

MASTER OF COMPUTER APPLICATIONS (MCA)

MCA/ASSIGN/SEMESTER-V

**ASSIGNMENTS
(July - 2022 & January - 2023)**

**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/Assign/2022-23**
Maximum Marks : **100**
Weightage : **25%**
Last Dates for Submission : **31st October, 2022 (for July, 2022 session)**
15th April, 2023 (for January, 2023 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 a cookie? Differentiate cookie with a session. **(6 Marks)**
- Q2.** Create a simple JSP page which includes declaration, scriptlets, expressions and comments tag in it. **(6 Marks)**
- Q3.** (a) Explain different types of JDBC drivers and their advantages. **(5 Marks)**
(b) Explain how an Applet is included in a JSP program with the help of a small code. **(5 Marks)**
- Q4.** (a) Create a login page using JSP and JDBC. Database is to be created in Oracle **(6 Marks)**
(b) Retrieve login records from database using JSP. **(4 Marks)**
- Q5.** (a) Describe External Entity, Internal Entity and Parameter Entity in XML with suitable Example of each. **(7 Marks)**
(b) Differentiate between HTML and XML with the help of an example. **(5 Marks)**
- Q6.** (a) Under what conditions the use of entity beans is done? Describe the entity beans methods to update and destroy a database. **(5 Marks)**
(b) What is EJB? What are different restrictions on EJB? **(6 Marks)**
- Q7.** What is Java Bean? Briefly explain the four categories of bean property. **(10 Marks)**
- Q8.** Describe the following HTTP authentication mechanism for authentication of a user to a web server: **(7 Marks)**
(i) HTTP authentication
(ii) HTTP click authentication
- Q9.** Define the basic security concepts and session tracking mechanism. **(8 Marks)**

Course Code	:	MCS-052
Assignment Number	:	MCA (V)/052/Assign/2022-23
Course Title	:	Principles of Management and Information Systems
Maximum Marks	:	100
Weightage	:	25%
Last Date of Submission	:	31st October, 2022 (for July, 2022 session) 15th April, 2023 (for January, 2023 session)

Answer all questions. Each question is of 10 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. Make suitable assumption is necessary.

- Q1.** What are different types of Organizations? What do you mean by structure of an organisation? **(10 Marks)**
- Q2.** What is portfolio management? Explain the objectives associated with portfolio management. **(10 Marks)**
- Q3.** Explain need of system analysis for design of an Information system. Also briefly describe tools and methods used in Analysis. **(10 Marks)**
- Q4.** Explain, how Neural Network method is used in market analysis. **(10 Marks)**
- Q5.** What is Transaction Processing System (TPS)? Explain with example. Also write features of TPS. **(10 Marks)**
- Q6.** (a) What is discounted cash flow (DCF)? Explain with example. **(5 Marks)**
- Q6.** (b) What are the advantages of Total Cost of Ownership (TCO). **(5 Marks)**
- Q7.** (a) What is knowledge discovery in Databases? Discuss Basket analysis in Data Mining. **(5 Marks)**
- Q7.** (b) What is “Intellectual Property”? What is its relevance in corporate world? How can intellectual property be protected? Explain in detail. **(5 Marks)**
- Q8.** What is ERP? Explain need of ERP and how it improves the performance of any organization. **(10 Marks)**

Course Code	:	MCS-053
Course Title	:	Computer Graphics and Multimedia
Assignment Number	:	MCA(V)/053/Assign/2022-23
Maximum Marks	:	100
Weightage	:	25%
Last Dates of Submission	:	31st October, 2022 (for July, 2022 session) 15th April, 2023 (for January, 2023 session)

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, through a Graph.
- Q2.** Write the Midpoint circle generation algorithm and use the same to produce a circular arc of radius 8 units in the first quadrant from $x = 0$ to $x = y$.
- 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 i th edge and the line segment PQ (line to be clipped) in the context of Cyber Beck line clipping algorithm.
- Q4.** Write Translational, Rotational, Scaling, Reflection, Shear Transformation matrix for 2D and 3D homogeneous system. Determine the final coordinates of a polygon ABCD, A (1, 4), B (-4, 1) C (-1, -1), D(2, -2) when it is scaled up to twice its size with respect to an arbitrary point P(1, 1).
- 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
- Q6.** What is a Bezier curve? Explain the Mathematical expression Bezier Curves. Derive all the properties of Bezier curves. A Cubic Bezier curve has control points $P_0(0, 0)$; $P_1(5, 40)$; $P_2(40, 5)$; $P_3(50, 15)$. Determine 2 more points on the same Bezier curve. Also, discuss the Parametric Continuities and Geometric Continuities of Bezier Curves, with suitable expressions, equations and examples
- Q7.** 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?

Q8. What do you mean by simulating acceleration in animation? What type of acceleration will be simulated by a straight line function? Draw suitable graph for the mathematical function used to describe the frame spacing regulation when positive acceleration is desired to be produced.

