

# **BACHELOR OF COMPUTER APPLICATIONS (BCA)**

## **(Revised Syllabus)**

BCA (Revised Syllabus)/ASSIGN/SEMESTER-V

### **ASSIGNMENTS**

**(July - 2021 & January - 2022)**

**(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/2021-22**  
**Maximum Marks** : **100**  
**Weightage** : **25%**  
**Last Date of Submission** : **31<sup>st</sup> October, 2021 (For July, Session)**  
**15<sup>th</sup> April, 2022 (For January, 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.**

**Question 1:** (30 Marks)

Develop SRS as per IEEE standard for Library Information System. Make assumptions wherever necessary.

**Question 2:** (30 Marks)

Develop Design Document for the System mentioned in Question no.1

**Question 3:** (20 Marks)

What is Change Management? Explain the process of changing requirements for a Software to be developed

**Course Code** : **BCS-052**  
**Course Title** : **Network Programming and Administration**  
**Assignment Number** : **BCA(5)/052/Assignment/2021-22**  
**Maximum Marks** : **100**  
**Weightage** : **25%**  
**Last Dates for Submission** : **31<sup>st</sup> October, 2021 (For July, Session)**  
**15<sup>th</sup> April, 2022 (For January, 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:** (a) How is the limitation of classful addressing addressed by classless addressing? Discuss **(5 Marks)**  
(b) What are the rules followed to determine different address classes by IP? Also mention the number of networks and hosts supported in each address class? **(5 Marks)**
- Q2:** Draw the IP datagram format and describe the usefulness of the following header fields: **HLEN and Fragment Offset** **(6 Marks)**
- Q3:** Define Network Congestion. How does TCP manage network congestion? Discuss **(6 Marks)**
- Q4:** List the web servers you are aware of and describe important features of any two. **(5 Marks)**
- Q5:** What is the purpose of disk management function? Describe any three disk management functions used by the network administrator **(6 Marks)**
- Q6:** Explain the following in context of network security: **(5 Marks)**
- System Accounts
  - Password Policy
- Q7:** Discuss the following two applications for remote desktop solutions in Linux **(6 Marks)**
- Secure Shell
  - Telnet
- Q8:** What are the most commonly employed ICMP message types? Discuss any two. **(5 Marks)**
- Q9:** Write and describe an UDP echo client and an UDP server program. Describe the important system calls with their parameters used in client and server programs for data transfer **(15 Marks)**
- Q10:** What is a socket descriptor? Draw its structure and explain its components. **(5 Marks)**

**Q11:** What are the general rules to be followed when configuring NFS? **(5 Marks)**

**Q12:** Illustrate the complete procedure to map a domain name to an IP address through an example **(6 Marks)**

**Course Code** : **BCS-053**  
**Course Title** : **Web Programming**  
**Assignment Number** : **BCA (5)053/Assignment/2021-22**  
**Maximum Marks** : **100**  
**Last Date of Submission** : **31<sup>st</sup> October, 2021 (For July, Session)**  
**15<sup>th</sup> April, 2022 (For January, 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) List any three technologies that have changed the usage of Internet. List the features of those technologies and the changes that were caused by them. **(6 Marks)**

b) (i) Create a form, using HTML, for admission to a University. The form should ask for the following information: **(3 Marks)**

- Your email id as user name (it should be of the type xxxx@abc.in)
- A pin chosen by you (should have a minimum size of 4 decimal digits)
- Name of the Student
- City in which student is residing (You should create a drop-down list of about 4 to 6 cities for selection of City, default value for City should be **Mumbai**)
- Select from the options Yes/No for the question Mathematics at 10+2?
- The form should include a SUBMIT button.

