BACHELOROFCOMPUTER APPLICATIONS (BCA)

(Revised Syllabus)

ASSIGNMENTS

(July-2025 & January-2026 sessions)

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

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

**SCHOOLOFCOMPUTERANDINFORMATIONSCIENCES
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(V)051/Assignment/2025-26**
Maximum Marks	:	**100**
Weightage	:	**25%**
Last Date of Submission	:	**31stOctober,2025(For July, Session)**
		30thApril, 2026(For January, Session)

Note: This assignment has eight questions for a total of 80 marks. Answer all the questions. Each question carries 10 marks. The rest 20 marks are for viva voce. You may use illustrations and diagrams to enhance explanations.

Q1.
(a) Compare and contrast the **Waterfall Model** and the **Spiral Model** of software development based on the following criteria: **(5 Marks)**

- Risk Handling Capability
- Flexibility to accommodate changes
- Customer Involvement
- Suitability for large vs. small projects

(b) For which of the following scenarios would you choose the Spiral model over the Waterfall model? Justify your answer. **(5 Marks)**

- Scenario 1: Developing a simple inventory management system with well-understood requirements.
- Scenario 2: Developing a cutting-edge research prototype for an AI-based medical diagnosis tool where requirements are expected to evolve.

Q2. You are tasked with developing a "Hostel Management System" for a university. The system should manage student check-in/check-out, fee payments, room allocation, and mess billing.

Prepare a **Software Requirements Specification (SRS)** document for this system. Your SRS must include at least the following sections as per the IEEE 830 standard: **(10 Marks)**

a. Introduction (Purpose, Scope, System Overview)
b. Overall Description (Product Perspective, User Characteristics, Constraints)
c. Specific Requirements (At least two Functional Requirements and two Non-Functional Requirements, e.g., performance, security).

Q3. For the "Hostel Management System" described in Q2, create the following **Data Flow Diagrams (DFDs)**:
(10 Marks)

(a) A **Context-Level (Level 0) DFD** showing the main system and its interactions with external entities (e.g., Student, Administrator, Accounts Department).
(b) A **Level 1 DFD** that decomposes the main process from the Context-Level diagram into at least three major sub-processes (e.g., "Manage Student Registration," "Process Fee Payments," "Allocate Rooms").

Q4. A software project has been estimated to have 300 Function Points (FP). The project is being developed by a

team with average experience, and the complexity of the project is considered high. The company uses a productivity factor of 10 FP per person-month.

- **(a)** Calculate the estimated **effort** in person-months. **(3 Marks)**
- **(b)** If the project needs to be completed in 6 months, calculate the estimated **team size** (number of people required). **(3 Marks)**
- **(c)** Briefly explain what a "Function Point" represents in software estimation and why it is often preferred over Lines of Code (LOC) as a metric. **(4 Marks)**

Q5.

- **(a)** Differentiate between **Black-Box Testing** and **White-Box Testing**. Provide one example testing technique for each. **(5 Marks)**

- **(b)** Explain the hierarchy of software testing levels: **Unit Testing, Integration Testing, and System Testing**. Describe the primary goal of each level. **(5 Marks)**

Q6. Suppose a software application for online ticket booking has been successfully deployed. Describe a scenario that would necessitate each of the following types of software maintenance. **(2.5 Marks for each)**

- **(a) Corrective Maintenance**
- **(b) Adaptive Maintenance**
- **(c) Perfective Maintenance**
- **(d) Preventive Maintenance**

Q7. What is **Software Quality Assurance (SQA)**? Describe four key activities that a dedicated SQA team would perform during the software development lifecycle to ensure the final product meets the desired quality standards.
(10 Marks)

Q8.
(a) What is **Software Configuration Management (SCM)**? Explain its importance in a team-based software development environment. **(5 Marks)**
(b) Define the following SCM concepts and explain their relationship:

- **Configuration Item (CI)** **(2 Marks)**
- **Baseline** **(2 Marks)**
- **Version Control** **(1 Marks)**

Course Code	:	BCS-052
Course Title	:	Network Programming and Administration
Assignment Number	:	BCA(V)/052/Assignment/2025-26
Maximum Marks	:	100
Weightage	:	25%
Last Dates for Submission	:	31st October,2025(For July, Session)
		30th April, 2026(For January, Session)

There are three questions in this assignment. In total, they carry 80 marks. Answer all the questions. 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.   What is SMTP? How does it differ from Internet Mail Access Protocol (IMAP).   **(30 marks)**

Q2.   Explain any 5 Socket options.   **(30 marks)**

Q3.   Explain various Disk Management functions.   **(20 marks)**

Course Code	:	**BCS-053**
Course Title	:	**Web Programming**
Assignment Number	:	**BCA(V)053/Assignment/2025-26**
Maximum Marks	:	**100**
Last Date of Submission	:	**31ˢᵗOctober,2025(For July, Session)**
		30ᵗʰApril, 2026(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 the presentation. Please give precise answers. The word limit for each part is 300 words.

