

MASTER OF COMPUTER APPLICATIONS (MCA)

MCA/ASSIGN/SEMESTER-V

**ASSIGNMENTS
(July - 2017 & January - 2018)**

**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
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CONTENTS

Course Code	Assignment No.	Submission-Schedule		Page No.
		For July-December Session	For January-June Session	
MCS-051	MCA(V)/051/Assignment/17-18	15 th October, 2017	15 th April, 2018	3
MCS-052	MCA(5)/052/Assignment/17-18	15 th October, 2017	15 th April, 2018	5
MCS-053	MCA(5)/053/Assignment/17-18	15 th October, 2017	15 th April, 2018	6
MCSL-054	MCA(5)/L-054/Assignment/17-18	15 th October, 2017	15 th April, 2018	8
MCSE-003	MCA(5)/E-003/Assignment/17-18	15 th October, 2017	15 th April, 2018	9
MCSE-004	MCA(5)/E-004/Assignment/17-18	15 th October, 2017	15 th April, 2018	12
MCSE-011	MCA(5)/E-011/Assignment/17-18	15 th October, 2017	15 th April, 2018	14

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(5)/051/Assignment/17-18
Maximum Marks	:	100
Weightage	:	25 %
Last Dates for Submission	:	15th October, 2017 (For July 2017 Session)
	:	15th April, 2018 (For January 2018 Session)

This assignment has eleven questions, which carry 80 marks in total. Answer all the questions. The rest 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.

1. Write a Message Driven Bean(MDB) for a new agency that has to capture the data from various news sources. The newly written MDB should accept the XML format for the news. The XML data needs to be parsed and stored in the database. The news format is as follows: *(8 Marks)*

```

<news-id>          </news-id>
<source>          </source>
<data>            </data>
<type_of_news>    </type_of_news>
<priority>        </priority>
<news_Content.>  </news_Content..>

```

2. Write and run Servlet code to fetch and display all the fields of a student table stored in an Oracle database with attributes: (students id, student-name, student - address, program, semester) *(8 Marks)*

3. Write an application to create a XML document from an employee database stored in an Oracle database. The XML document should contain the following fields: *(8 Marks)*

(employee-id, employee-name, employee-address, employee-email, employee-sex, age and the last twelve month salary summary).

4. Suppose there is a table named as product in Oracle database with attributes as : product id, product name, product quality, product price, model and its description . Write JAVA program to insert, delete and display records of the table using JDBC. *(8 Marks)*

5. Describe with suitable program segment how to include file and applets in a JSP page. (6 Marks)
6. Write a web based student registration application where the students can register on-line with their enrollment numbers. The registered students should be able to login on after getting registered. You are required to use JSP, Servlet and JDBC. (8 Marks)
7. Explain the difference between Session and Cookie. (4 Marks)
8. What are the different components to be used while writing SSL client application ? Discuss. Write sample codes for SSL client and SSL Client Servlet and explain it. (10 Marks)
9. Write a template code for implementation of EJB client. What are the restriction on what EJB can do ? (5 Marks)
10. What are the important features of entity beans. Distinguish between Bean managed and Container managed persistence for Entity Beans. Write the methods required for entity beans. (10 Marks)
11. What are different recovery procedures in security implementation? Discuss (5 Marks)

Course Code	:	MCS-052
Course Title	:	Principles of Management and Information Systems
Assignment Number	:	MCA(5)/052/Assignment/17-18
Maximum Marks	:	100
Weightage	:	25%
Last Date of Submission	:	15th October, 2017 (For July 2017 Session)
	:	15th April, 2018 (For January 2018 Session)

This assignment has eight questions. 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. Answer to each part of the question should be confined to about 300 words.