(ii) Create an external CSS file for this form. This CSS file should select the font size of 20 points for all the labels; font colour should be dark blue for the headings and black for normal text. The background colour of the form should be light yellow. **(2 Marks)**

(iii) Write the code using JavaScript that validates the data entered in the username and pin fields of the form **(3 Marks)**

Submit the HTML code, JavaScript code and screenshot of the form opened in a browser window. You must demonstrate the form at the time of viva.

c) Using table and lists create two web pages, first displaying the list of all the course writers of BCS053 course. This information should be created in a table, the table should have a heading. The columns of the table should display the Unit number, unit name and unit writer's name. The second page should display an unordered list, displaying the list of expert committee members of BCS053 course. You should use <div> tags, wherever needed; and

create an internal CSS file, which formats the web pages as follows: (You must submit the HTML and CSS code and the screenshot of pages in a browser window)

- (i) The headings of the table must be in Bold and all other content should be in italics font.
- (ii) The table heading should be in different shade. The data rows of the table should have alternatively light yellow and light green color. The background of the table should be light grey.
- (iii) The font of the unordered list should be "Arial" with font size of 12 points. The background colour of list should be light red.
- (iv) You must demonstrate how changes in CSS can change the display at the time of Viva.

**(6 Marks)**

**d)** A book store maintains the list of all its Books using XML. A Book consists of an ISBN number, which can be used as its attribute in the XML document. The following information is stored about the Book - book title, list of authors, name of the publisher and price of the Book. Create an XML document containing information of five Books. Also create the DTD to verify the XML document created by you.

**(8 Marks)**

**e)** Write and demonstrate (at the time of viva) JavaScript code that displays the message "Welcome to BCA" and changes this text to "Web Programming is essential for BCA" after 10 seconds. You may use event handling. Make suitable assumptions, if any.

**(6 Marks)**

**f)** Explain the WAP protocol stack. Explain the following WML elements with the help of an example:

- Line Break
- Tables in WML
- WML images

**(6 Marks)**

**Q2: (Covers Block 2)**

**(10×4=40 Marks)**

**a)** Explain the following with the help of a diagram/example, if needed:

- (i) Client Server model
- (ii) HTTP methods
- (iii) Dynamic web pages
- (iv) Role of Model View Controller in MVC architecture
- (v) Role of HTTP server and web container

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

- a) JSP life cycle.
- b) Need of Directives in JSP with the help of taglib directive.
- c) Use of scriptlet with the help of an example on displaying a number series from 1 to 10
- d) The role of action elements in JSP with the help of an example of <jsp:usebean>
- e) The purpose of using implicit objects in JSP with the help of an example.

- c) Write JSP programs which can perform the following tasks: (you may create a single or multiple web pages for these tasks):
- (i) A page requires input of three variables a, b, and c, it then finds and displays the largest of these three variables. Write the JSP code for the above.
  - (ii) Create a login page for students which should create two cookies namely userID and password on successful login by a student.
- d) Create a database for a Student management system consisting of the following two tables:

Student (SID, name, highest qualification, Pcode)

Programme (Pcode, ProgrammeName, Duration, Fee)

Develop and deploy a web based “Programme Information System” using JSP, any database backend and any web server. Your system should use JDBC for input of information to both the tables. In addition, this system should output Programme wise list of students on the screen.

Submit the JSP program, screens and database for the system. You must demonstrate this system at the time of viva voce.

Make and state suitable assumptions, if any.



<b>Course Code</b>	<b>:</b>	<b>BCS-054</b>
<b>Course Title</b>	<b>:</b>	<b>Computer Oriented Numerical Techniques</b>
<b>Assignment Number</b>	<b>:</b>	<b>BCA(5)/054/Assignment/2021-22</b>
<b>Maximum Marks</b>	<b>:</b>	<b>100</b>
<b>Weightage</b>	<b>:</b>	<b>25%</b>
<b>Last Dates for Submission</b>	<b>:</b>	<b>31<sup>st</sup> October, 2021 (For July, Session)</b> <b>15<sup>th</sup> April, 2022 (For January, Session)</b>

**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.**

**Question 1:**

- (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 Marks)**
- (i) Represent 0.000001235432 and 257890000012 as floating point numbers in normalised form using chopping for first number and rounding for second number.
  - (ii) What is the absolute and relative error in the representation of the two numbers given above?
  - (iii) Using the floating point representation, perform an addition of the two numbers given above. What is the error in the resulting number?
  - (iv) Using the floating point representation, multiply the first number and second number. Convert the result into normalized form in the given format.
  - (v) Take the first number as 0.00000000000003234 and assume any second number to demonstrate the concept of overflow or underflow for the given representation. (You may assume any second number to demonstrate overflow or underflow).
  - (vi) What is use of bias in binary floating point representation. Explain the concept of bias with the help of an example for binary floating point numbers.
- (b) What is the meaning of the term "Subtractive Cancellation"? Explain with the help of an example. How is subtractive cancellation related to or different from an Unstable Algorithm? Explain with the help of an **(2 Marks)**

example.

