MASTER OF COMPUTER APPLICATIONS (MCA)

MCA/ASSIGN/SEMESTER-V

ASSIGNMENTS

(July - 2018 & January - 2019)

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/2018-19**
Maximum Marks	**:**	**100**
Weightage	**:**	**25%**
Last Dates for Submission	**:**	**15th October, 2018 (For July session)**
		15th April, 2019 (For January 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

Question1: Make a JSP page that randomly select a background color for each request. (5Marks)

Question2: Explain the benefits offered by EJB component architecture to application developers and customers. (5Marks)

Question 3: What are the benefits of using entity bean over directly using JDBC APIs to do database operations? Also discuss when should we use one over the other. (5Marks)

Question4: Explain four basic mechanisms through which a web client can authenticate a user to a web server during HTTP authentication. (5Marks)

Question5: What is DTD? Why do we use it? Write a XML DTD to represent for following product details :
product –ID
Type of products:- five different types of product
price,
discount offer –(Yes / No) (5Marks)

Question6: Write a web based feedback application where the registered customers should be able to login with the customer-ID and provide a feedback about the product. Design a suitable form and do coding of the buttons. You are required to use JSP, Servlet and JDBC. (10Marks)

Question7: What are the advantages of using Java's multilayer security implementation. (10Marks)

Question8: Explain various circumstances under which a message driven bean should be used. (5Marks)

Question9: Write a code in JSP to insert records in a student table with fields: student- ID, student-name, program, semester, student address using JDBC. Assume that the student table is created in database. Create records with the above fields in thee database. (10Marks)

Question10: Design a login page and write code for login button using JSP. (10Marks)

Question11: Crate a database of 10 records in customer tables with field (customer-ID, customer-name, customer- phone, customer-address) in Oracle Write a program using Sevelet and JDBC that will display all the records of the customer in ascending order of customer-ID.

(10Marks)

Course Code	**:**	**MCS-052**
Course Title	**:**	**Principles of Management and Information Systems**
Assignment Number	**:**	**MCA(V)-052/Assignment/2018-19**
Maximum Marks	**:**	**100**
Weightage	**:**	**25%**
Last Date of Submission	**:**	**15th October, 2018 (For July Session)** **15th April, 2019 (For January 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.

Question1: List the advantages and limitations of data mining to support an Information system? Also, discuss the importance of business intelligence. Explain how "Big Data Technology" is affecting data mining. (10 Marks)

Question2: What are the different criteria which are used in "decision making". Explain how quality of information improves the knowledge and decision making capability of the people (10 Marks)

Question3: Elaborate the importance of security in Information System and explain the various measures against the threats to the system. Also, discuss the importance of information security policies and information security plan. (10 Marks)

Question4: Explain the significance of ERP in contemporary business environment? Explain, how an ERP is different from conventional packages? Also, describe the components of an ERP system. (10 Marks)

Question5: Explain how system analysisapproach is different in new system requirement compared to the existing system. What problems does the system analyst face in ascertaining the information requirement at the various levels of Management? (10 Marks)

Question6: Discuss the significance and requirements of EIS (Executive information system) and ESS (executive support system). Also, explain the differences between MIS and EIS. (10Marks)

Question7: (a) What is "Copyright" protection? Explain its relevance in computer applications. (5 Marks)

(b) Explain the concept of data warehousing. Also, discuss its need in modem business. (5 Marks)

Question8: Explain the significance of Knowledge Management. Discuss the issues to be considered for successful implementation of knowledge management (10 Marks)

Course Code	**:**	**MCS-053**
Course Title	**:**	**Computer Graphics and Multimedia**
Assignment Number	**:**	**MCA(V)-053/Assignment/2018-19**
Maximum Marks	**:**	**100**
Weightage	**:**	**25%**
Last Date of Submission	**:**	**15th October, 2018 (For July Session)**
		15th April, 2019 (For January Session)

Note: This assignment has 16 questions of 80 marks (each question 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.

Question1: Write Midpoint Circle Generation Algorithm. Computer coordinate points of circle drawn with centre at (0,0) and radius 5, using midpoint circle algorithm.

Question2: Discuss Shear Transformation with suitable example, write Shear transformation matrix for Shear along X- axis, Y-axis and Generalized Shear. Show that the simultaneous shearing shxy (a, b), is not same as the shearing in x-direction, shx(a) followed by a shearing in y-direction, shy(b).

Question3: Explain the scan line polygon filling algorithm with the help of suitable diagram.