1. What is ERP? Explain different components of an ERP system. *(10 Marks)*
Compare ERP with other similar software solution.
2. What is portfolio management? Discuss the uses and significance of various tools used to automate the portfolio management processes *(10 Marks)*
3. Discuss why management needs information. Is it possible for the management of an organization to make effective decisions without the aid of an information system? Explain. *(10 Marks)*
4. How are databases used in e-business? How does e-business fit into different locations within the production chain? *(10 Marks)*
5. What is the role of OLAP in decision-making? What does the term drill mean down in an executive information system? *(10 Marks)*
6. Explain different advantages and disadvantages of Knowledge Management in Organisations. *(10 Marks)*
7. Explain some of the security threats to information systems? How does encryption ensure data security? *(10 Marks)*
8. What is total cost of ownership (TCO)? What are the different cost factors for computation of the TCO of any system? Explain. *(10 Marks)*

Course Code	:	MCS-053
Course Title	:	Computer Graphics and Multimedia
Assignment Number	:	MCA(5)/053/Assignment/17-18
Maximum Marks	:	100
Weightage	:	25 %
Last Dates of Submission	:	15th October, 2017 (For July 2017 Session)
	:	15th April, 2018 (For January 2018 Session)

There are Eight questions in this assignment (each carrying 10 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.

1. What are the advantages and disadvantages of using DDA algorithm for line generation? List the steps of the algorithm. Use this algorithm to draw a line with endpoints (2, 3) and (9, 8). Compare DDA algorithm and Bresenham Line generation Algorithm? Show step by step execution of Bresenham Line Generation algorithm for drawing a line having endpoints (2, 3) and (9, 8). *(10 Marks)*
2. What is the major difference between Cohen Sutherland and Cyrus beck line clipping algorithms? Briefly Discuss both algorithms with suitable example. In Cyrus Beck line clipping algorithm, How will you determine whether the point of intersection between line and clipping window is Potentially Entering (P_E) or Potentially Leaving (P_L). Derive the expression for t with respect to i^{th} edge and PQ (line to be clipped) in the context of Cyber Beck line clipping algorithm. Use the Cohen Sutherland line clipping algorithm to clip the line segment PQ having coordinates P(20, 30) and Q (100, 100). The clipping window ABCD's coordinates are – A(0,0), B(40,0), C(40,40) and D(0,40) *(10 Marks)*
3. How Euclidean Coordinate System Differs from Homogeneous Coordinate system? What is the advantage of Homogeneous Coordinate system over Euclidean Coordinate System? Assume a polygon ABCDE having coordinates A(0,0), B(10,10), C(10,2), D(5,5), E(7,6) is subjected to the counter-clockwise rotation of 45° about an axis passing through the centroid of the polygon . Find the transformed coordinates of the polygon ABCDE. You should represent the transformation using Homogeneous Coordinate System *(10 Marks)*
4. Draw the tree structure to discuss the Taxonomy of Projection, in computer graphics. Compare and contrast Parallel & Perspective projection, in detail. i.e with suitable examples, equations, expressions etc. What is isometric projection? Derive a general transformation matrix for isometric projection. Obtain an isometric view of a cube of the unit size lying on the origin. What is vanishing *(10 Marks)*

point in context of projections, in computer graphics? Consider a cube of size 4 units that is lying on the origin, obtain the perspective projection of this cube on $z=0$ plane having the centre of projection at $E(0,0,-2)$. Can we find the vanishing point(s) for this projection?