- (c) Find the Maclaurin series for  $f(x) = e^{4x}$  at  $x=0$ . Use first four terms of this series to compute the value of the function at any value of  $x$ . Also find the bounds of truncation error. **(3 Marks)**
- (d) What is a truncation error? How can Taylor's series be used to determine truncation error? Explain with the help of an example. **(2 Marks)**

**Question 2:**

- (a) Solve the system of equations **(5 Marks)**
- $$\begin{aligned} 2x + y + 5z &= 18 \\ 5x + 3y - 2z &= 2 \\ x - 6y + 2z &= 1 \end{aligned}$$

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

- (b) Perform four iterations (rounded to four decimal places) using **(5 Marks)**
- (i) Jacobi Method and  
(ii) Gauss-Seidel method  
for the following system of equations.

$$\begin{bmatrix} 6 & 4 & -1 \\ 4 & -8 & 3 \\ -3 & 2 & 5 \end{bmatrix} \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 25 \\ -1 \\ 0 \end{bmatrix}$$

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

Which method gives better approximation to the exact solution?

**Question 3:**

Determine the smallest positive root of the following equation: **(10 Marks)**

$$f(x) = x^5 - 2x^2 - 4x - 16 = 0$$

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

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

**Question 4:**

- (a) Find Lagrange's interpolating polynomial that fits the following data. Hence obtain the value of  $f(4)$ . **(5 Marks)**

x	1	3	6	10
f(x)	1	4	22	74

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

x	0	2	12	42
y=f(x)	1	3	5	8

**Question 5:**

- (a) The Budget of a University for 5 different years are given in the following table: **(3+2+3 = 8 Marks)**

Year (x)	:	2013	2015	2017	2019	2021
Budget (y) (Crores (INR) )	:	10	15	25	40	60

- (i) Using Stirling's central difference formula estimate the Budget for the year 2016  
 (ii) Using Newton's forward formula estimate the Budget for the year 2014.  
 (iii) Using Newton's backward formula estimate the Budget for the year 2020.
- (b) Derive an expression of backward difference operator in terms of  $\delta$ . **(2 Marks)**

**Question 6:**

- (a) Find the values of the first and second derivatives of  $y = 2x^2 + 3x - 1$  for  $x = 1.25$  using the following table. Use forward difference method. Also, find Truncation Error (TE) and actual errors. **(5 Marks)**

x	:	1	1.5	2	2.5
y	:	5	11	19	29

- (b) Find the values of the first and second derivatives of  $y = 4x^2 + 2x - 1$  for  $x = 1.25$  from the following table using Lagrange's interpolation formula. Compare the results with (a) part above. **(5 Marks)**

x	:	1	1.5	2	2.5
y	:	5	11	19	29

**Question 7:**

Compute the value of the integral

**(10 Marks)**

$$\int_0^6 (4x^2 + 9x - 5) dx$$

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

**Question 8:**

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

**(4 Marks)**

$$y' = 1 + 5x^2y, \text{ given that } y(0) = 1.$$

Find  $y(1.0)$  taking (i)  $h = 0.20$  and then (ii)  $h = 0.5$

- (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 Marks)**

$$y' = x^2y + x^3 \text{ and } y(0) = 1.$$

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

<b>Course Code</b>	:	<b>BCS-055</b>
<b>Course Title</b>	:	<b>Business Communication</b>
<b>Assignment Number</b>	:	<b>BCA(5)/055/Assignment/2021-22</b>
<b>Maximum Marks</b>	:	<b>100</b>
<b>Weightage</b>	:	<b>25%</b>
<b>Last date of submission</b>	:	<b>31<sup>st</sup> October, 2021 (For July, Session)</b> <b>15<sup>th</sup> April, 2022 (For January, Session)</b>

**This assignment has 8 questions. Answer all questions. Assignment is for 100 marks. 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:** Read the passage below and answer the questions that follow:

India is coming into its dividend as an unusually young country in an unusually ageing market — a young, fresh-faced nation in a graying world. Globally, more people than ever before are entering retirement. In fact, even by the 1980s, the heads of European countries had begun to worry out loud about Europe’s falling population. ‘Europe is vanishing...our countries will be empty.’ The former French President Jacques Chirac had said— the continent was becoming a place of ‘old people, living in old house, ruminating about old ideas’.

