BACHELOR OF COMPUTER APPLICATIONS

(BCA)

BCA/ASSIGN/IV/YEAR/14-15

ASSIGNMENTS
(For July, 2014 and Jan., 2015 sessions)

(4rd Semester (Revised Syllabus))

(BCS-040, MCS-024, BCS-041, BCS-042, MCSL-016, BCSL-043, BCSL-044, BCSL-045)

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

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Course Code	**:**	**BCS-040**
Course Title	**:**	**Statistical Techniques**
Assignment Number	**:**	**BCA(IV)-040/Assignment/14-15**
Maximum Marks	**:**	**100**
Weightage	**:**	**25%**
Last Date of Submission	**:**	**15th October, 2014 (For July 2014 Session)**
		15th April, 2015 (For January 2015 Session)

Note: This assignment has eight questions of 80 marks (each section of a 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.

Q1 Ten individuals are chosen at random, from a normal population and their weights (in kg) are found to be 63, 63, 66, 67, 68, 69, 70, 70, 71 and 71. In the light of this data set, test the claim that the mean weight in population is 66 kg at 5% level of significance. **(10)**

Q2 I bought two packets of apples, 25 in each packet. The mean and standard deviation of weights of apples in the first packet are 235 and 3; and the mean and standard deviation for the second packet are 237.5 and 4. Write down the mean and standard deviation formulae for all the fifty apples and compute them. **(10)**

Q3 A consumer research organization tests three brands of tires to see how many miles they can be driven before they should be replaced. One tyre of each brand is tested in each of five types of cars. The results (in thousands of miles) are as follows: **(10)**

Type of car	Brand A	Brand B	Brand C
I	6	9	4
II	3	2	7
III	2	3	6
IV	8	8	5
V	9	1	8

Compute the ANOVA and interpret your result.

Q4 A building has 11 flats. A sample of 4 flats is to be selected using (i) linear systematic sampling and (ii) circular systematic sampling. List all possible samples for each of these cases separately. **(10)**

Q5 Calculate Probabilities for following situations : **(10)**

a) There are 1000 pages in a book out of which 100 pages are defective. What is the probability that out of first 50 pages 10 pages will be defective? **(3)**

b) A die is tossed twice. Getting an odd number in at least a toss is termed as a success. Find the probability distribution of number of successes. Also find expected number of successes. **(3)**

c) Find the probability that at most 5 defective fuses will be found in a box of 200, if experience shows that 20% of such fuses are defective.

(4)

Q6 Following data are given for marks in subject A and B in a certain examination : **(10)**

	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.

Q7A sample of 900 members has a mean 3.4 cm and standard deviation 2.61 cm. Test whether the sample is from a large population of mean 3.25 cm and standard deviation 2.61 cm. If the population is normal and its mean is unknown, find the 95% confidence interval for population mean. **(10)**

Q8The mean yield for one acre plot is 662 kg with a s.d. 32 kg. Assuming normal distribution, how many one acre plot in a batch of 1000 plots would your expect to have yield between 600 and 750 kg. **(10)**

Course Code	**:**	**MCS-024**
Course Title	**:**	**Object Oriented Technologies and Java Programming**
Assignment Number	**:**	**BCA(IV)-024/Assign/14-15**
Assignment Marks	**:**	**100**
Maximum Marks	**:**	**25%**
Last Dates for Submission	**:**	**15th October, 2014 (For July 2014 Session)** **15th April, 2015 (For January 2015 Session)**

There are eight questions in this assignment which carries 80 marks. Rest of 20 marks is for viva-voce. Answer all the questions. Write and execute the program given in this assignment and submit along with output. Also in your programs give appropriate comments to increase understandability. Please go through the guidelines regarding assignments given in the Programme Guide for the format of presentation.

Q.1. *a)* What is Object Oriented Programming? Explain features of Object Oriented Programming. Write a program in java to show data hiding. *(5 Marks)*

b) Explain why java is platform independent. Also explain how memory is managed in java. *(5 Marks)*

Q.2. *a)* What is static method? Explain application of static method with example. *(3 Marks)*

b) What are different arithmetic and logical operators in java? Write a Java program and show uses of all arithmetic operators. *(5 Marks)*

c) What is final keyword in java ? Explain different uses of final keyword. *(2 Marks)*

Q.3. *a)* What is method overloading? How it is different from method overriding? Write a java program to explain overloading and overriding of methods. *(5 Marks)*

b) What is abstract class? Explain why abstract class is used in java, with the help of an example program. *(5 Marks)*

Q.4. *a)* What is inheritance? Explain different types of inheritance supported by java. *(5 Marks)*

b) What is an exception? Explain haw an exception is handled in Java. Create your own exception class to handle undesirable operation in your program. *(5 Marks)*