Question 1: (Covers Block 1)

a) Explain the features of the following technologies: Content Networks, Social Media and Web Services. How are these technologies useful to you?   **(6 Marks)**

b) (i) Create an online admission form for an Institute using HTML. The form should ask for the following information: (**3 Marks**)

- The Name of the candidate
- Mother's Name
- Subject (Choose only one Subject from a drop-down list containing CS-01, CS-02, CS-03 and CS-04)
- Fee of the subject
- Have you registered for a subject earlier? (Yes/No)
- Your Educational Background (to be entered in text area)
- A SUBMIT button

(ii) Create an external CSS file for this form. This CSS file should select the font size of 16-point italics for all the labels; font colour should be Blue for the headings and dark green for the normal text. The background colour of the form should be light yellow.

(2 Marks)

(iii) Write JavaScript code to validate if any of the field of the form is not filled.

(3 Marks)

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

c) Using tables, create a webpage displaying the list of items in a departmental store. This webpage should display the item code, item name, unit price, and date of expiry of the item. Create a second page containing the ordered item by a customer, showing the item code, item name, unit price and ordered quantity. You should use <div> tags, wherever needed, and create an internal CSS file, which formats the web pages as given below:

(i) The headings of the table must be in 14-point Bold, and all other content should be in 12-point Times Roman font.

(ii) The table heading should be in a different shade. The data rows of the table should have alternate light yellow and light green colour shades. The background of the table should be light blue.

(iii) The font of the ordered list should be "Arial" and the font size should be 12 points. The background colour of the list should be light blue.

(iv) At the time of the viva, you should demonstrate how changes in CSS can change the display.

You must submit the HTML and CSS code and the screenshots of the pages in a browser window.

(6 Marks)

d) A University maintains the list of Books in its library using XML. Every Book is allotted a unique book code, which should be used as an attribute in the XML document. In addition, the following information is stored about the Books: Title of the book, Author(s) (minimum 1 and maximum 3), year of publication, and publisher. Create an XML document containing information about five Books. Also, create the DTD to verify the XML document created by you.

(8 Marks)

e) Write JavaScript code that displays the text "The Power of JavaScript is Dynamism". When you bring the mouse pointer over this text on the screen, it changes to "This is a Demonstration of Dynamism". You may use event handling to perform the action as stated above. Make suitable assumptions, if any. Submit the code. You should demonstrate this code at the time of the viva.

(6 Marks)

f) Explain the WAP protocol stack. Also, explain the following WML elements with the help of an example of each:
- WML tables
- WML Images
- WML <anchor> element

(6 Marks)

Question 2: (Covers Block 2)   **(10×4=40 Marks)**

a) Explain the following with the help of a diagram/example, if needed:
   (i) Features of dynamic web pages
   (ii) MVC Architecture
   (iii) Tools for client-side scripting
   (iv) HTTP methods
   (v) Web Containers

b) Explain with the help of an example/diagram or write code for the following using JSP:
   (i) *Page* and *include* directives of JSP
   (ii) Write a JSP scriptlet to display a list of the first 8 double-digit positive even numbers.

(iii) <jsp:useBean> and <jsp:plugin> action elements of JSP

(iv) *out* and *exception* implicit objects in JSP

(v) Steps of JSP page processing

c) Write JSP programs which can perform the following tasks (you may create a single or multiple webpages for these tasks):

(i) Write a JSP code to create a simple web page that accepts user input for two variables, namely alpha and beta. After the successful input to these variables, the JSP program should display the values entered for the alpha and beta variables, along with the result of their multiplication.

(ii) Create a web page that takes input in two fields, namely the student ID and the Programme of the student. In case the data is correctly entered in both fields, two cookies, one for the student ID and the second for the Programme of the student, are created.

d) Create a database for the Student Examination System consisting of the following two tables:

Student (StudentID, Name, ProgrammeCode, DateOfEnrolment)

FeePaid (StudentID, Semester, dateofPayment, AmountPaid)

Develop and deploy a web-based "Student Examination System" using JSP, having a database backend and a web server (you may select DBMS and web server, as per your choice). Your system should use JDBC for input of information to both tables. The system should also display the StudentID, Name, dateofPayment and Amount paid for all the students.

