the four categories of bean property. **(10 Marks)**

Q6: Write an application to create a XML document from an employee database. The XML document should contain the name of an employee, address, mobile number and the last 6 months salary payment summary. **(10 Marks)**

Q7: (a) What is Message-Driven Bean? List any four uses of message-driven bean. **(5 Marks)**
Q7. (b) Explain HTTP authentication with example. **(5 Marls)**

Q8: What is need of web security? Define the basic security concepts and session tracking mechanisms. **(10 Marks)**

Q9: Discuss the security measures taken in SSL protocol. Describe briefly, the two-way SSL authentication mechanism **(10 Marks)**

Course Code	**:**	**MCS-052**
Assignment Number	**:**	**MCA (V)/052/Assignment**
Course Title	**:**	**Principles of Management and Information Systems**
Maximum Marks	**:**	**100**
Weightage	**:**	**25%**
Last Date of Submission	**:**	**15th October (For July Session)** **15th April (For January Session)**

This assignment has sixteen questions. Answer all questions. Each question is of 5 marks. Rest 20 marks are for viva voce. You may use illustrations and diagrams to enhance the explanations. Please go through the guidelines regarding assignments given in the Programme Guide for the format of presentation.

Q1: What are Business Ethics? Why are business ethics an important requirement for management? **(5 Marks)**

Q2: List and describe the tools used in requirement analysis of software design and its management. **(5 Marks)**

Q3: What are Office Automation Systems? How do they help in improving the productivity of any organization? Name three common office automation products and list out their functions. **(5 Marks)**

Q4: Explain the term "Discounted Cash Flow" (DCF). Discuss the relation between Discounted Present Value and Future Value. **(5 Marks)**

Q5: Briefly describe any five types of information systems by explaining their respective features like information inputs, processing, information output and users. **(5 Marks)**

Q6: What is Requirement Analysis ? Name the tools and methods used to perform Requirement Analysis. **(5 Marks)**

Q7: Write short notes on any two of the following : **(5 Marks)**

(i) Podcasting (ii) Risk Management (iii) NPV-Net Present Value

(iv) Horizontal organizations (v) Vertical Organizations

Q8: What do you mean by OLAP? How does OLAP contribute to Business Intelligence? **(5 Marks)**

Q9: Briefly discuss CRM and ERP. "Can CRM be ERP?" Comment on this statement. **(5 Marks)**

Q10: What do you mean by the term Intellectual Property? What is the relevance of this concept in the corporate world and how do we protect it? **(5 Marks)**

Q11: Describe the term Decision Support System (DSS). What are the various levels of classification of DSS? How do the classified levels differ from one another? **(5 Marks)**

Q12: Define Portfolio Management. What are the methods used to carry it out? Explain how it can be implemented. **(5 Marks)**

Q13: Explain the term "Business Analytics as change manager". Name any three available business analytics. **(5 Marks)**

Q14: What is meant by "Total Cost of Ownership (TCO)" of an information system ? Describe its various components. **(5 Marks)**

Q15: What is Business Intelligence? Discuss the role of Business Intelligence report in an information system. **(5 Marks)**

Q16: Compare and contrast the following : **(5 Marks)**

(i) Expert systems and Fuzzy expert systems

(ii) MOLAP and ROLAP

Course Code	**:**	**MCS-053**
Course Title	**:**	**Computer Graphics and Multimedia**
Assignment Number	**:**	**MCA(V)/053/Assignment**
Maximum Marks	**:**	**100**
Weightage	**:**	**25%**
Last Dates of Submission	**:**	**15th October (For July Session)** **15th April (For January Session)**

Note: There are Ten questions in this assignment (each carrying 8 marks). Answer all the questions. 20 Marks are for viva-voce. You may use illustrations and diagrams to enhance explanations. Please go through the guidelines regarding assignments given in the Programme Guide for the format of presentation.