Q.5. *a)* Write a java program to create a file of given name and directory and copy a file named myjava.java available at desktop. *(5Marks)*

b) What is String class in java? Explain different constructors and method of String class. Also write a java program to find the length of a given string. *(5 Marks)*

Q.6. *a)* What is multithreading? Write a java program to explain how concurrency control is done. *(5 Marks)*

b) What is I/O stream in Java? Explain what is byte steam? How byte stream is different from character stream. *(5 Marks)*

Q.7. *a)* What is Java Applet? Create an Applet program to display your details including your academic and personal information. Use appropriate GUI components and images to make your applet more attractive and informative. *(5 Marks)*

b) What are principles of event delegation model? Explain different sources of events and event listener. *(5 Marks)*

Q.8. *a)* What is InetAddress class in Java ? Explain its methods and their uses. *(5 Marks)*

b) What is RMI? Explain architecture of RMI. *(5 Marks)*

Course Code	**:**	**BCS-041**
Course Title	**:**	**Fundamentals of Computer Networks**
Assignment Number	**:**	**BCA(IV)/Assignment/14-15**
Maximum Marks	**:**	**100**
Weightage	**:**	**25%**
Last Date of Submission	**:**	**15th October, 2014 (For July 2014 Session)** **15th April, 2015 (For January 2015 Session)**

There are four questions in this assignment, which carries 80 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 (a) Calculate Cyclic Redundancy Check (CRC), where Message bits M=1010101110 and Generator bits G=10001.

(4 Marks)

(b) Write an algorithm to compute the shortest path using Dijkstra's algorithm.

(6 Marks)

(c) Describe the configuration of BUS, STAR, and RING network topologies, with their one advantage and one disadvantage.

(6 Marks)

(d) Describe the different techniques used to multiplex signals?

(4 Marks)

2 (a) What is Pulse Code Modulation (PCM)? Assume the maximum signal bandwidth of speech data is 4,000Hz. What is the sampling rate for converting speech into digital data using Pulse Code Modulation (PCM)? If each sample is encoded by 8 bits, what is the data rate of the encoded signal

(6 Marks)

(b) Write RSA algorithm and explain it using an example.

(8 Marks)

(c) Show the signals that will be generated when the sequence 01010001 is encoded using NRZI and Differential Manchester encoding schemes.

(4 Marks)

(d) Why are the wires twisted in a twisted-pair copper wire?

(2 Marks)

3 (a) What are the major differences between wired LANs and wireless LANs? What are the two main problems with wireless LANs. Briefly, describe the physical layer standards of IEEE 802.11.

(8 Marks)

(b) Make a comparative analysis between IPV4 and IPV6.

(4 Marks)

(c) What is congestion? What are the main reasons for occurring congestion in the network? Explain the techniques to solve the problem of congestion.

(8 Marks)

4(a) Explain the features of HDLC and describe in detail the Frame Format.

(8 Marks)

(b) Make a comparison of channel utilization versus load for various random access protocols.

(6 Marks)

(c) Discuss why repeaters are needed in a communication channel. What is a key difference between an analog repeater and a digital repeater?

(6 Marks)

Course Code	**:**	**BCS-042**
Course Title	**:**	**Introduction to Algorithm Design**
Assignment Number	**:**	**BCA(IV)-042/Assign/14-15**
Maximum Marks	**:**	**80**
Weightage	**:**	**25%**
Last Date of Submission	**:**	**15th October, 2014 (For July 2014 Session)** **15th April, 2015 (For January 2015 Session)**

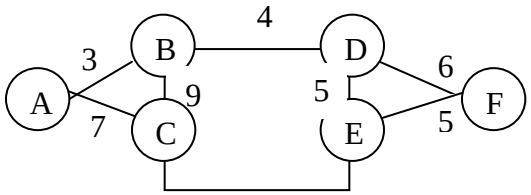
There are nine questions in this assignment, which carries 80 marks. Rest 20 marks are for viva-voce. Answer all the questions. Please go through the guidelines regarding assignments given in the Programme Guide for the format of presentation.

Question 1: Describe an algorithm for finding both the largest and the smallest integers in a finite sequence of integers in an array and count them how many comparison operation are involved.

(10 Marks)

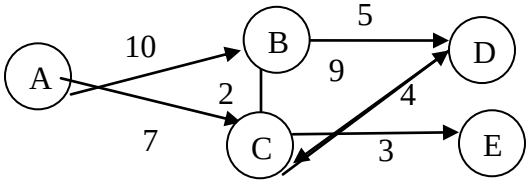
Question 2: Write Prim's algorithm and apply it to find a minimum cost spanning tree of the following Graph. Show all the steps.

(10 Marks)



Question 3: **(i)** Apply Dijkstra's algorithm to find shortest path from source ventex A to each of other vertices of following directed graph. Show all the steps.