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

Make and state suitable assumptions, if any.

Course Code	:	BCS-054
Course Title	:	**Computer Oriented Numerical Techniques**
Assignment Number	:	**BCA(V)/054/Assignment/2025-26**
Maximum Marks	:	**100**
Weightage	:	**25%**
Last Dates for Submission	:	**31st October,2025(For July, Session)**
		30th April, 2026(For January, Session)

This assignment has seven 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) Find floating point representation, if possible normalized, in the 4-digit mantissa, two digit exponent, if necessary use approximation for each of the following numbers: **(8 Marks)**
(i) 27.94 (ii) -0.00943 (iii) -6781014 (iv) 0.0644321

Also, find absolute error, if any, in each ca

(b) Convert the decimal integer -465 to binary using both the methods (as shown in Pg No:16 of Block-1) . Show all the steps. **(4 Marks)**

(c) Convert the number given as binary fraction $-(0.101110101)_2$ to decimal. **(3 Marks)**

(d) Find the sum of the two floating numbers $x1=0.1364 \times 10^1$ and $x2=0.7342 \times 10^{-1}$. Further express the result in normal form, using (i) Chopping (ii) Rounding. Also, find the absolute error.

(5 Marks)

Q2. (a) Solve the system of equations **(5 Marks)**
$2x + y + z = 3$
$x + 3y + 3z = 4$
$x - 4y + 2z = 9$

using Gauss elimination method with **partial pivoting**. Show all thesteps.

(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.

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

With $x^{(0)} = (0, 0, 0)^T$. The exact solution is $(1, -4, -5)^T$.

Which method gives better approximation to the exact solution?

Q3. Determine the smallest positive root of the following equation: **(10 Marks)**

$$f(x) \equiv x^3 - 9x^2 - x + 9 = 0$$

to three significant digits using

(a) Regula-falsi method (b) Newton-Raphson method

(c) Bisectionmethod (d) Secant method

Q4. (a) Find Lagrange's interpolating polynomial for the following data. Hence obtain the value of f(4).

(5 Marks)

x	0	2	3	5
f(x)	2	11	21	121

(b) Using the inverse Lagrange's interpolation, find the value of x when y=3 for the following data:

(5 Marks)

x	25	35	55	75
y=f(x)	-2	-1	1	5

Q5. (a) The population of a country for the last 25 years is given in the following table:. **(3+2+3=8 Marks)**

Year (x)   : 1995 2000 2005 2010   2015
Population in lakhs (y)   : 678   1205 1855 2745   3403

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

(ii) Using Newton's forward formula, estimate the population for theyear 1998.

(iii) Using Newton's backward formula, estimate the population for theyear 2013.

(b) Derive the relationship for the operators δ in terms of E. **(2 Marks)**

Q6. (a) Find the values of the first and second derivatives of y = f(x) for x=2.1 using the **(5 Marks)**
following table. Use forward difference method. Also, find Truncation Error (TE) and actual errors.

x	:	2	2.5	3	3.5
y	:	8.7	12.7	16.8	20.9

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(b)   Find the values of the first and second derivatives of y = f(x) for x=2.1 from the following table using Lagrange's interpolation formula. Compare the results with (a)   part above.

(5 Marks)

x	:	2	2.5	3	3.5
y	:	8.7	12.7	16.8	20.9

Q7.   Compute the value of the integral   **(10 Marks)**

$$\int_0^8 (4 x^4 + 5x^3 + 6x + 5)\, dx$$

By taking 8 equal subintervals using (a) Trapezoidal Rule and then (b) Simpson's 1/3 Rule. Compare the result with the actual value.

Course Code	:	BCS-055
Course Title	:	Business Communication
Assignment Number	:	BCA(V)/055/Assignment/2025-26
Maximum Marks	:	100
Weightage	:	25%
Last date of submission	:	31stOctober,2025(For July, Session)
		30thApril, 2026(For January, Session)

This assignment has 10 questions and carries 100 marks. Answer all 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.)

Read the following passage and answer the questions that follow:

The Power of Listening in Business Communication

In today's fast-paced corporate world, listening is often an underestimated skill. Yet, it is fundamental to effective communication. Active listening is not just hearing what someone says, but fully concentrating, understanding, responding, and remembering what is being communicated. In a business setting, this skill can build trust, resolve conflicts, and enhance productivity.

