BACHELOR OF COMPUTER APPLICATIONS (BCA)

(Revised Syllabus)

BCA(Revised Syllabus)/ASSIGN/SEMESTER-V

ASSIGNMENTS

(July - 2019 & January - 2020)

(BCS-051, BCS-052, BCS-053, BCS-054, BCS-055

BCSL-056, BCSL-057, BCSL-058)

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 BCA 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 BCA Programme Guide.

Course Code	**:**	**BCS-051**
Course Title	**:**	**Introduction to Software Engineering**
Assignment Number	**:**	**BCA(5)/051/Assignment/2019-20**
Maximum Marks	**:**	**100**
Weightage	**:**	**25%**
Last Date of Submission	**:**	**15th October, 2019 (For July, 2019 Session)** **15th April, 2020 (For January, 2020 Session)**

This assignment has three questions carrying a total of 80 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. Develop SRS as per IEEE standard for Hospital Management System. Make assumptions wherever necessary. **(30)**

Q2. Develop Design Document for the System mentioned in Question no.1 **(30)**

Q3. Explain the process of calculating the cost of a Project with an Example. **(20)**

Course Code	**:**	**BCS-052**
Course Title	**:**	**Network Programming and Administration**
Assignment Number	**:**	**BCA(5)/052/Assignment/2019-20**
Maximum Marks	**:**	**100**
Weightage	**:**	**25%**
Last Dates for Submission	**:**	**15th October, 2019 (For July 2019 Session)**
	:	**15th April, 2020 (For January 2020 Session)**

Answer all the questions of the assignment having 80 marks in total. 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. Explain the initialization process of overall Linux system in detail. **(8)**

Q2 (a) Explain the important features of proprietary and open source remote desktop administration tools. **(4)**

(b) Why remote administration is needed ? **(4)**

Q3 (a) What are the Linux commands pertaining to user and group administration ? Write the syntax and explain the meaning of these commands. **(5)**

(b) What are Ethernet configuration tools and their objectives ? **(5)**

Q4 (a) How does DHCP work ? Explain. **(5)**

(b) What are the different types of DNS servers ? What are the configuration tasks which need to be performed for proper maintenance of the server ? Elaborate. **(5)**

Q5 Explain the following NFS key concepts. **(6)**

- Caching
- NFS background mounting
- Hard & Soft mounts

Q6 What is the significance of the following utilities? Discuss. **(6)**

(i) ping
(ii) ipconfig / ifconfig
(iii) Nmap

Q7 What are the various security services parameters? Elaborate. **(6)**

Q8 Describe IP header fields. **(8)**

Q9 Network can also be enlarged through the use of a technique known as **subnetting**. Explain the concept with the help of an example ? **(6)**

Q10 How does TCP handle out of order segments, lost segmentsandduplicate segments ? Explain with the help of diagrams ? **(6)**

Q11 Write algorithms for design of the followings software: **(6)**

1. Connection oriented and concurrent client
2. Iterative connection oriented server
3. Connections and concurrent server

Course Code	**:**	**BCS-53**
Course Title	**:**	**Web Programming**
Assignment Number	**:**	**BCA (5)/53/Assignment/2019-20**
Maximum Marks	**:**	**100**
Last Date of Submission	**:**	**15th October, 2019 (For July 2019 Session)**
	:	**15th April, 2020 (For January 2020 Session)**

This assignment has two questions of 80 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. Please give precise answers. The word limit for each part is 300 words.

Q1. (Covers Block 1)

a) What are the features of Web 2.0 that makes it different than that of Web 1.0? What is Web 3.0? What is a search engine? Explain how it is able to find information from the WWW. Explain the term "Web Services" and "Streaming". List the protocols/software that would be required to implement Web Services. List the features of any four different Web 2.0 technologies. **(6)**

b) Create a registration form using HTML for a Banking application. The form asks for the following information – Account Number (it should be of 16 decimal digits), Name of Account Holder (assume that joint accounts are not allowed), City and State of account holder (both should be selected from drop down lists, default value for City should be **Lucknow** and State be **Uttar Pradesh**), email ID (it should be validated), and selectable list of choice of services (using check boxes) such as Passbook Viewing, Money Transfer, Cheque Book issues, Bank Draft Issue etc. The form should include a SUBMIT button. You must also create a CSS file for this form. This CSS file should define font family; a bigger font size (16 points) for headings and for normal text font size of 12 points; font colour should be dark blue for the headings and dark green for normal text. The background colour of the entire form should be light yellow. Also write the code using JavaScript that validates the entered data when the user presses Submit button. You must demonstrate the form at the time of viva. **(8)**

c) Using tables and Lists create two web pages first showing the timetable of the theory and practical counselling sessions of BCA with proper headings. This table should include Semester, course code, course name, batch number, session date and time and Venue (lecture room number or lab number). The second page should display an unordered list, displaying batch number and name of students in that batch. You should use tags and create an internal CSS file which formats the web pages as follows:

(i) The content of the table heading should be in Italics.