(10 Marks)



(ii) Differentiate between Bellman-Ford and Dijkstra's algorithm to find a shortest path in a graph.

(5 Marks)

Question 4: Write a psudocode for Quiksort and partition algorithms. Illustrate the operation of partition procedure on the following sequence.

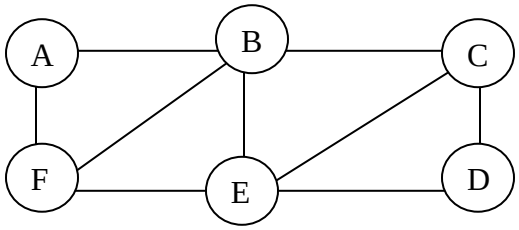
A = <25,5,30,40,15,65,20,35>

(15 Marks)

Question 5: Illustrate representation of the following graph :

(a) through adjacency matrix and adjacency list

(Marks 10)



(b) (i) Suppose most of the entries in the adjancy matrix are zeroes, i.e. when a graph is sparse, how much time is needed to find *m* number of edges in a graph. **(5 Marks)**

(ii) What is the storage required for an adjacency list of any graph. **(5 Marks)**

Question 6: Explain the following items with **(10 Marks)**

(i) Asympatotic bounds

(ii) Greedy techniques

(iii) DFS

(iv) Recursion tree method

Question 7: Briefly describe running time of important algorithms under different classes. **(10 Marks)**

Question 8: What are the different approaches of solution to recursion relation. Solve the following recurrence relation by master method. **(10 Marks)**

T (n) =2T(n/2)+n

Course Code	**:**	**MCSL-016**
Course Title	**:**	**Internet Concepts and Web design (Lab Course)**
Assignment Number	**:**	**BCA(IV)-L016/Assign/14-15**
Maximum Marks	**:**	**100**
Weightage	**:**	**25%**
Last Dates for Submission	**:**	**15th October, 2014 (For July 2014 Session)** **15th April, 2015 (For January 2015 Session)**

There is one question in this assignment, which carries 40 marks. Your Lab Record will carry 40 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. Submit the screenshots also along with the coding and documentation.

Question 1: Create a web site for a School consisting of the following pages:

a) The Home page should consists of four areas containing the following information:
   - Header area containing the logo, name of the school and a photograph of the school. Make sure that you use a good picture format.
   - Left area containing the links to other pages - these links should include - About us, Academics, Infrastructure, Contact us and Feedback.
   - The Content area should display a table showing list of upcoming events of the School along with dates.
   - The Footer area should display the copyright information and current date and time.

   You need to make sure that the Header and Footer area is same across all the pages of the website.

b) *About us* page should give information about the Objectives, values and beliefs of the school, preferable in some structured format. You may use lists or tables for the same.

c) *Academics* page lists details about the teachers and the past activities of the school.

d) *Infrastructure* page should highlighting the available resources of the school.

e) *Contact us* page should provide information about the school address and contact details

f) *Feedback* page should have a feedback form consisting of text box, radio buttons, list boxes etc. This page should get the information from the site visitors about various aspects of schools website. You must use JavaScript to check that all the required fields are entered by the visitor.

g) Write a program using VBscipt that adds only diagonal elements of two matrices. The program should be efficient.

Course Code	**:**	**BCSL-043**
Title	**:**	**Java Programming Lab**
Assignment Number	**:**	**BCA(IV)/L043/Assign/14-15**
Maximum Marks	**:**	**50**
Weightage	**:**	**25%**
Last Date of Submission	**:**	**15th October, 2014 (For July 2014 Session)** **15th April, 2015 (For January 2015 Session)**

Note: This assignment has four questions. Answer all the questions. These questions carry 40 marks. Rest 10 marks are for viva voce. You may give proper comments in your programs to enhance the explanation. Please go through the guidelines regarding the assignments given in the programme guide for the format of presentation.

Question 1:

Write a Java program to show use of all the logical operators in Java. **(10 Marks)**

Question 2:

Write a Java program to create Shape class. Define proper constructors and functions to create shape class objects and find its area. Inherit Circle and Square classes from Shape class and override method of area calculation. **(10 Marks)**

Question 3:

Write a program in Java to find the length of a given string. Also write a method in this program to display the string in reverse order. **(10 Marks)**

Question 4:

Write a program in Java to create an applet which find the interest earned on a given principal amount for a given specified period (in months), assuming that interest rate is 15% per annum. (**10 Marks)**

Course Code	**:**	**BCSL-044**
Course Title	**:**	**Statistical Techniques Lab**
Assignment Number	**:**	**BCA(4)/044/Assign/14-15**
Maximum Marks	**:**	**100**
Weightage	**:**	**25%**
Last Date of Submission	**:**	**15th October, 2014 (For July 2014 Session)** **15th April, 2015 (For January 2015 Session)**

There are six questions in this assignment, which carries 80 marks. Rest 20 marks are for viva-voce. Answer all the questions. Please go through the guidelines regarding assignments given in the Programme Guide for the format of presentation.