Active listeners demonstrate empathy and patience. They maintain eye contact, nod affirmatively, and avoid interrupting the speaker. This non-verbal behavior encourages openness and shows respect. Furthermore, good listeners ask relevant follow-up questions and summarize what they hear to ensure mutual understanding.

Unfortunately, many people fall into the trap of passive listening. They appear to listen but are mentally distracted or formulating responses while the other person is speaking. This results in miscommunication, errors, and loss of valuable opportunities. Businesses that promote listening cultures often see higher employee engagement and stronger customer relationships.

The importance of listening is especially evident in leadership roles. A leader who listens well creates an environment where team members feel heard and valued. This fosters innovation and team cohesion. In contrast, poor listening habits can lead to misunderstandings, low morale, and high turnover rates.

Investing time in improving listening skills pays off. It not only strengthens workplace relationships but also promotes a culture of respect and clarity.

Q1. Say whether the following statements are True or False. Correct the false ones.   **(5 Marks)**
 (a) Listening only involves hearing the words spoken.
 (b) Interrupting the speaker shows interest and involvement.
 (c) Passive listening is a key element of effective communication.
 (d) Active listening can help in building trust and reducing conflicts.
 (e) Leaders with strong listening skills promote better team collaboration.

Q2. Answer the following questions based on the passage.   **(5 Marks)**
 (a) What is the difference between active and passive listening?
 (b) How can good listening improve customer relationships?
 (c) What are some non-verbal signals of active listening?
 (d) Why is listening particularly important for leaders?

(e) Suggest a suitable title for the passage.

Q3. Write the antonyms (opposites) of the following words as used in the passage: **(6 Marks)**
(a) Concentrating
(b) Empathy
(c) Encourage
(d) Openness
(e) Engagement
(f) Clarity

Q4. Find the meaning of the following words/phrases and use them in sentences of your own: **(4 Marks)**
(a) Miscommunication
(b) Cohesion
(c) Follow-up
(d) Underestimated

Q5. Fill in the blanks with appropriate verb forms (Simple Past, Past Perfect, Past Continuous): **(10 Marks)**
(a) They _____ (hold) a team meeting when the manager _____ (walk) in.
(b) By the time the project _____ (complete), the deadline _____ (already pass).
(c) The CEO _____ (speak) when the fire alarm suddenly _____ (go off).
(d) When I _____ (call) her, she _____ (attend) a webinar on customer service.
(e) We _____ (never expect) such a strong response before we _____ (launch) the product.

Q6. Fill in the blanks with suitable articles (a/an/the or no article Ø): **(10 Marks)**
(a) Listening is _____ essential skill in _____ workplace.
(b) _____ active listener plays _____ crucial role in building team trust.
(c) My friend is _____ HR executive who promotes _____ culture of empathy.
(d) They arranged _____ workshop on listening skills at _____ university campus.
(e) Is this _____ best solution we can offer?

Q7. Imagine you are the HR Manager of a company where employees have been ignoring basic communication etiquette during online meetings (e.g., not muting mics, talking over others). Draft a memo to remind them about online meeting decorum. **(10 Marks)**

Q8. Define the various types of communication styles: Assertive, Aggressive, Passive, and Passive-Aggressive. Which one do you identify with and why? **(20 Marks)**

Q9. You attended a workshop on "Digital Presentation Skills" over the winter break. Write a report on the workshop including: **(15 Marks)**
- Objectives and content of the workshop

- Sessions and hands-on activities

- Usefulness of the training

- Suggestions for improvement

Q10. You and your colleagues are planning a short office retreat to Kerala. Write an email to a travel agency to enquire about: **(15 Marks)**
- Travel and accommodation options

- Food arrangements

- Local sightseeing options

- Total cost per person

- Availability of packages in December

Course Code	:	BCSL-056
Course Title	:	**Network Programming and Administration**
		Lab
Assignment Number	:	**BCA(V)/L-056/Assignment/2025-26**
Maximum Marks	:	**50**
Weightage	:	**25%**
Last date of Submission	:	**31stOctober,2025(For July, Session)**

Last date of Submission : 31ˢᵗOctober,2025(For July, Session)
30ᵗʰApril, 2026 (For January, Session)

Note: This assignment has two questions. Answer all the questions. These questions carry 40 marks. Rest 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 necessary assumptions.