Q1: Write the DDA algorithm and Bresenham Line generation Algorithm. Compare the line generation mechanism of DDA algorithm with Bresenham Line generation Algorithm while drawing a line segment from (1, 0) and (9, 8). Show step by step execution of both Line Generation algorithm, though a Graph. **(8 Marks)**

Q2: Write the Pseudocode for Bresenham's circle generation algorithm. Use this algorithm to produce a circle of radius (r) equal to four units, in the first quadrant from x = 0 to x = y. **(8 Marks)**

Q3: Compare Cohen Sutherland and Cyrus beck line clipping algorithms, with suitable example of each. In Cyrus Beck line clipping algorithm, How will you determine whether the point of intersection between line segment and clipping window is Potentially Entering (PE) or Potentially Leaving (PL). Derive the expression for the parameter (t) with respect to ith edge and the line segment PQ (line to be clipped) in the context of Cyber Beck line clipping algorithm. **(8 Marks)**

Q4: Differentiate between Euclidean Coordinate System and Homogeneous Coordinate system. Discuss the advantage of Homogeneous Coordinate system over Euclidean Coordinate System. Assume that a polygon ABCDE has the coordinates A(0, 0), B(10,10), C(10,2),D(5,5),E(7,6) is subjected to the clockwise rotation of 45° about an axis passing through the centroid of the polygon, find the final coordinates of the polygon ABCDE. You should represent the transformation using Homogeneous Coordinate System. **(8 Marks)**

Q5: Discuss the Taxonomy of Projection in computer graphics, with suitable diagram. Compare and contrast Parallel & Perspective projection, in detail (i.e. with suitable examples, equations, expressions etc.). What is isometric projection? What do you understand by the term vanishing point in context of projections, in computer graphics. Obtain a Projection matrix for perspective projection of a point P(x,y,z) onto z= 5 plane, provided the center of projection is at (0,0,-10), can we find the vanishing point(s) for this projection? Justify. **(8 Marks)**

Q6: What are the uses of Bezier Curves and Bezier Surfaces? Explain the Mathematical expression of Bezier Curves. Write the properties of the Bezier curves, prove all properties. Discuss the Parametric Continuities and Geometric Continuities of Bezier Curves, with suitable expressions, equations and examples. Explain the purpose of control points in Bezier, a Cubic Bezier curve has control points P0 (0, 0); P1 (5, 40); P2 (40, 5); P3 (50, 15). Determine 2 more points on the same Bezier curve. Draw a rough sketch of the curve and show coordinates of various points on it? **(8 Marks)**

Q7: What are Geometric continuities ? How do Geometric continuities differ from Parametric continuities ? Discuss each type of Geometric continuity and Parametric continuity with suitable diagram. **(8 Marks)**

Q8: Write and discuss Z-Buffer algorithm with suitable example. What are the maximum number of objects that can be handled by the Z-buffer algorithm? What will happen if Z-buffer algorithm is used and it is found that two polygons have same Z-value? **(8 Marks)**

Q9: Explain the following with suitable examples: **(8 Marks)**

a) Windowing Transformations
b) Scan Line Polygon Fill Algorithm
c) Area Sub-Division Algorithm
d) Simulating Accelerations in Computer Animations
e) Shading and its types
f) Authoring Tools
g) Animation and its types
h) Video File Formats and its types

Q10: Differentiate between the following **(8 Marks)**

a) Key frame animation and Cel animation
b) Analog and Digital Sound
c) Hypermedia and hypertext
d) Painting tools and drawing tools
e) Random Scan Display Devices and Raster Scan Display Devices
f) Computer Graphics and Animation
g) Compression and decompression in digital video
h) Ray tracing and Ray casting

Course Code	**:**	**MCSL-054**
Course Title	**:**	**Laboratory Course in (Advanced Internet Technologies & Computer Graphics and Multimedia)**
Assignment Number	**:**	**MCA(V)/L-054/Assignment**
Maximum Marks	**:**	**100**
Weightage	**:**	**30%**
Last Date of Submission	**:**	**15th October (For July Session)** **15th April (For January Session)**

This assignment has 10 Questions. Answer all the questions. Total marks is 50 and the max marks for each question is mentioned. Your Lab Records will carry 30 Marks (marks for each question is mentioned). Rest 20 marks are for viva voce. Please go through the guidelines regarding assignments given in the programme guide for the format of presentation.