All the following questions must be performed using a statistical package. You may use any statistical package for this purpose.

Question 1: The weight of 50 adults in the age group 20-30 years, measured in Kilograms, is given below. Perform the tasks given in (i) to (iv) using a spreadsheet package:

(12 Marks)

40	70	61	58	58	50	72	63	51	62
65	60	68	68	78	54	52	60	50	70
60	35	53	58	79	60	62	61	55	65
51	39	45	58	50	65	62	50	72	62
52	65	67	87	45	75	71	52	65	59

(i) Find the minimum and maximum weight using spreadsheet formula.
(ii) Divide the weight in 5 classes with class interval 10 and create the frequency distribution for these classes using Array formula .
(iii) Find the percentage of students, whose weight is in between 50 and 60 kgs.
(iv) Represent the frequency distribution with the help of a relevant graph.

Question 2: Perform the following tasks using a spreadsheet (you must either enter necessary formula that are required to calculate the value or you may use spreadsheet function for the same): **(12 Marks)**

(i) Calculate the standard error, given a population of 250, sample size 50 and population standard deviation of 25.
(ii) Assume that a company manufactures rings. The rings should have a mean diameter of 2cm. A sample of 20 such rings were taken out of 1000 such rings. The sample diameter of these rings was 2.01 cm with a standard deviation of 0.01 cm. Can the company say with 95% confidence that the rings should be accepted. Make suitable assumption and justify your answer.

Question 3: A paper making company experiments with quantity of paper being produced by four of its machine. Assuming that company has four such machines and productivity of these machine is recorded on four different days in the following table.

(20 Marks)

Day	Quantity of paper per Machine			
	A	B	C	D
1	91	89	92	90
2	90	88	89	87
3	93	88	90	91
4	88	89	90	88

Perform an ANOVA using any software to test (at 5% level) whether all the four machines are equally productive. Make suitable assumptions, if any.

Question 4: The daily production of items of a company is given in the following table. Use spreadsheet software to find the moving averages for the length of 5.

(12 Marks)

Day	Production (in Metric tons)
1	29
2	5
3	44
4	30
5	40
6	45
7	7
8	60
9	30
10	49
11	44
12	30
13	50
14	30
15	34

Question 5: A company manufactures refills of pens. Five observations of refills are taken on each day. These observations were taken 6 times during a working day. Calculate the control limits for mean and range, and plot the control charts using any statistical software. Make suitable assumptions, if any. **(12 Marks)**

The data is given in the following table:

Sample No.	Point size of pen in mm
1	2.04, 2.01, 1.87, 1.85, 1.90
2	2.14, 2.11, 1.97, 1.95, 2.10
3	1.99, 2.21, 1.77, 1.98, 1.98
4	2.00, 2.05, 1.97, 1.95, 2.01
5	1.87, 2.14, 2.19, 2.20, 2.15
6	2.06, 1.91, 2.17, 2.05, 1.90

(Please take the suitable values of d_2 , d_3, d_4 , A_2 and other variables.)

Question 6 : A company sells summer clothing. Fit a trend using any statistical software to sales data for this company. Make suitable assumptions. **(12 Marks)**

Month	Mar	Arp	May	June	Jul	Aug	Sept
Sales(in pieces)	400	700	2000	3000	2000	1000	200

Course Code	**:**	**BCSL-045**
Course Title	**:**	**Introduction to Algorithm Design Lab**
Assignment Number	**:**	**BCA (IV)/045/Assignment/14-15**
Maximum Marks	**:**	**50**
Weightage	**:**	**25%**
Last Dates for Submission	**:**	**15th October, 2014 (For July 2014 Session)** **15th April, 2015 (For January 2015 Session)**

All questions carry eight marks each. Rest 10 marks are for viva-voce. Answer all the questions. All programmes are required to be run and tested including test reports.

Q.1

(i) A Palindrome is a string that reads the same forward and backward. Write an algorithm for determining whether a string of *n* characters is palindrome.

(ii) Find the largest number in an array and count a number of comparison operations as well as running time complexity of each statement and total complexity of the problem.

(iii) Write a programme which interchanges the values the variable using only assignment operations. What is the minimum number of assignments operations required?

(iv) Write a programme to do bubblesort to sort an array X={10,5,7,8,3,6,4,14} showing the list obtained at each step. Also count no. of comparison operations in the programme.

(v) Write a programme to find multiplication of matrices of order 4*4 and find the total number of comparison, total no. of assignments, total number of multiplications and total number of addition operations required in the programme.