Q1. (a): Write a UDP client and UDP server program in C language on Unix/Linux, where client program interact with the Server as given below: **(8 Marks)**

1. The client will send a message "welcome" to the Server.
2. Server program sends an acknowledgement for receiving the message.
3. The sever program will find the length of the message and send it to the respective client.
4. The client will send an acknowledgement to the server upon receiving the response.
5. The server program will reverse the message and send it to the respective client.
6. The client will send an acknowledgement to the server upon receiving the response.

Q1. (b) Write the steps to install the network monitor application on Unix/Linux. Demonstrate the use of the capture filter and display filter with the help of examples for each. **(6 Marks)**

Q1. (c) Run the following Linux commands on your machine and show the output: **(6 Marks)**
  ➢ cat
  ➢ sort
  ➢ ping
  ➢ more
  ➢ df-h
  ➢ tail - f

Q2. (a) Write the command(s) to perform the following tasks **(10 Marks)**
  (i) Checking the status of the destination host and communication with another host name.
  (ii) Finding host/domain name and IP address.

Q2. (b) Configure the DHCP server on the Linux operating system. Write all the steps and sort each column of the table, then show the result. **(10 Marks)**

Course Code	:	**BCSL-057**
Course Title	:	**Web Programming Lab**
Assignment Number	:	**BCA(V)/L-057/Assignment/2025-26**
Maximum Marks	:	**50**
Weightage	:	**25%**
Last Dates for Submission	:	**31ˢᵗOctober,2025(For July, Session)**
		30ᵗʰApril, 2026(For January, Session)

Note: This assignment has one question for a total of 40 marks. The rest 10 marks are for viva voce. You must create the web application as specified, take screenshots of all pages and code, and attach them with your assignment.

Q1. Project: Community Library Management Website

You are required to design and implement a dynamic web application for a "Community Library". The website will allow users to browse available books and submit a request to borrow a book.

The website must consist of three pages, all following the layout shown in Figure 1.
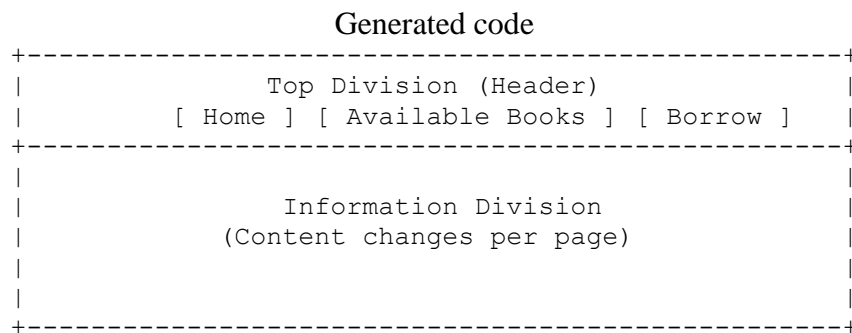
```
                        Generated code
    +-------------------------------------------------+
    |                Top Division (Header)             |
    |      [ Home ] [ Available Books ] [ Borrow ]     |
    +-------------------------------------------------+
    |                                                 |
    |              Information Division                |
    |           (Content changes per page)            |
    |                                                 |
    |                                                 |
    +-------------------------------------------------+
```

Figure 1: Layout of Web Pages

Part A: HTML, CSS, and Client-Side Scripting (20 Marks)

(i) Create Three HTML Pages:
Create three separate HTML files: index.html (Home), books.jsp (Available Books), and borrow.html (Borrow). All three pages must share the same layout as described in Figure 1, with a common Top Division for navigation.

(ii) CSS Styling:
Create an **external CSS file** (style.css) and link it to all three pages. This file should define the following styles:

- The Top Division should have a dark background color (#333) with white text for the navigation links.
- The Information Division should have a light grey background (#f4f4f4).
- The currently active navigation link should be highlighted (e.g., with a different background color or an underline).
- Use appropriate fonts, margins, and padding to make the layout clean and readable.

(iii) Home Page (index.html):
The Information Division of the Home page should display:

- A welcoming headline, e.g., "Welcome to the Community Library".
- A brief description of the library's mission and operating hours.
- An image of a library or books.