(ii) The table heading should be shaded and every alternate row of table should have light blue as fill colour. The background of the table should be light green.

(iii) The font of the unordered list should be Arial with font size 12 points.

(iv) You must demonstrate how change in CSS can change the display at the time of Viva.

(6)

d) A Book store maintains the list of its Books using XML. Each Book has a unique ISBN number (you may use 13 digit ISBN number only) and should be used as an attribute in XML document. The document should also store the Book Title, One or more author names, price of the book and number of copies available in the store. Create an XML documents containing information of five such Book records. Also create the DTD for the XML document created by you. **(8)**

e) Write and demonstrate JavaScript code that changes the text entered in a text box of a form to uppercase when the user leaves that text box. You must use event handling. Make suitable assumptions, if any. **(6)**

f) What are the Objectives of WAP? Explain the working of WAP model. Explain the following WML elements with the help of an example

- Table
- Images
- Select and Input

(6)

Q2. (Covers Block 2) **(10×4=40)**

a) Differentiate between the following with the help of a diagram/example, if needed:

(i) Three tier architecture and MVC architecture

(ii) GET and POST methods

(iii) Client side scripting and Server side scripting

(iv) HTTP server and Web Container

(v) JSP and JavaScript

b) Explain with the help of an example/diagram or write code for the following using JSP:

(i) Use of dynamic includes option in JSP.

(ii) Write a Scriptlet that displays first n natural numbers and their sum. You may assume n=10. You must use looping construct for the same.

(iii) JSP Life cycle

(iv) Use of JSP implicit objects -request and response

(v) Any one action element other than include.

c) Write JSP code which can perform the following task:

(i) A page requires input of three variables x, y and z, it then calculates and displays the value x*y/z. In addition, the program must make sure that division by zero error, if occurs, is reported.

(ii) Demonstrate the use of cookies by creating two cookies using JSP - username and password. Also write the JSP code to displays the values stored in these cookies on a web page.

d) Explain the process of application development and deployment; and develop and deploy the following application using this process:

Develop and deploy a student management system for a small institute. A student can enroll for only one course at the institute by paying fee. The information about the student is recorded in a database table. You must create two database tables for this application; Student table should keep track of student ID, name, course code, fee paid; the Course table should have details like course code, course title, teacher name, start date, duration, fee of course. Your application should be able to enroll a new student; display list of all the students of a course; and add or delete a course.

Make and state suitable assumptions.

Course Code	**:**	**BCS-054**
Course Title	**:**	**Computer Oriented Numerical Techniques**
Assignment Number	**:**	**BCA(5)/054/Assignment/2019-20**
Maximum Marks	**:**	**100**
Weightage	**:**	**25%**
Last Dates for Submission	**:**	**15th October, 2019 (For July 2019 Session)** **15th April, 2020 (For January 2020 Session)**

This assignment has eight questions of total 80 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. Illustrations/ examples, where-ever required, should be different from those given in the course material. You must use only simple calculator to perform the calculations.

Q1.

(a) Use the eight-decimal digit floating point representation as given in your Block 1, Unit 1, Section 1.3.1 page 29 to perform the following operations: **(3)**

(i) Represent 0.0006374845 and 5749855743 as floating point numbers in normalised form using chopping for first number and rounding for second number.
(ii) Given the above two numbers what is the absolute and relative error in their representation.
(iii) Subtract the smaller number from the bigger numbers. What is the error in the resulting number?
(iv) Divide the first number by the second number. Convert the result into normalized form in the given format.
(v) Take the first number as 586309 and assume any second number to demonstrate the concepts of overflow or underflow for the given representation. (You may assume any second number to demonstrate overflow or underflow).
(vi) Explain the term bias in the context of binary floating point representation.