Q1: Write a program in JSP which displays the assignment marks of all the courses of MCA 5th semester of IGNOU of all the students in a batch. Make necessary assumptions, if any. Also display current date on this page. Do proper formatting and colouring of the page. **(5+3 Marks)**

Q2: Write a program using JSP that displays a webpage consisting of Application form for 20 change of Study Centre which can be filled by any student who wants to change his/her study centre. Make necessary assumptions. **(5+3 Marks)**

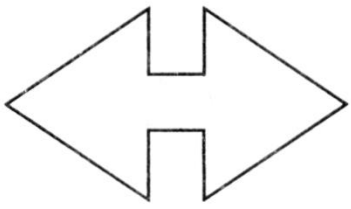
Q3: Write a Program in JSP that enables any student to apply for change of his/her examination center. Make necessary assumptions. **(5+3 Marks)**

Q4: Write a servlet program to display your name, address, date_of_birth and current date and time. The program should also calculate your age and display it. **(5+3 Marks)**

Q5: Write a JSP program using JDBC to develop an online leave management system, in which an employee can apply for leave and can see his/her leave balance. Make necessary assumptions. **(5+3 Marks)**

Q6: Implement DDA Line Generation algorithm in C/C++ using OpenGL. **(5+3 Marks)**

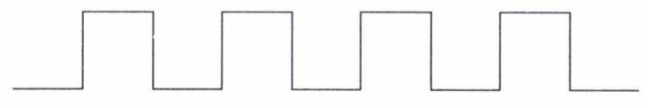
Q7: Write a program in C/C++ using OpenGL that draws the following figure: **(5+3 Marks)**



Q8: Write a program in C/C++ to implement a Bresenham's Circle generation algorithm (without using inbuilt circle ( ) function). **(5+3 Marks)**

Q9: Write a Program in C/C++ using open GL that draws the following figure: **(5+3 Marks)**

Q10: Write a Program in C/C++ using Open GL that draws the following figure. **(5+3 Marks)**



Course Code	**:**	**MCSE-003**
Course Title	**:**	**Artificial Intelligence**
Assignment Number	**:**	**MCA(V)E003/Assignment**
Maximum Marks	**:**	**100**
Weightage	**:**	**30%**
Last Date of Submission	**:**	**15th October (For July Session)**
		15th April (For January Session)

This assignment has 10 questions of 8 Marks each, answer all questions. Rest 20 marks are for viva voce. You may use illustrations and diagrams to enhance the explanations. Please go through the guidelines regarding assignments given in the Programme Guide for the format of presentation.

Q1: If the propositions are described as follows: **(8 Marks)**

P : He needs a doctor
S : He is Sick
Q : He needs a lawyer
U : He is injured
R : He has an accident

Then represent the following formulas in English :

(i) $(P \wedge Q) \rightarrow R$
(ii) $(P \wedge Q) \leftrightarrow (S \wedge U)$

Q2: What are Expert Systems? Briefly discuss the various categories of software tools, used for the development of expert systems. **(8 Marks)**

Q3: Write a program in LISP to calculate the area of the circle, whose radius is given by the user. Write proper comments to enhance readability of your code. **(8 Marks)**

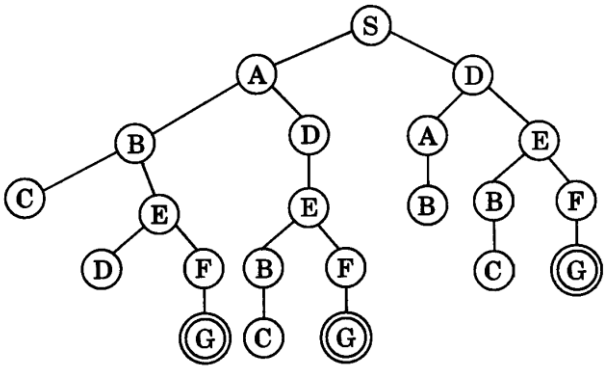
Q4: What is Prenex Normal Form (PNF). Write the steps to transform a Well-Formed Formula (WFF) into PNF. Transform $\forall x(Q(x) \rightarrow (\exists x)\, R(x, y))$. **(8 Marks)**

Q5: What are Semantic Nets? Briefly discuss the utility of semantic nets in knowledge management. Give suitable example in support of your answer. **(8 Marks)**

Q6: Define fuzzy inference system? What are the main steps in Fuzzy inference system? Make an inference system for food management system. **(8 Marks)**

Q7: What is Means-Ends Analysis? How is Means-Ends Analysis used as a problem solving technique? **(8 Marks)**

Q8: Write BFS algorithm. Use the BFS to search the goal node  . Show each step of the algorithm. **(8 Marks)**