Q9. Differentiate the following:

1. Ray tracing and Ray casting
2. Scan line Polygon fill algorithm and Flood Fill Algorithm
3. Phong shading and Gourand Shading
4. JPEG and TIFF
5. Bitmap Graphics and Vector Graphics

Q10. Explain the following with suitable examples:

1. Windowing Transformations
2. Area Sub-Division Algorithm
3. Sweep representations
4. Authoring Tools
5. Video file formats

Course Code : **MCSL-054**
Course Title : **Laboratory Course**
Assignment Number : **MCA(V)/L-054/Assign/2022-23**
Maximum Marks : **100**
Weightage : **25%**
Last Date of Submission : **31st October, 2022 (for July, 2022 session)**
15th April, 2023 (for January, 2023 session)

Note: This assignment has two parts A and B (Advanced Internet Technologies and Computer Graphics & Multimedia) and each part is for 20 marks. Answer all the questions. Lab record for all the respective sessions (given in the MCSL-054 Lab Manual) for each course carries 20 Marks each. Rest 20 marks are for viva voce. Please go through the guidelines regarding assignments given in the MCA Programme Guide for the format of presentation. Make assumptions if any and state them.

PART-I: MCS-051 (Advanced Internet Technologies)

- Q1.** Write a Servlet program to display details of the Saving Accounts. Make necessary assumptions. **(6 Marks)**
- Q2.** Write a program using JDBC and JSP to manage Fee Payment Records of the Students of MCA and BCA Programmes of IGNOU. Make necessary assumptions. **(10 Marks)**
- Q3.** Create an XML document for Teacher of a University. **(4 Marks)**

PART-II: MCS-053 (Computer Graphics and Multimedia)

- Q1.** Write a program in C/C++ using OpenGL to draw a rectangle of red colour and inside that draw a triangle of blue colour. **(4 Marks)**
- Q2.** Write a program in C/C++ using OpenGL to draw a hard wire house as shown in figure given below. Use basic primitives of openGL. **(4 Marks)**

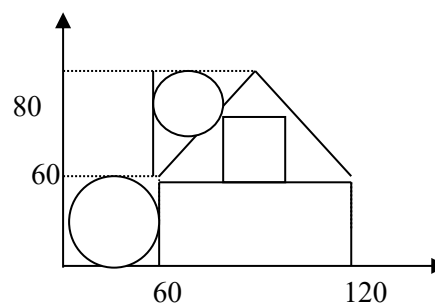


Figure: House

- Q3.** Write a program in C or C++ to implement DDA Circle generation Algorithm. **(4 Marks)**
- Q4.** Write a program in C/C++ to implement Bresenham's line generation algorithm. **(4 Marks)**
- Q5.** Write a program in C/C++ to implement Cohen-Sutherland line clipping algorithm. **(4 Marks)**

Course Code	:	MCSE-003
Course Title	:	Artificial Intelligence and Knowledge Management
Assignment Number	:	MCA(V)E003/Assign/2022-23
Maximum Marks	:	100
Weightage	:	25%
Last Date of Submission	:	31st October, 2022 (for July, 2022 session) 15th April, 2023 (for January, 2023 session)

Note: This assignment has 8 questions of 80 marks (All Questions carries equal marks). Answer all the questions. Rest 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.** (a) What is “Turing test”? Give a brief outline of the Turing test.
What are the limitations of Turing test?
- (b) How “Chinese Room Test” took over the limitations of Turing test? How did the outcomes of the Chinese Room Test contribute in the development of machine intelligence?
- Q2.** (a) Transform the following to **DNF**:
(i) $P \rightarrow (\sim (Q \rightarrow R))$
(ii) $\sim (P \rightarrow Q) \rightarrow \sim R$
- (b) Transform the following into **CNF**
(i) $\sim (C \rightarrow D) \vee (C \wedge D)$
(ii) $(P \rightarrow (\sim Q \rightarrow R))$
- Q3.** (a) Determine whether each of the following sentences are satisfactory, contradictory or valid
(i) $(P \wedge Q) \vee \sim (P \wedge Q)$
(ii) $(P \rightarrow Q) \rightarrow \sim P$
- (b) Given the formulae $E_1 : A \rightarrow B : E_2 : \sim B : G : \sim A$
Prove the G is logical Consequence of E1 and E2 without truth table.
- Q4.** (a) Transformed the following well-formed formula to Prenex normal form
 $(\forall x) (Q(x) \rightarrow (\exists x) R(x, y))$
- (b) Write well-formed formulae of following statements
(i) Person respected by every other person is a king.
(ii) Some, who are intelligent, can't read.
- Q5.** (a) With the help of a suitable example, describe the “member” function of PROLOG. How it can be used for searching of a data in a list, recursively.
- (b) Write a recursive program in LISP to find factorial of a number given by the user.
- Q6.** (a) Explain the difference between Forward and Backward Chaining. Under which situation which mechanism is best to use, for a given set of problem?
- (b) Compare and contrast the following:
(i) Frames and scripts

(ii) Informed search and uniformed search

Q7. (a) Discuss the systems available to handle the incompleteness of a knowledge base. What do you understand by the term “Fuzzyfication”? Given below a fuzzy set to describe the term tall

$$\text{tall} = (5' / 0.0; 5'5'' / 0.2; 5'8'' / 0.5; 6' / 0.7; 6'5'' / 0.8; 7' / 1.0)$$

Discuss and describe membership function for the fuzzy sets for each of the terms:

(i) Very tall

(ii) More or less tall

(iii) Not tall

(b) Express the following knowledge as a semantic network structure with Interconnected nodes and labeled arcs. “Ram is Vice President of ABC Company. He is married to Raj and has a male child RajaRam. RajaRam Goes to school. Ram plays golf and owns a silver color German made car Mercedez Benz”

Q8. Write Short notes on the following

(i) Classification of Agents in Artificial Intelligence

(ii) Truth Maintenance System – TMS.