(b) Explain the term Unstable Algorithm and Unstable Problem with the help of one example of each other than the example given in the course material. **(2)**

(c) Find the Maclaurin series for calculating $(1-2x)^{-1}$ at x=0. Use first four terms of this series to calculate the value of $(1-2x)^{-1}$ at any value of x. Also find the bounds of truncation error for such cases. **(3)**

(d) What is Taylor's series? Explain with the help of an example. Explain the Truncation errors in this context. **(2)**

Q2.

(a) Solve the system of equations **(5)**

$$\begin{aligned} x + y + 6z &= 6 \\ 7x + 3y - 4z &= 4 \\ 2x - 7y + 3z &= 21 \end{aligned}$$

using Gauss elimination method with **partial pivoting**. Show all the steps.

(b) Perform four iterations (rounded to four decimal places) using **(5)**

(i) Jacobi Method and
(ii) Gauss-Seidel method
for the following system of equations.

$$\begin{bmatrix} 4 & 1 & -2 \\ 1 & -6 & 2 \\ -2 & 4 & 8 \end{bmatrix} \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 15 \\ -10 \\ -24 \end{bmatrix}$$

With $\mathbf{x}^{(0)} = (0, 0, 0)^T$. The exact solution is $(2, 1, -3)^T$.

Which method gives better approximation to the exact solution?

Q3

Determine the largest negative root of the following equation: **(10)**

$$f(x) = 4x^3 - 6x^2 - 8x + 11 = 0$$

The root should be correct up to 2 decimal places, using

(a) Regula-falsi method (b) Newton-Raphson method (c) Bisection method (d) Secant method

Q4.

(a) Find Lagrange's interpolating polynomial that fits the following data. Hence obtain the value of f(3.5). **(5)**

x	1	3	6	10
f(x)	1	7	31	91

(b) Using the Lagrange's inverse interpolation method, find the value of x when y is 7. **(5)**

x	4	16	36	81
y=f(x)	1	3	5	8

Q5.

(a) The population of a State for the last 20 years is given in the following table: **(3+2+3 = 8)**

Year (x)	:	1998	2003	2008	2013	2018
Population(y) (in Lakhs)	:	19	40	79	142	235

(i) Using Stirling's central difference formula, estimate the population for the year 2007

(ii) Using Newton's forward formula, estimate the population for the year 2000.

(iii) Using Newton's backward formula, estimate the population for the year 2015.

(b) Derive an expression of forward difference operator in terms of δ. **(2)**

Q6.

(a) Find the values of the first and second derivatives of $y = x^2+x-1$ for $x=2.25$ using the following table. Use forward difference method. Also, find Truncation Error (TE) and actual errors. **(5)**

x	:	2	2.5	3	3.5
y	:	5.00	7.75	11.00	14.75

(b) Find the values of the first and second derivatives of $y = x^2+x-1$ for $x=2.25$ from the following table using Lagrange's interpolation formula. Compare the results with (a) part above. **(5)**

x	:	2	2.5	3	3.5
y	:	5.00	7.75	11.00	14.75

Q7.

Compute the value of the integral **(10)**

$$\int_0^6 (2x^3+ 5x^2 - 11)\ dx$$

By taking 12 equal subintervals using (a) Trapezoidal Rule and then (b) Simpson's 1/3 Rule. Compare the result with the actual value.

Q8.

(a) Solve the Initial Value Problem, using Euler's Method for the differential Equation: **(4)**

$$y' = 1+x^2y, \text{ given that } y(0) = 1.$$

Find y(1.0) taking (i) h = 0.25 and then (ii) h = 0.1

(b) Solve the following Initial Value Problem using (i)R-K method of $O(h^2)$ and (ii) R-K method of $O(h^4)$ **(6)**

$$y' = xy + x^2 \text{ and } y(0) = 1.$$

Find y(0.4) taking h = 0.2, where y' means dy/dx

Course Code	**:**	**BCS-055**
Course Title	**:**	**Business Communication**
Assignment Number	**:**	**BCS(5)/055/Assignment/2019-20**
Maximum Marks	**:**	**100**
Weightage	**:**	**25%**
Last Dates for Submission	**:**	**15th October, 2019 (For July 2019 Session)** **15th April, 2020 (For January 2020 Session)**

This assignment has 8 questions. Answer all questions. Please go through the guidelines regarding assignments given in the Programme Guide for the format of presentation of assignment.