5. What is the utility of Bezier Curves in Computer Graphics? Write the properties of the Bezier curves and prove all properties. What do you understand by the Parametric Continuities and Geometric Continuities in context of Bezier Curves? Discuss both type of continuities with suitable expressions, equations and examples. Explain the role of control points in Bezier Curves. Draw a Bezier curve having the control points as $P_0(0, 0)$, $P_1(2, 5)$, $P_2(5, 9)$, $P_3(10, 20)$. Calculate the coordinates of the points on the curve corresponding to the parameter $u = 0.2, 0.4, 0.6$. Draw a rough sketch of the curve and show coordinates of various points on it? *(10 Marks)*
6. Explain the following with suitable examples: *(10 Marks)*
- Windowing Transformations
 - Scan Line Polygon Fill Algorithm
 - Z-Buffer Algorithm
 - Sweep representations
 - Simulating Accelerations in Computer Animations
7. Explain the following in the context of computer Graphics and multimedia, use suitable diagram and /or mathematical equations or example in your explanation. *(10 Marks)*
- Shading and its types
 - Reflection and its types
 - Animation and its types
 - Audio File Formats and its type
 - Video File Formats and its types
8. Differentiate between the following *(10 Marks)*
- Key frame animation and Cel animation
 - Analog and Digital Sound
 - Hypermedia and hypertext
 - Painting tools and drawing tools
 - Random Scan Display Devices and Raster Scan Display Devices
 - Computer Graphics and Animation
 - Interlaced and progressive scan
 - Compression and decompression in digital video
 - Hypermedia and hypertext
 - Ray tracing and Ray casting

Course Code	:	MCSL-054
Course Title	:	Laboratory Course
Assignment Number	:	MCA(5)/L-054/Assignment/17-18
Maximum Marks	:	100
Weightage	:	25 %
Last Date of Submission	:	15th October, 2017 (For July 2017 Session)
	:	15th April, 2018 (For January 2018 Session)

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. If any assumptions made, please state them.

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

1. Develop a web page using servlet to display counselling schedule of MCSL-054 at your Study Centre. *(4 Marks)*
2. Develop a web page for conducting an online test for jsp programming. The questions in test should be of multiple choice type and true/ false type. There should be provisions for registration, examination and to see the results after examination. Use servlet.jsp,jdbc, to develop this application. Make necessary assumptions require. *(12 Marks)*
3. Create an XML document for Medicines in a medical store. *(4 Marks)*

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

1. Write a program in C/C++ using OpenGL to draw a triangle of blue colour and inside that draw a circle of orange colour. *(4 Marks)*
2. Write a program in C/C++ using OpenGL to show a ball is shrinking. *(4 Marks)*
3. Write a program in C/C++ to implement DDA line drawing algorithm. *(4 Marks)*
4. Write a program in C/C++ to implement Bresenham's circle generation algorithm. *(4 Marks)*
5. Write a program in C/C++ to implement Scan-Line Polygon Filling Algorithm. *(4 Marks)*

Course Code	:	MCSE-003
Course Title	:	Artificial Intelligence and Knowledge Management
Assignment Number	:	MCA(5)/E-003/Assignment/17-18
Maximum Marks	:	100
Weight age	:	25 %
Last Date of Submission	:	15th October, 2017 (For July 2017 Session)
	:	15th April, 2018 (For January 2018 Session)

This assignment has eight questions each carries equal marks (10 each), in total 80 marks. The rest of the 20 marks are for viva-voce. Answer all the questions. 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.

1. Discuss the Turing Test & Chinese room test in detail. How these two tests addresses the machine intelligence over the human intelligence? Which test has edge over the other? Justify your answer with suitable arguments.
2. Differentiate between Predicate & Propositional logic. Identify some application areas where Predicate & Propositional logic is used. Write De-Morgan's laws for Predicate & Propositional logic. Do the Universal Quantification & Existential Quantification, represents generalized version of conjunction & disjunction operations, respectively? Justify your answer with suitable arguments. Using which mechanism you verify the validity of the statement? Discuss with suitable example.

For each of the following formulae, construct a truth-table, and then determine whether it is valid, consistent or inconsistent:

- (i) $(\sim C \rightarrow \sim D) \rightarrow (D \rightarrow C)$
- (ii) $((\sim C \vee D) \rightarrow B) \rightarrow (\sim C \rightarrow B)$