Question4: What is the role of light in computer graphics? Discuss the Lamberts Cosine Law? Explain ambient .diffused and specular reflection. Give general mathematical expression of each. And also the give the mathematical expression to determine the Intensity when all three type of reflections are available

Question5: What is frame buffer? How it is different from the display buffer? How a frame buffer is used for putting colour and controlling intensity of any display device?

Question6: Discuss the Taxonomy of projection with suitable diagram. How Perspective projection differs from Parallel projection. Derive a transformation matrix for a perspective projection of a point P (x, y, z) onto a x=4 plane as viewed from E (6, 0, 0)

Question7: Write Bresenham line drawing algorithm and DDA algorithm? Compare both algorithms and identify which one is better and why? Draw a line segment joining (4, 8) and (8, 10) using both algorithms i.e. Bresenham line drawing algorithm and DDA algorithm.

Question 8: What is Bezier Curve? Discuss the Role of Bernstein Polynomial in Bezier Curve. How Bezier curves contribute to Bezier Surfaces? Prove the following properties of Bezier curve.

(i) $P(u=1) = P_n$ (ii) $P'(0) = n(P_1-P_0)$

Given four control points PO (2, 2) P1 (3, 4) P2 (5, 4) and P3 (4, 2) as vertices of Bezier curve. Determine four points of Bezier Curve.

Question9: What is the advantage of using homogenous co-ordinate system over Euclidean coordinate sstem? Consider the square ABCD with vertices A(0, 0),B (0, 2),C (2, 0), D (2, 2). Perform a composite transformation of the square by performing the following steps. (Give the coordinates of the square at each steps).

(i) Scale by using $Sx = 2$ and $Sy = 3$
(ii) Rotate of 45^0 in the anticlockwise direction
(iii) Translate by using $Tx = 3$ and $Ty = 5$

Question10: Derive the 2D-transformtion matrix for reflection about the line $y = mx$, where m is a constant. Use this transformation matrix to reflect the triangle A (0,0) ,B(1, 1), C(2 ,0) about the line $y = 2x$.

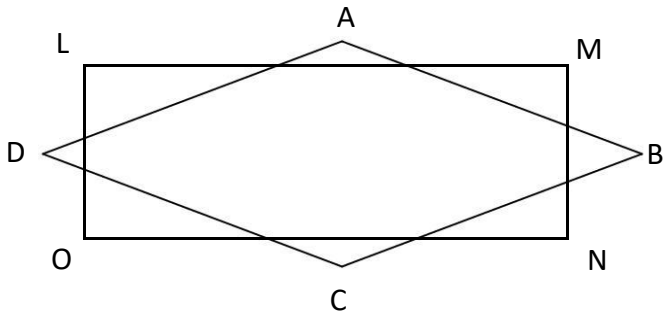
Question11: Why Shading is required in Computer Graphics? Briefly Discuss the role of interpolation technique in Shading. Compare intensity interpolation and Normal Interpolation? Which Interpolation technique contributes to which type of shading? Which shading technique is better Phong shading or Gourand shading, why?

Question12: Write Z-Buffer Algorithm for hidden surface detection. Explain how this algorithm is applied to determine the hidden surfaces.

Question13: What is animation? How it is different from Graphics? Explain how acceleration is simulated in animation? Discuss all the cases i.e. zero acceleration, Positive acceleration, Negative acceleration and combination of positive and negative acceleration.

Question14: What is windowing transformation? Discuss the real life example where you can apply the windowing transformation? Explain the concept of window to view port transformation with the help of suitable diagram and calculations.

Question15: Write and explain the pseudocode for Sutherland Hodgman polygon clipping algorithm. Using this algorithm clip the following polygon against the rectangular window ABCD as given below.



Question16: Explain any five of the following terms with the help of suitable diagram/example, if needed.

(a) Ray Tracing (b)Ray Casting.
(c) Object-space approach in Visible-surface detection.
(d) Audio file formats (e) Video file formats (f) Image filtering
(g) Authoring tools (h) Animation and its types

Course Code	**:**	**MCSL-054**
Course Title	**:**	**Laboratory Course**
Assignment Number	**:**	**MCA(V)-054/Assignment/2018-19**
Maximum Marks	**:**	**100**
Weightage	**:**	**25%**
Last Date of Submission	**:**	**15th October, 2018 (For July Session)** **15th April, 2019 (For January 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. If any assumptions made, please state them.