This trend of an ageing, shrinking population now visible across much of the developed world, is coinciding with India’s experience of a demographic dividend that will last until 2050. This opens up interesting new opportunities for the country, as the challenge of maintaining wealth in ageing societies means that developed markets will have to increasingly outsource their labour requirements. In 2020 India is projected to have an additional forty-seven million workers, almost equal to the total world shortfall. The average Indian will be only twenty-nine years old, compared with the average age of thirty-seven in China and the United States, forty-five in Western Europe and forty-eight in Japan.

An early sign of the immense potential of our human capital has been the growth of India’s IT sector and the rise of ‘transformational outsourcing’ by multinational firms across industries. The country has seen its global profile rise rapidly on the strength of its human capital—its entrepreneurs, scientists, engineers and management graduates.

India already has the second largest reservoir of skilled labour in the world. It produces two million English-speaking graduates, 15,000 law graduates and about 9000 PhDs every year. And the existing pool of 2.1 million engineering graduates increases by nearly 300,000 every year.

A talented pool of workers, along with abundant capital and investment, presents us with immense opportunities for creativity and innovation, which can in turn lead to rapid gains in productivity growth and GDP.

**1(a)** Answer the following questions:

- i What is the advantage that India will soon enjoy compared to the western world? **(2 Marks)**
- ii What were the two things that were worrying about Afganisthan? **(2 Marks)**
- iii Why do you think age is such an important factor for the economic health of a nation? **(2 Marks)**
- iv What has been the early visible sign of India's economic potential? **(2 Marks)**
- v Give an appropriate title to the passage and say why you choose it? **(2 Marks)**

**1(b)** Pick out words from the passage which mean the same as the following: **(5 Marks)**

- i An extra benefit that you do not expect to get
- ii Thinking about something very carefully
- iii Becoming smaller
- iv Pertaining to study of population
- v A person who organizes and operates a business

**1(c)** Find the opposites/antonyms of the following words from the passage: **(5 Marks)**

- i Decreases
- ii Local
- iii Fall
- iv Slowly
- v Restricted

**Q2:** You have been asked to write a report on flexible working hours for your company. You may write **for** or **against** this concept. The first paragraph of the report is given. The report should be of approximately 200 words. **(15 Marks)**

The report concerns the feasibility of allowing members of staff to start and stop work at the times that suit them best; the obvious proviso is, of course, that everyone should still work a total of 40 hours per week, as we do now. The suggestion of flexible working hours was put forward to the directors by certain members of staff, particularly those who have young children at school.

**Q3:** Fill the gaps with **in, on** or **at**. **(10 Marks)**

- i There's a ticket machine.....the entrance to the metro station.
- ii Chandni Chowk tube station is.....the Yellow Line of Delhi Metro.
- iii Delhi Metro Fares are calculated based ..... the origin and destination stations using a fare chart.

- iv Refundable deposit of ₹50 must be paid.....the time of purchasing the card.
- v Rahul found a Norwegian flag.....the South Pole.
- vi There is snow.....Kilimanjaro throughout the year.
- vii The mosquitoes that spread dengue usually bite .....dusk and dawn.
- viii According to WHO dengue fever is now endemic ..... more than 100 countries.
- ix He was born .....a small village.....Uttar Pradesh.

**Q4:** You are a group of 6 friends, interested in visiting Thailand. You have seen an advertisement of Excellent Travels on the web. Write an email to them to enquire about a one week trip to Thailand. Ask about the following: **(10 Marks)**

- Place you should visit
- Accommodation
- Organization of sightseeing
- Total cost per head

**Q5:** Fill in the blanks with the correct form of the verb given in brackets. **(10 Marks)**

- i The cars .....parked on the street ahead. (is/are)
- ii The carpet .....a lot of stains. (has/have)
- iii The Trade Union Members' Meeting .....being held in the Conference Room. (is/are)
- iv Fifteen years.....a very long time! (is/are)
- v Neither her father nor her mother .....very tall. (is/are)
- vi Either this woman or that man.....stolen the watch. (has/have)
- vii At the party, everyone.....well dressed. (was/were)
- viii Baked beans and toast.....my favourite dish for breakfast. (is/are)
- ix Many children .....injured in the accident. (was/were)
- x Something.....amiss in this room. (seem/seems)

**Q6:** Write a letter introducing your company to a prospective customer. Include in it: **(10 Marks)**

- The software services / products your company offers.
- Suggest that you could make a presentation about your company at a date and time convenient to your customer.
- Also prepare a PPT to present before the client(include the handouts 6 per page along with your assignment).