3. Why do we need to do the Normalization of any Well Form Formula (WFF)? What is the practical utility of deriving the Conjunctive Normal Form (CNF) & Disjunctive Normal Form (DNF)? Determine whether the equivalence between the formulae on two sides of '=' holds or not $(A \rightarrow B) \rightarrow C = (A \rightarrow B) \rightarrow (A \rightarrow C)$? Reduce each of the given formulae on the two sides of '=' to one of the normal forms (DNF or CNF).
4. Write the process of transforming a Well Form Formula or FOPL expression in to a clausal form. What is the role of achieving Prenex Normal Form (PNF) in the above process, what is its utility? How Prenex Normal Form (PNF) contributes to the process of

Skolemization. Write the steps involved in achieving PNF and Skolemization. What is the role of clausal form in the process of Resolution, in context of Artificial Intelligence? Skolemize the expression below :

$$\exists x_1 \exists x_2 \forall y_1 \forall y_2 \exists x_3 \forall y_3 P(x_1, x_2, x_3, y_1, y_2, y_3)$$

5. Translate the following three statements in First Order Predicate Logic, and then deduce (iii) from (i) and (ii): *Firstly without using Resolution Method and then by using the Resolution method*
 - (i) Lord Krishna is loved by everyone who loves someone.
 - (ii) No one loves nobody
 - (iii) Lord Krishna is loved by everyone.

6. How Programming Languages like C/C++/Java differs from Programming languages used for the purpose of Artificial intelligence viz. PROLOG, LISP. What are the additional components present in LISP & PROLOG, which makes them intelligent enough. What is the mathematical basis of PROLOG? Which polish notation supports the LISP ? Write the Following codes(provide suitable comments with code to express your logic)
 - (a) Write a recursive function in LISP named **power** that takes two numeric arguments, n and m , that computes n th power of m (i.e., m^n).
 - (b) Write a PROLOG programme that answers questions about family members and relationships. Include predicates and rules which define sister, brother, father, mother, grandfather, grandchild and uncle. The programme should be able to answer queries such as the following:
 - ? – father (X, mohit)
 - ? – grandson (X, Y)
 - ? – uncle (abdul, ruksana)
 - ? – mother (mary, X)

7. **Perform The Following:**
 - a) Transform the FOPL statement given below in to equivalent conceptual graph

$$\forall x (\text{Has Wings}(x) \wedge \text{Layseggs}(x) \rightarrow \text{Bird}(x))$$
 - b) Transform the following conceptual graph in to FOPL statement
 [PERSONA: Anil] ← (AGENT) ← [DRINK] → (OBJECT) → [Food: Milk] →← (Instrument Glass)

- (c) Give Semantic Net representation of the facts given below :
“Shobhit is a 52 year old Professor of Computer Science in a University. The name of his wife, son and daughter are respectively Seema, Yashasvi and Savita”.
- (d) Create a frame network for terrestrial motor vehicles (cars, trucks, motorcycles) and give one complete frame in detail for cars which includes the slots for the main component parts, their attributes, and relations between parts. Include an as-needed slot for the gas of each type mileage.

8. Perform The Following:

- a) For the following fuzzy sets:

$$X = \{x/0.7, y/0.3, z/0, u/1, v/0.4\} \text{ and } Y = \{x/0.3, y/0.8, z/0.6, u/0.9, v/0\}$$

Find (i) $X \cup Y$ (ii) $X \cap Y'$ (iii) $(X \cup Y)'$ (iv) $(X \cap Y)'$

- (b) Write a note on Non-monotonic reasoning systems.
- (c) Discuss briefly various methods/ mechanism for handling incompleteness of a knowledge-base.
- (d) Describe briefly each of the components of an expert system shell.
- (e) What is an agent? Discuss briefly different (*at least four*) types of agents.

Course Code	:	MCSE-004
Course Title	:	Numerical and Statistical Computing
Assignment Number	:	MCA(5)/E-004/Assignment/17-18
Maximum Marks	:	100
Weightage	:	25 %
Last Date of Submission	:	15th October, 2017 (For July 2017 Session)
	:	15th April, 2018 (For January 2018 Session)

This assignment has eight questions in all, each question carries 10 marks. The rest of the 20 marks are for viva-voice. Answer all the questions. 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.