(iv) Borrow Page (borrow.html) and JavaScript Validation:
The Information Division of the Borrow page should contain a form for users to request a book. The form must include fields for:

- **Full Name** (Text input)
- **Email Address** (Email input)
- **Book ID** (Text input, referring to the ID from the "Available Books" page)
- **Borrow Date** (Date input)

Create a **JavaScript function** to validate this form on submission:

- All fields must not be empty.
- The Email Address must be in a valid format (e.g., contain '@' and '.').
- The Book ID must be a number.
- If validation fails, display an alert message and prevent the form from submitting.

Part B: JSP and Database Connectivity (20 Marks)

(v) Database Setup:
Create a database (e.g., in MySQL or Oracle) named library_db. Inside this database, create a table named books with the following schema:

- BookID (INT, Primary Key)
- Title (VARCHAR(100))
- Author (VARCHAR(100))
- Genre (VARCHAR(50))
- Status (VARCHAR(20), e.g., 'Available' or 'Borrowed')

Insert at least five sample records into the books table.

(vi) Available Books Page (books.jsp):
This page must be a **JSP page**. The Information Division should dynamically generate a table of all books from the library_db database.

- Use JSP scriptlets (<% ... %>) to connect to the database.
- Execute a SQL query to fetch all records from the books table.
- Use a loop to display the data in an HTML table with the columns: **Book ID, Title, Author, Genre, and Status**.
- Only books with the status 'Available' should have a green background color for the status cell. Books with 'Borrowed' status should have a red background.

(vii) Submission Handling (Optional, for higher marks):
(You are not required to write the full server-side code for processing the borrow form, but describing the logic is encouraged.) Briefly explain how you would create a JSP page (process_borrow.jsp) to handle the form submission

from borrow.html. The explanation should cover:

- Retrieving form data using request.getParameter().
- Connecting to the database.
- Updating the status of the requested book in the books table from 'Available' to 'Borrowed'.
- Displaying a success or failure message to the user.

Submission Checklist:

1. A report containing:
   - Screenshots of all three web pages (Home, Available Books, Borrow).
   - The complete code for index.html, borrow.html, books.jsp, and style.css.
   - The JavaScript validation code.
   - The SQL CREATE TABLE statement and INSERT statements for your database.
2. All source files should be included in the submission package.

Course Code	:	**BCSL-058**
Course Title	:	**Computer oriented Numerical techniques Lab**
Assignment Number	:	**BCA(V)/L-058/Assignment/2025-26**
Maximum Marks	:	**50**
Weightage	:	**25%**
Last Dates for Submission	:	**31st October,2025(For July Session)**
		30th April,2026(For January 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.

Q1. Write a program in C that accepts a decimal number and displays its floating-point equivalent number. You may make assumptions to simplify the program, however, your representation of floating point number should be closer to IEEE 754 standard 32 bit representation.

(5 Marks)

Q2. Write a program in C to implement Regula-Falsi method. **(5 Marks)**

Q3. Write a program to implement Gauss Elimination method for solving linear equations. Your method should check if a given pivot is zero or not. It should also minimise the floating-point errors.

(5 Marks)

Q4. Write a program in C for the demonstration of Stirling's Formula for Interpolation. **(5 Marks)**

Q5. Write a C Program for solving the following system of equations using Jacobi method:

$$\begin{bmatrix} 5 & -1 & -1 & -1 \\ -1 & 10 & -1 & -1 \\ -1 & -1 & 5 & -1 \\ -1 & -1 & -1 & 10 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ x_3 \\ x_4 \end{bmatrix} = \begin{bmatrix} -4 \\ 12 \\ 8 \\ 34 \end{bmatrix}$$

Starting with $x^{(0)} = (0, 0, 0, 0)$. The exact solution is $x = (1, 2, 3, 4)\ T^n$. **(5 Marks)**

Q6. Write a C program to solve the IVP $y' = -ty^2$, $y(2) = 1$ and find $y(2.1)$ and $y(2.2)$ with $h = 0.1$ using improved tangent method (modified Euler method) of $O(h^2)$. **(5 Marks)**

Q7. Write a program in C to find the approximate value of the following definite integral using Trapezoidal rule and obtain a bound for the error. The exact value of $I = \ln_2 = 0.693147$ correct to six decimal places.:

(5 Marks)

$$\int_0^1 \frac{dx}{1+x}$$

Q8. Write a program in C to solve the equation $x^2y' = 1-xy-x^2y^2$, $y(1) = -1$ from $x=1$ to $x=2$ by using Taylor series method of $O(h^2)$ with $h= 1/3$ and ¼ and find the actual error at $x=2$ if the exact solution is $y=-1/x$.

(5 Marks)