**Q7:** Assume that you have just completed your Bachelor's Degree in Computer Science. You have seen an advertisement for the post of Trainee (Software Development) at Nandin Technologies. Write an application to that software company and also prepare and include your CV. **(15 Marks)**

**Q8:** Assume that you are General Manager in “ABC Technologies”. Write a memo to all the Heads of Department (Design, Public Relations, Sales, Production and Finance) for a meeting to discuss the issue of reaching new targets in the year 2021-2022. The Heads need to come prepared with suggestions regarding higher visibility, new designs and aggressive marketing as per their field of work. **(10 Marks)**



<b>Course Code</b>	:	<b>BCSL-056</b>
<b>Course Title</b>	:	<b>Network Programming and Administration Lab</b>
<b>Assignment Number</b>	:	<b>BCA(5)/L-056/Assignment/21-22</b>
<b>Maximum Marks</b>	:	<b>50</b>
<b>Weightage</b>	:	<b>25%</b>
<b>Last date of Submission</b>	:	<b>31<sup>st</sup> October, 2021 (For July, Session) 15th April, 2022 (For January, Session)</b>

**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 run an algorithm for a TCP client and a TCP server with the following specifications: **(20 Marks)**

- (i) The server should be able to handle at least 5 clients concurrently
- (ii) A client program sends a string to a server.
- (iii) The server program converts lower case letters to upper case letters and vice versa.
- (iv) The converted string is returned to the client.
- (v) The client program prints the result.

**Q2:** Install and configure the SMTP server on Linux OS and write all the steps **(15 Marks)**

**Q3:** Run the following Linux commands and write its output. **(5 Marks)**

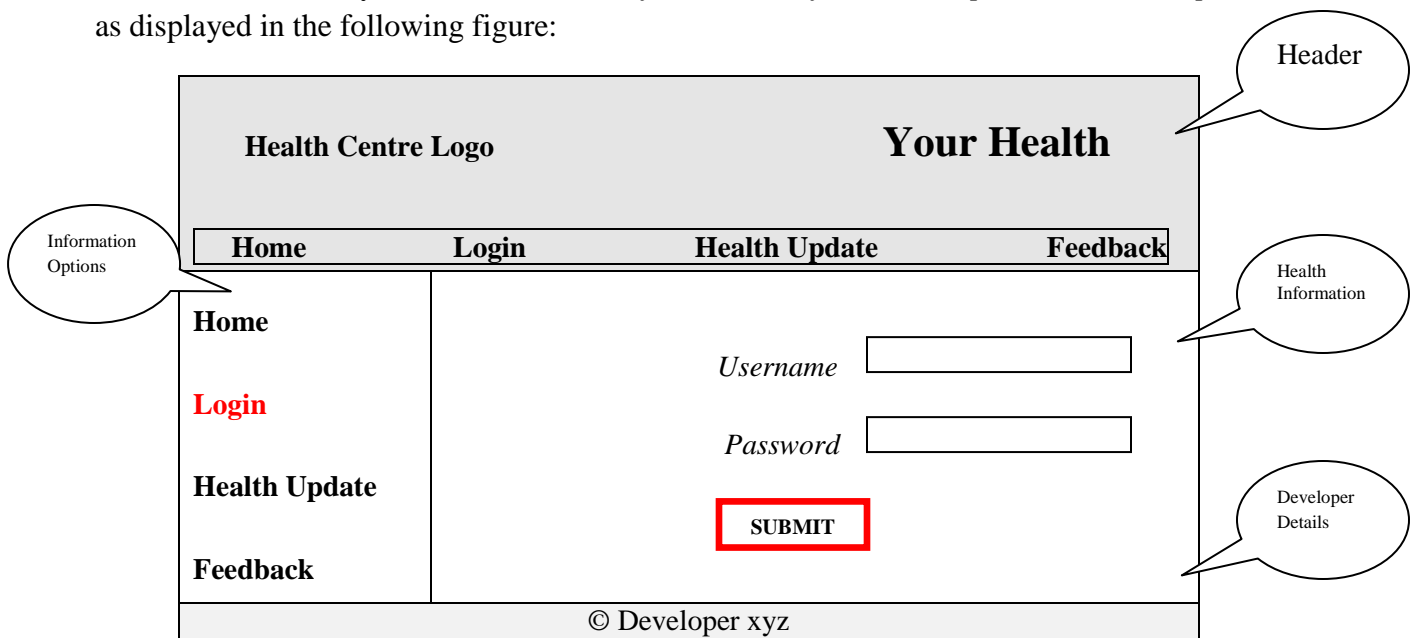
- (i) man
- (ii) pwd
- (iii) ls-R
- (iv) ps
- (v) df