Q1. This passage is part of the speech that Oprah Winfrey (a famous American television personality, actress, and entrepreneur) gave at the convocation in Harvard University, USA. Read the passage carefully and answer the questions given below:

This is what I want to share. It doesn't matter how far you might rise. At some point you are bound to stumble because if you're constantly doing what we do, raising the bar. If you're constantly pushing yourself higher and higher, the law of averages predicts that you will at some point fall. And when you do I want you to know this, remember this: there is no such thing as failure. Failure is just life trying to move us in another direction. Now when you're down there in the hole, it looks like failure. And when you're down in the hole, when that moment comes, it's really okay to feel bad for a little while. Give yourself time to mourn what you think you may have lost but then here's the key, learn from every mistake because every experience, encounter, and particularly your mistakes are there to teach you and force you into being more who you are. And then figure out what is the next right move. And the key to life is to develop an internal moral, emotional G.P.S. that can tell you which way to go. Because now and forever more when you Google yourself, your search results will read "Harvard, 2013". And in a very competitive world that really is a calling card because I can tell you as one who employs a lot of people when I see "Harvard" I sit up a little straighter and say, "Where is he or she? Bring them in." It's an impressive calling card that can lead to even more impressive bullets in the years ahead: lawyer, senator, C.E.O., scientist, physicist, winners of Nobel and Pulitzer Prizes or late night talk show host.

But the challenge of life I have found is to build a résumé that doesn't simply tell a story about what you want to be but it's a story about who you want to be. It's a résumé that doesn't just tell a story about what you want to accomplish but why. A story that's not just a collection of titles and positions but a story that's really about your purpose. Because when you inevitably stumble and find yourself stuck in a hole, that is the story that will get you out. What is your true calling? What is your dharma? What is your purpose? For me that discovery came in 1994 when I interviewed a little girl who had decided to collect pocket money in order to help other people in need. She raised a thousand dollars all by herself and I thought, well if that little 9-year-old girl with a box and a big heart could do that, I wonder what I could do? So I asked for our viewers to take up their own change

collection and in one month, just from pennies and nickels and dimes, we raised more than three million dollars that we used to send one student from every State in the United States to college. That was the beginning of the Angel Network.

1a Why does Oprah feel that everyone no matter what their qualifications or competences will encounter failure? Pick out the line. **(1)**

1b What should a student/person do when faced with failure? **(2)**

1c What does the speaker mean by "And the key to life is to develop an internal moral, emotional G.P.S. that can tell you which way to go"? **(2)**

1d What have the former Harvard graduates achieved according to the passage? **(2)**

1e What is the "true" resume that the students should build in their lives? **(2)**

1f What have you learnt from this passage and how would you implement it in your own life? **(5)**

1g Give a title to the passage. **(1)**

1h Use the following words/phrases from the passage in sentences of your own: **(10)**

share, rise, stumble, raising the bar, the law of averages, down in the hole, challenge, accomplish, a big heart, wonder

Q2. Insert responses in the following conversation: **(10)**

You: …….

Caller: My name is Chetan Bhatia and I'm the debating secretary of Modern School. I wanted to invite Dr. Pandit to be the judge at our Annual Debate.

You: …….

Caller: Monday, the fourteenth.

You: …….

Caller: We would want her to be at our school from 9:30 in the morning and to stay till about noon.

You: …….

Caller: Could you tell her about it and find out if she will be able to accept our invitation? I'll ring again in about an hour to find out.

You: …….

Caller: Thank you very much. I'll speak to you later. Bye!

Q3. Imagine you are at the interview and were asked the following questions. What would your answers be: **(20)**

i What do you know about our company?
ii Why do you want to work with us?
iii Why should we hire you?
iv Can we offer you a career path?
v What are your greatest weaknesses?
vi What do you think this job requires?
vii What is important to you in a job?
viii How do you spend your spare time?
ix How has what you have accomplished outside the classroom added to your qualifications/abilities?
x What are your salary expectations?