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

Question 1:
Develop a web page using servlet to display your profile. Make necessary assumptions. (4 Marks)

Question 2:
Write a JSP program for your Study Centre , which displays a web page containing two web links, one for Counselling Schedule and other for Examination Schedule. On clicking Counselling Schedule link, it goes to a JSP page which display course wise counselling schedule with name of counsellors, class room/ laboratory. On clicking the Examination Schedule link JSP page with schedule of Viva- Voce schedule for assignments of courses of MCA 5th Semester is opened. (6 Marks)

Question 3:
Write a program using JDBC and JSP to display the current balance from a saving bank account. The program should take account number or registered mobile number as input. (6 Marks)

Question 4:
Create an XML document for students for library. (4 Marks)

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

Question 1:
Write a program in C/C++ using OpenGL to draw a circle of orange colour and inside that draw a square of blue colour. (4 Marks**)**

Question 2:
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)

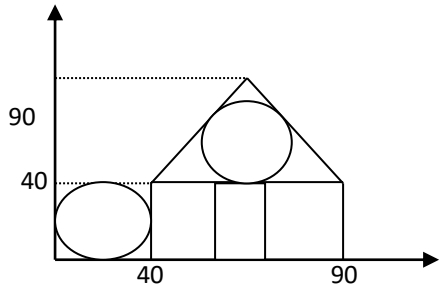


Figure: House

Question 3:
Write a program in C/C++ to implement Bresenham's circle generation algorithm. (5 Marks)

Question 4:
Write a program in C/C++ to implement Cohen-Sutherland line clipping algorithm. In this implementation consider two cases of a line: totally visible, totally invisible, against the rectangular clipping window. (7 Marks)

Course Code	**:**	**MCSE-003**
Course Title	**:**	**Artificial Intelligence and knowledge Management**
Assignment Number	**:**	**MCA(V)-E003/Assignment/2018-19**
Maximum Marks	**:**	**100**
Weightage	**:**	**25%**
Last Date of Submission	**:**	**15th October, 2018 (For July Session)**
		15th April, 2019 (For January Session

Note: This assignment has 20 questions of 80 marks (each question 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.

Question 1: State and justify the validity of following inference rules
(i) Chain rule
(ii) Simplification

Question 2: Transform the FOPL statement given below into equivalent conceptual graph.
$\forall x$ (Has wings (x) Λ Layseggs (x)$\rightarrow$ is_Bird (x))

Question 3: Determine whether each of the following sentences are satisfactory, contradictory or valid
(i) P Λ Q) V ~ (P Λ Q)
(ii) (P$\rightarrow$ Q) $\rightarrow$ ~ P

Question 4: Transform the following in to CNF (Any two)
(i) ~ (C$\rightarrow$D) V (C Λ D)
(ii) ~ (X$\rightarrow$Y)$\rightarrow$ Z
(iii)P$\rightarrow$ (~ CQ$\rightarrow$ R))

Question 5: With the help of a suitable example, describe the "member" function of PROLOG. How Searching of a data in a list, recursively.

Question 6: What is Turing Test? If the machine passes Turing Test, does it mean that the system is intelligent? What are the associated problems with Turing Text? What are required improvements/advances to overcome these problems?

Question 7: Transform the following conceptual graph in to FOPL statement
[PERSON: Anita] $\leftarrow$ (AGENT) $\leftarrow$[DEINK] $\rightarrow$ (OBJECT) $\rightarrow$ [Food: MILK] $\rightarrow$ $\leftarrow$ (Instrument Glass)

Question 8: Describe 'Means-ends Analysis' as problem solving technique.

Question 9: Write a recursive program is LISP to find factorial of a number given by the user?

Question10: How a language for artificial intelligence differs from normal programming languages? Give name of three languages frequently used as programming language for developing Expert System

Question11: What do you mean by term "Agents" in Artificial Intelligence? Classify the various types of agents.

Question12: Briefly describe the term "Truth Maintainance System – TMS".

Question13: Explain the following logic concepts, if required use suitable examples (Any two):

(i) Modus Tollens (ii) Satisfiable statement

(iii) Resolution principle in proposition logic

Question14: Give conceptual dependency representation of the sentence give below:

"Mohan will eat pizza from the plate with fork and knife"

Question15: Compare and contrast the following:

(i) Frames and scripts

(ii) Informed search and uniformed search

(iii) Abductive inference and Analogical inference

(iv) A* algorithm and AO* algorithm

Question16: Define following properties of propositional statement:

(i) Satisfiable

(ii) Contradiction

(iii) Valid

(iv) Equivalent

(v) Logical consequtence

Question17: What is meant by 'Closed Word Assumption'? Where is it used in AI?