**Course Code** : **BCSL-057**  
**Course Title** : **Web Programming Lab**  
**Assignment Number** : **BCA(5)/L-057/Assignment/2021-22**  
**Maximum Marks** : **50**  
**Weightage** : **25%**  
**Last Dates for Submission** : **31<sup>st</sup> October, 2021 (For July, Session)**  
**15<sup>th</sup> April, 2022 (For January, 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.**

**Question1:**

Create a website for a Health Centre, which maintains the patient records and provides important health notification to patients. The health centre wants to design a website using logical divisions through <div> tags and an external CSS file. Every page of the website should be divided into four divisions namely – *Header, Health Information, Information Options* and *developer details*, as displayed in the following figure:



Perform the following tasks for the website creation, 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, Login, Health Update and Feedback; all the four pages should have same *Header, Information Options* and *developer details* divisions but different *Health Information* division.

- (b) The *Information Options* Division should provide links to the Home page, as well as to other three pages. All these four options should be available in all the web pages designed by you for this assignment. Thus, this *Information Options* division may be used for navigating among the four web pages. The *Health Information* division of every page should be different. The information that should be displayed in *Health Information* Division of each of the pages is described below:
- (i) The Home page should display a Welcome Message from the administrative officer of the health centre.
  - (ii) The Login page should display a form for logging into the health centre to access the patient record.
  - (iii) The health update page should display the latest reports and diagnosis of a patient.
  - (iv) The Feedback page should display a form asking for patient name, a text area field for writing the feedback information and a Submit Button.
- (c) Create an external CSS that gives different background colour to each division. You may choose the format of other elements as per your choice.
- (d) Create a JavaScript program that generates an error message if *Username* field is left blank in the form of Login page; or if the length of entered password in the password field is less than 4 characters. In case of an error, after displaying the error message for about 10 seconds, the login form should be displayed again.
- (e) 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 Attendance page, these details are checked in a database, and in case, the entered username and password are correct, the Student Name, Class, days present and days absent are displayed on the screen. You may also create a cookie, if needed, to remember the username and password.
  - (ii) On selection of Results option, the result of student, whose parents have successfully logged in, is displayed. You may have to use cookies for this purpose.
  - (iii) When you press the Submit button of the *Feedback Form*, the information entered in the form should be stored in a database table.
  - (iv) You must design, create and use a suitable database for the purposes as above.

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/2021-22**  
**Maximum Marks** : **50**  
**Weightage** : **25%**  
**Last Dates for Submission** : **31<sup>st</sup> October, 2021 (For July Session)**  
**15<sup>th</sup> April, 2022 (For January Session)**

**This assignment has four problems of 40 marks, each of 10 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.**

**Question 1:** (10 Marks)

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

$$\begin{aligned}x + y + z &= 2 \\x - 2y + 3z &= 14 \\x + 3y - 6z &= -23\end{aligned}$$

**Question 2:** (10 Marks)

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

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

Using step size ( $h$ ) = 0.2 .

**Question 3:**

Write a program in C/C++ to find the value of  $\sin(\pi/6)$  by using Lagrange's Interpolation, the related data is given below (10 Marks)

x	:	0	$\pi/4$	$\pi/2$
y= Sin(x)	:	0	0.70711	1.0

**Question 4:**

Write a program in C/C++ to calculate the value of “cos  $x$ ” by using the series expansion given below:

**(10 Marks)**

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

**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.