- How Error differs from Uncertainty. Briefly discuss the classification of errors. If $\pi = 22/7$, is approximated as 3.14, find the absolute error, relative error and relative percentage error. Explain the term Accuracy and Precision with suitable example.
- Write a short note on Secant method, Regula Falsi method and the Newton Raphson method and further discuss their relative advantages and disadvantages. Determine the efficiency or the order of these three methods? Using Secant method, Regula Falsi method and the Newton Raphson method, find the real-root of the equation $X^3 - X^2 - 2 = 0$
- Perform the Following:**
 - Solve the following systems of equations
 $2X + 8Y - 2Z = -10$; $X + Y - 6Z = -12$; $6X - 2Y - 2Z = -18$
 - Using the Gauss elimination method
 - Using LU Decomposition method
 - Discuss the pitfalls of Gauss Elimination method.
 - Solve the following system of equations:
 $x + y - 2 = 0$; $-x + 3y = 2$; $x - 2z = -3$

 Using Jacobi Method and Gauss Seidel method. Assume the initial solution vector $[0.8 \ 0.8 \ 2.1]^T$.

4. Perform the following :

- Find Newtons Forward Difference interpolating Polynomial for the following data

X:	0.1	0.2	0.3	0.4	0.5
F(X):	1.40	1.56	1.76	2.00	2.28

- b) Estimate the missing term in the following data, using Difference table

x :	1	2	3	4	5
f(x) :	3	7	?	21	31

5. **Perform The following:**

- a) Calculate the value of integral $I = \int_4^6 2x + 3$ by $h=0.5$; by Using

- i) Simpson 3/8 rule
- ii) Weddle's rule
- iii) Simpson 1/3 rule
- iv) Trapezoidal rule

- b) Compute the integral $I = \int_1^2 \frac{2x}{1+x^2} dx$ by applying Gauss's Quadrature formula.

6. **Perform the following:**

- a) Estimate $Y(0.4)$ by the Classical Runge-Kutta method when $Y'(x) = X^2 + Y^2$, $Y(0) = 0$ & $h = 0.2$.
- b) Given $\frac{dy}{dx} = \frac{y-x}{y+x}$; with initial condition $y=1$ at $x=0$. Find y approximately at $x=0.1$; using Euler's Method
- c) Solve the given Differential Equation $\frac{dy}{dt} = t + y$; with initial condition $y(0)=1$. Using Fourth Order Runge-Kutta method from $t=0$ to $t=0.4$ taking $h=0.1$

7. **Perform The following:**

- a) If a bank receives on an average $\lambda=6$ bad cheques per day what is the probability that it will receive 4 bad cheques on any given day.
- b) A farmer buys a quantity of cabbage seeds from a company that claims that approximately 90% of the seeds will germinate if planted properly. If four seeds are planted, what is the probability that exactly two will germinate.

8. **Perform the following:**

- a) What is the utility of residual plot ? what are its disadvantages ?
- b) Given Equations of two lines of regression are : $4x + 3y + 7 = 0$ and $3x + 4y + 8 = 0$. Find:
 - (i) mean of x and mean of y
 - (ii) Regression coefficient of b_{yx} , and b_{xy}
 - (iii) Correlation coefficient between x and y

Course Code	:	MCSE-011
Course Title	:	Parallel Computing
Assignment Number	:	MCA(5)/E-011/Assignment/17-18
Maximum Marks	:	100
Weightage	:	25 %
Last Dates for Submission	:	15th October, 2017 (For July 2017 Session)
	:	15th April, 2018 (For January 2018 Session)

Answer all the questions. Each question carries 40 marks. 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.

1. Characterize the architectural operations of SIMD and MIMD computers. Distinguish between Multiprocessors and Multicomputers based on their structures, resource sharing, and interprocessor communications. Also, explain the differences among UMA, NUMA, COMA and NORMA computers.
2. Explain the differences between string reduction and graph reduction machines.