Question18: Write short notes on any two of the following:

(i) Expert systems (ii) Non Deductive Inference rule

(iii) Methods to deal with Uncertainty in knowledge systems

Question19: Explain the difference between Forward and Backward Chaining. Under which situation which mechanism is best to use, for a given set of problems?

Question20: 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 RamRaj. RamRaj Goes to school. Ram plays golf and owns a silver color German made car Mercedez Benz"

Course Code	**:**	**MCSE-004**
Course Title	**:**	**Numerical and Statistical Computing**
Assignment Number	**:**	**MCA(V)-E004/Assignment/2018-19**
Maximum Marks	**:**	**100**
Weightage	**:**	**25%**
Last Date of Submission	**:**	**15th October, 2018 (For July Session)**
		15th April, 2019 (For January Session)

Note: This assignment has 16 questions of 80 marks (each question 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.

Question 1: Obtain the positive root of the equation $x^2 - 1 = 0$ by Regular Falsi method.

Question 2: Apply Gauss – Eliminaiton method to solve the following sets of equation

$x + 4y - z = -5$; $x + y - 6z = -12$; $3x - y - z = -4$

Question 3: Use method of Lagrange's interpolation to find f(0.16), for Given function f(x) = sin(x) where f (0.1) = 0.09983, f (0.2) =0.19867. Also, Find error in f (0.16).

Question 4: Evaluate $\int_0^1 \frac{dx}{1+x}$ Use Gauss-Legendre three point formula.

Question 5: 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

Question 6: Calculate the value of integral: $\int_0^6 \frac{dx}{1+x^2}$ by

(i) Simpson's 1/3 rule.

(ii) Simpson's 3/8 rule.

Question 7: Given $\frac{dy}{dx} = y - x$, where y(0) = 2. Find y(0.1) and y(0.2), correct to four decimal places, using Runge-Kutta Second Order method.

Question 8: 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?

Question 9: Suppose that the amount of time one spends in a bank to withdraw cash from an evening counter is exponentially distributed with mean ten minutes, that is $\lambda = 1/10$. What is the probability that the customer will spend more than 15 minutes in the counter?

Question 10: Fit a straight line to the following data by the method of least square.

X	0	1	2	3	4
Y	1	1.8	3.3	4.5	6.3

Question 11: Compute the approximate derivatives of $f(x) = x^2$ at $x = 0.5$ for the increasing value of h from 0.01 to 0.03 with a step size of 0.005 using :
(i) first order forward difference model
(ii) first order backward difference model.

Question 12: Find the root of the equation $x^3 - x - 1 = 0$ lying between 1 and 2 by Bisection method.

Question 13: A problem in statistics is given to the three students A, B and C, whose chances of solving it are ½, ¾, and ¼ respectively. What is the probability that the problem will be solved?

Question 14: a partially destroyed laboratory, the record of an analysis of correlation data, the following results are legible :
Variance of X = 9 Regression equations:
$8X - 10Y + 66 = 0$; $40X - 18Y - 214 = 0$

Find: (i) The mean values of X and Y (ii) The correlation coefficient between X and Y (iii) Standard deviation of Y

Question15: An individual's IQ score has a Normal distribution N (100,152). Find the probability that an individual IQ score is between 91 and121.

Question16: What do you mean by term "Goodness to fit test"? What for the said test is required?

Course Code	**:**	**MCSE-011**
Course Title	**:**	**Parallel Computing**
Assignment Number	**:**	**MCA (V)/E011/Assignment/2018-19**
Maximum Marks	**:**	**100**
Weightage	**:**	**25%**
Last Dates for Submission	**:**	**15th October, 2018 (For July session)** **15th April, 2019 (For January session)**

Note: 20 marks are for viva voce. All questions given carry equal marks. 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.

Question 1: Compare the advantages and disadvantages of three interleaved memory organisations: the S-access, the C-access and the C/S-access for pipelined vector processing. In the comparison, you should be concerned with the issues on effective memory bandwidth, storage schemes used, access conflict resolution and cost-effective tradeoffs.

Question 2: Explain the following system features associated with the Illiac-IV, the BSP, and the MPP array processors: (a) Multi-array configurations of the Illiac-IV (b) The prime memory for the BSP (c) The bit-slice operations in the MPP (d) Concurrent scalar-array operations in the BSP (e) Concurrent I/O and arithmetic logic operations in the MPP (f) The staging memory configurations in the MPP (g) Host computers for the Illiac-IV, the BSP, and the MPP (h) The I/O facilities in the Illiac-IV, the BSP and the MPP