(iii) Skolemization

(iv) Expert System and its architecture

(v) Closed World Assumptions

Course Code : **MCSE-004**
Course Title : **Numerical and Statistical Computing**
Assignment Number : **MCA(V)E004/Assign/2022-23**
Maximum Marks : **100**
Weightage : **25%**
Last Date of Submission : **31st October, 2022 (for July, 2022 session)**
15th April, 2023 (for January, 2023 session)

Note: This assignment has 16 questions of 80 marks (All Questions carries equal marks). Answer all the questions. Rest 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.** If 0.333 is the approximate value of $\frac{1}{3}$, find absolute, relative and percentage error. Explain how these errors measure accuracy.
Q2. Use the Newton-Raphson method to find a root of the equation $x^3 - 2x - 5 = 0$.
Q3. Find the roots of the equation $f(x) = \frac{e^x}{2} - 5x + 2$, by using Secant method.
Q4. What are the pitfalls of Gauss-Elimination method? Solve the following system, using Gauss Elimination Method:

$$\begin{aligned}
 2x + y + z &= 10 \\
 3x + 2y + 3z &= 18 \\
 x + 4y + 9z &= 16
 \end{aligned}$$

- Q5.** Use Lagrange's Interpolation formula to find the value of $\text{Cos}(\pi/6)$ given $y = \text{Cos } x$.

x	0	$\pi/4$	$\pi/2$
$y = \text{Cos } x$	1.0	0.70711	0

- Q6.** A car hire firm has two cars which it hires out day by day. The number of demands for a car on each day is distributed as Poisson variate with mean 1.5. Calculate the proportion of days on which
 (i) neither car is used
 (ii) some demand is refused

- Q7.** Solve by Jacobi's method, the following system of linear equations:

$$\begin{aligned}
 2x_1 - x_2 + x_3 &= -1 \\
 x_1 + 2x_2 - x_3 &= 6 \\
 x_1 - x_2 + 2x_3 &= -3
 \end{aligned}$$

- Q8.** Evaluate the integral $I = \int_0^{\pi/2} \sin x \, dx$ using Gauss-Legendre formula. Compare the results with exact solution obtained by Simpson rule. The exact value of $I = 1$.
Q9. Evaluate $\int_0^1 \frac{dx}{1+x}$ using composite trapezoidal rule with $n = 2$ and 4.
Q10. Solve the initial value problem $\frac{dy}{dx} = y - x$ with $y(0) = 2$ and $h = 0.1$, Using fourth order classical Runge-Kutta Method, find $y(0.1)$ and $y(0.2)$ correct to four decimal places.

- Q11.** Following data is given for marks in subject A and B of a certain examination.

	Subject A	Subject B
Mean Marks	36	85
Standard Deviation	11	8

Coefficient of correlation between A and B = ± 0.66

- (i) Determine the two equations of regression.
- (ii) Calculate the expected marks in A corresponding to 75 marks obtained in B.

Q12. A polynomial passes through the following set of points:

x	1	2	3	4
y	-1	-1	1	5

Find the polynomial, using Newton's forward interpolation.

- Q13.** An irregular six faced die is thrown and the expectation that in 10 throws it will give live even numbers is twice the expectation that it will give four even numbers. How many times in 10000 sets of 10 throws would you expect it to give no even number?
- Q14.** If a bank receives on an average six bad cheques per day, then what is the probability that it will receive four bad cheques on any given day?
- Q15.** A chemical engineer is investigating the effect of process operating temperature on product yield. The study results in the following data:

Term ($^{\circ}\text{C}$) (X)	Yield % (Y)
100	45
110	51
120	54
130	61
140	66
150	70
160	74
170	78
180	85
190	89

Determine the Goodness to fit parameter 'R' and comment on whether the predicted line fits well into the data or not.

- Q16.** Find the root of the equation $2x = \cos x + 3$ by using Bisection method, correct to three decimal places.

Course Code : **MCSE-011**
Course Title : **Parallel Computing**
Assignment Number : **MCA(V)/E011/Assign/2022-23**
Maximum Marks : **100**
Weightage : **25%**
Last Dates for Submission : **31st October, 2022 (for July, 2022 session)**
15th April, 2023 (for January, 2023 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. Identify the factors due to whom speed of Pipelining is limited.

Q2. Write a program to find sum of elements of an Array using K processors.