Q4. Select a nationally advertised product or service that you want to know more about and write a letter that requests the information you would need if you were to purchase this product or service. You may write on behalf of yourself or your company. **(15)**

Q5. Modals can be used in multiple ways in different kinds of sentences to express different things. Look at the sentences below and complete them using appropriate modals given below. One modal can be used in more than one place. You may use the shortened forms wherever required. **(12)**

will would should shall won't could

i ……you give me your mobile number, please?

ii You ……. allow the machine to cool down before you start it again.

iii I need help. The car ……. start. ……..you send someone to look at it?

iv ……..you listen to me?

v I assure you, the engineer …….come to your house within twenty-four hours.

vi I have been sending mails to have the error in the policy rectified. I wish someone in your office ……..do the needful.

vii I'm sorry to hear about your inconvenience. …… I send the mechanic to look at it?

viii I ……..rather go for a double door refrigerator.

ix I think you …….check your product well before delivery.

x You have been most unhelpful! I……..write a complaint to your manager.

xi I promise you ……..get the delivery before 5 p.m. tomorrow.

xii Looking at the volume of your work, I think you …….go for a good quality laser printer.

Q6. Select appropriate adjectives for the sentences below. **(8)**

i The Lara XV has a more ……(efficient/effective) engine. Its petrol consumption is less. Moreover, it is less (loud/noisy).

ii We offer you the package at a ……(discounted/depreciated) price.

iii I feel that Clause 14a in your agreement is ……. (needless/ redundant) as the point has been covered at Clause 11.

iv You may rest assured. We use only ……. (washed/sterilized) cotton in our clinic.

v The company will provide you …… (maintenance/ maintaining) support for 12 months after the purchase of the machine.

vi The ……(estimated/ guessed) expenditure for providing media support during the function would be Rs.35,000/-

vii The mistake committed is indeed ……(regrettable/deplorable).

viii We only make ……..(massive/bulk) deliveries to institutes.

Q7. Form Wh-questions from the statement given below using the question words given in the bracket. Do not forget to put the question mark. **(5)**

i The novel was written in 1964. (when)
ii His house was destroyed in an earthquake. (how)
iii You have selected this book. (which)
iv The servant let out the secret. (who)
v The suitcase was lost at the airport. (where)

Q8. Complete the sentences using suitable adverbial clauses from the box. There are three extra clauses: **(5)**

If I had the money…
…before the police could arrive on the scene.
…whenever there is a holiday.
… if the occasion demands it.
Since you're late ……
…while their wives play bridge.
If you watch a movie every night…
whenever I get hold of ….

i The mob created havoc ……..
ii …….you'll have to eat cold food.
iii …….you will soon need glasses.
iv The gym is packed ……
v ……I would eat out every week.

Course Code	**:**	**BCSL-056**
Course Title	**:**	**Network Programming and Administration Lab**
Assignment Number	**:**	**BCA(5)/L-056/Assignment/19-20**
Maximum Marks	**:**	**50**
Weightage	**:**	**25%**
Last date of Submission	**:**	**15th October, 2019 (For July 2019 Session);.**
	:	**15th April, 2020 (For January 2020 Session)**

Note: Answer all the questions in the assignment having 40 marks in total. 10 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. Write and execute a TCP client and a server program in C-language to perform the following tasks: **(20)**

- The TCP client program sends two strings to the TCP server program to concatenate these two strings.
- The TCP server program sends the concatenated strings to the client.

Q2. (a) Run the following Linux commands on your machine and show the output: **(10)**