Q9: What is the difference between Knowledge and Intelligence? Enumerate the various knowledge representation schemes, giving a brief description for each scheme. **(8 Marks)**

Q10: Write a program in Prolog to find and print prime numbers between 50 to 200. **(8 Marks)**

Course Code	**:**	**MCSE-004**
Course Title	**:**	**Numerical and Statistical Computing**
Assignment Number	**:**	**MCA(V)E004/Assignment**
Maximum Marks	**:**	**100**
Weightage	**:**	**30%**
Last Date of Submission	**:**	**15th October (For July Session)**
		15th April (For January Session)

This assignment has 10 questions of 8 Marks each, answer all questions. Rest 20 marks are for viva voce. You may use illustrations and diagrams to enhance the explanations. Please go through the guidelines regarding assignments given in the Programme Guide for the format of presentation.

Q1: Use Regula-Falsi method to find the roots of the equation $f(x) = x^3 + x - 1$. **(8 Marks)**

Q2: Calculate the value of the integral **(8 Marks)**

$\int_4^{5.4} logx$ by using

(i) Simpson's 1/3 rule,
(ii) Simpson's 3/8 rule.

Q3: Solve the following system of equations by using the Gauss Elimination method: **(8 Marks)**

$x + 2y + z = 3$
$2x + 3y + 3z = 10$
$3x\ y + 2z = 13$

Q4: Use the Jacobi method to solve the following system of equations: **(8 Marks)**

$3x + 4y + 15z = 54.8$
$x + 12y + 3z = 39.66$
$10x + y — 2z = 7.74$

Q5: A husband and wife appear in an interview for two vacancies in the same post. The probability of husband's selection is 18 and that of wife's selection is ¼. What is the probability that: **(8 Marks)**

(i) Both of them will be selected
(ii) Only one of them will be selected
(iii) None of them will be selected.

Q6: In the table below, the value of y are consecutive terms of a series of which 23.6 is the sixth term. Find the first and tenth terms of the series using Newton's forward interpolation method.

(8 Marks)

x	3	4	5	6	7	8	9
y	4.8	8.4	14.5	23.6	36.2	52.8	73.9

Q7: The length of metallic strips produced by a machine has mean 100 cm and variance 2.25 cm. Only strips with length between 98 and 103 cm are acceptable. What proportion of strips will be acceptable? You may assume that the length of a strip has a Normal Distribution. **(8 Marks)**

Q8: 1000 light bulbs with a mean life of 120 days are installed in a new factory and their length of life is normally distributed with standard deviation of 20 days. **(8 Marks)**

(i) How many bulbs will expire in less than 90 days?

(ii) If it is decided to replace all the bulbs together, what interval should be allowed between replacements if not more than 10% should expire before replacement?

Q9: Briefly discuss the following with a suitable example: **(8 Marks)**

(i) Non Linear Regression
(ii) Acceptance Rejection method

Q10: What are residual plots? Discuss the utility and disadvantage of residual plots. **(8 Marks)**

Course Code	**:**	**MCSE-011**
Course Title	**:**	**Parallel Computing**
Assignment Number	**:**	**MCA(V)/E011/Assignment**
Maximum Marks	**:**	**100**
Weightage	**:**	**25%**
Last Dates for Submission	**:**	**15th October (For July Session)** **15th April (For January Session)**

All questions given carry equal marks. Answer all the questions. 20 marks are for viva-voce. You may use illustrations and diagrams to enhance the explanations. Please go through the guidelines regarding assignments given in the Programme Guide for the format of presentation.

Q1:

a) Explain the various classifications of parallel computers in detail.
b) Discuss the design issues of interconnection network in detail.
c) Discuss the performance and issues factor in pipelining.
d) Discuss the performance and issues factor in pipelining.
e) Explain the algorithm for matrix multiplication for parallel computational model. What is its complexity?

Q2:

a) Solve the matrix multiplication problem using the parallel models.
b) Explain odd-even transposition sorting method. Provide an example to understand the concept.

Q3:

a) Define 8 x 8 Benz network of 4 stage in detail.
b) What are the problems encountered in superscalar architecture? Discuss.

Q4: Explain the following terms:

(i) Cluster Computing
(ii) Master Slave Kernel
(iii) System Deadlock
(iv) Parallel Random Access Machine
(v) Instruction Level and Loop Level
(vi) Parallelism