- **df – h**
- **du**
- **ping**
- **more**
- **tail – f**

(b) Write and run commands in Linux for the following tasks: **(10)**

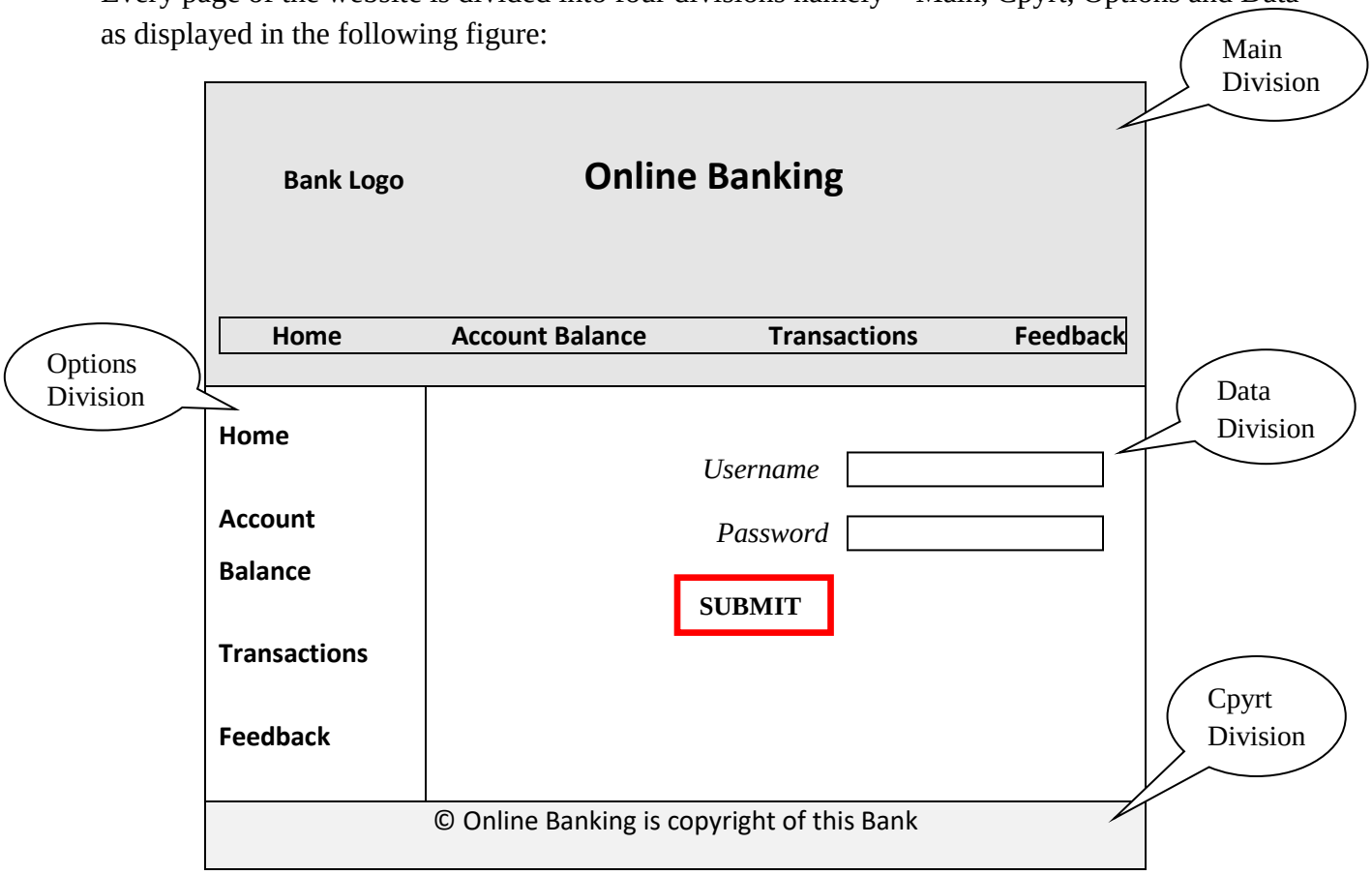
- Add new users
- Display the list of users who belong to different groups
- Display the list of users who are currently logged on.
- List all the processes which are currently running in the systems.
- Show all the active internet connection in the system.

Course Code	**:**	**BCSL-057**
Course Title	**:**	**Web Programming Lab**
Assignment Number	**:**	**BCA(5)/057/Assignment/2019-20**
Maximum Marks	**:**	**50**
Weightage	**:**	**25%**
Last Dates for Submission	**:**	**15th October, 2019 (For July 2019 Session)**
	:	**15th April, 2020 (For January 2020 Session)**

This assignment has one question of 40 marks. Rest 10 marks are for viva voce. Please go through the guidelines regarding assignments given in the programme guide for the format of presentation.

Q1.

Create a website for a Bank which offers online Banking service to its registered customers. The website should be designed using logical divisions through tags and an external CSS file. Every page of the website is divided into four divisions namely – Main, Cpyrt, Options and Data as displayed in the following figure:



Perform the following tasks for the website as given above:

[Part (a) : 10 Marks + Part (b) : 05 Marks + Part (c) : 05 Marks + Part (d) : 20 Marks]

(a) Create four pages for the website viz Home, Account Balance, Transactions and Feedback; all the four pages should have same Main, Options and Cpyrt division but different Data division. The *Options Division* should provide links to the Home page as well as all the other three pages. All these four options should be available in all the web pages designed by you for this assignment. Thus, this Option division may be used for navigating among the four web pages. The *Data Division* of every page should be different. The information that should be displayed in Data Division of each of the pages is described below:

(i) The Home page should display the list of services available through these pages.

(ii) The Account Balance page should display a form for logging into the Database of the Bank.

(iii) The Transactions page should display the transactions of the account for which Balance has been shown.

(iv) The Feedback page should display another form having a text area field for writing the Feedback and a Button to submit the form.

(b) Create an external CSS that gives different background colour to each division. You may choose the format of other elements as per your choice.

(c) Create a JavaScript program that generates an error message if *Username* field is left blank in the form for Account Balance page; or if the length of entered password in the password field is less than 4 characters . After displaying the error message, the login form should be displayed again.

(d) Implement the following using jsp program, servlets, java classes, database(s), etc. for the pages as described below:

(i) When a user presses Submit button after properly filling *Username* and *password* in the form in the Account Balance page, these details are checked in a database and in case such username and password are correct, the account number, account holder name and balance of the account are displayed on the screen. You may also create a cookie, if needed, to remember the account number for the given username and password (assuming each user has only one account).

(ii) On selection of Transactions option, all the transactions made (assume only Deposit and Withdrawal transaction) for the account number, as remembered in part (d)(i) above, is displayed in a tabular format.

(iii) When you press the Submit button of the *Feedback Form*, the information (account number from the cookie and entered text) should be stored in the database.

(iv) You must design a suitable database structure.

You may make suitable assumptions, if needed.

Course Code	**:**	**BCSL-058**
Course Title	**:**	**Computer oriented Numerical techniques Lab**
Assignment Number	**:**	**BCA(5)/L-058/Assignment/2019-20**
Maximum Marks	**:**	**50**
Weightage	**:**	**25%**
Last Dates for Submission	**:**	**15th October, 2019 (For July, 2019 Session)**
		15th April, 2020 (For January, 2020 Session)

This assignment has eight problems of 40 marks, each of 5 marks. All problems are compulsory. 10 marks are for viva voce. Please go through the guidelines regarding assignments given in the programme guide for the format of presentation.

Note: The programs are to be written in C/C++ and/or in MS-Excel/Any spread sheet.

Q1. Write a program in C/C++ to find the solution of system of linear equations (given below), by suing Gauss- Elimination method: **(5)**

$$x + y + z = 2$$
$$x - 2y + 3z = 14$$
$$x + 3y - 6z = -23$$

Q2. Write a program in C/C++ to determine the approximate value of the definite integral (I), by using Simpson's (1/3)rd rule: **(5)**

$$\mathrm{I} = \int_{0.2}^{1.0} x^{1/3}\, dx,$$

Using step size (h) = 0.2 .

Q3. Write a program in C/C++ to find the value of Sin(π/6) by using Lagrange's Interpolation, the related data is given below **(5)**

x	: 0	π /4	π /2
y= Sin(x)	: 0	0.70711	1.0

Q4. Write a program in C/C++ to calculate the value of "$\cos x$" by using the series expansion given below: **(5)**

$$\cos x = 1 - \frac{x^2}{2!} + \frac{x^4}{4!} - \frac{x^6}{6!} + \cdots$$

Note: Evaluate $\cos x$ only upto first three terms.

Also find the value of $\cos x$ by using the inbuilt function.

Compare the results i.e., the result produced by your program and that produced by inbuilt function. Based on comparison, determine error.

Q5. Write a program in C/C++ to find the root of the following equation by using "Bisection Method" : **(5)**

Equation:

$$x^3 - 5x + 1 = 0; x \in [1, 2]$$

Q6. Write a program in C/C++ to approximate the value of Integral (I), by using Trapezoidal rule : **(5)**

$$\mathrm{I} = \int_{0.2}^{1} \frac{dx}{\sqrt{5+x}}$$

Using step size $(h) = 0.2$.

Q7. Write a program in C or C++ to demonstrate the operation of the following operations, for the function $f(x) = x^2 + x + 7$: **(5)**

(a) Forward Difference Operator
(b) Central Difference Operator

Q8. Write a program in C or C++ to calculate the value of e^x by suing its series expansion, given below : **(5)**

$$e^x = 1 + x + \frac{x^2}{2!} + \frac{x^3}{3!} + \cdots$$

Note: Evaluate e^xonly upto first three terms.

Also find the value of e^x by using the inbuilt function and compare it with the result produced by your program.