BACHELOR OF COMPUTER APPLICATIONS (BCA)

(Revised Syllabus)

ASSIGNMENTS

(July - 2022 & January - 2023)

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

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

(july - 2023 & Jannuary - 2024)

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THE PEOPLE'S UNIVERSITY

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

CONTENTS

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/2023-24**
Maximum Marks	:	**100**
Weightage	:	**25%**
Last Date of Submission	:	**31ˢᵗ October, 2023 (For July, Session)**
		30ᵗʰ April, 2024 (For January, Session)

This assignment has four 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.

(a) What is SRS? Explain properties of good SRS. Develop an SRS for an "Online Student Registration System". Make necessary assumptions. Follow IEEE SRS format. Briefly explain the characteristics of a good SRS.

(b) Develop a test case for any testing technique for an "Online Student Registration System".

Q2.

(a) Define the terms 'Coupling' and 'Cohesion'. Briefly explain the meaning of 'highly cohesive' system. Is there any relation between 'coupling' and 'cohesion'? Explain briefly.

(b) What are application logic objects? Explain with the help of an example.

Q3.

(a) What is Spiral model for software development? Explain the types of software systems developed using this model.

(b) What is Software Configuration Management? Briefly explain the activities in software configuration management.

Q4. Write short notes on the following:

(a) Entity Relationship Diagram

(b) Alpha and Beta Testing

(c) Software Quality Assurance Activities

(d) Project Triangle

Course Code	:	**BCS-052**
Course Title	:	**Network Programming and Administration**
Assignment Number	:	**BCA(V)/052/Assignment/2023-24**
Maximum Marks	:	**100**
Weightage	:	**25%**
Last Dates for Submission	:	**31st October, 2023 (For July, Session)**
		30th April, 2024 (For January, Session)

There are four questions in this assignment. Each question is of 20 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. If a binary signal is sent over a 3-kHz channel whose signal-to-noise ratio is 30 dB, what is the maximum achievable data rate. **(20)**

Q2. Imagine that a two-way handshake rather than a three-way handshake were used to set up connections. In other words, the third message was not required. Are deadlocks now possible? Give an example or show that none exist. **(20)**

Q3. What is User Security Management? How does it differ from Disk Security Management? **(20)**

Q4. Explain TCP and UDP architectures. **(20)**

Course Code	:	BCS-053
Course Title	:	Web Programming
Assignment Number	:	BCA(V)053/Assignment/2023-24
Maximum Marks	:	100
Last Date of Submission	:	31st October, 2023 (For July, Session)
		30th April, 2024 (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) Explain the features of the following technologies – Widgets, Data Streaming and Content Networks. How does these technologies affect us? **(6)**

b) (i) Create an online feedback form for a University using HTML. The form should ask for the following information: **(3)**

- The StudentID of the Programme on which feedback is being given.
- Programme code of the Programme Passed (Use a drop-down list for Programme code selection.)
- Name of the Student
- Year of admission and year of passing the programme
- Have you taken admission to another programme? Yes/No
- Text area for giving the feedback.

(ii) Create an external CSS file for this form. This CSS file should select the font size of 12 point bold for all the labels; font colour should be dark blue for the headings and green for normal text. The background colour of the form should be light yellow. **(2)**

(iii) Write the code using JavaScript that validates if all the fields of the form are filled. **(3)**

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 viva.

c) Using tables, create a webpage displaying the batchwise schedule of the counselling sessions of the 5th Semester courses at your Study Centre. This table should have proper headings. The columns of the table should display the batch number, course code, session time and the name of the counsellor taking the session. Create a second page using an ordered list showing the batch wise list of student's enrolment number and names. You should use <div> tags, wherever needed; and create an internal CSS file, which formats the web pages as given below (You must submit the HTML and CSS code and the screenshot of pages in a browser window): **(6)**

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

(ii) The table heading should be in different shade. The data rows of the table should have alternatively light yellow and light green colour. The background of the table should be light pink.

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

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

d) A Book store maintains the list of Books using XML. The Book information consists of a Book ISBN Number, which can be used as an attribute in the XML document. In addition, the following information is stored about the Book – Title of the Book, Author(s) of the Book (Please note a Book will have one or more authors), Number of copies of the book available in the Book Store. Create an XML document containing information of five Books. Also create the DTD to verify the XML document created by you. **(8)**

e) Write and demonstrate (at the time of viva) JavaScript code that displays the message "Welcome to Demonstration of JavaScript…Watch this Text…" and changes this text to "JavaScript can Change Display..." after 10 seconds. You may use event handling to perform the action as stated above. Make suitable assumptions, if any. **(6)**

f) What is WAP? What are the advantages and limitations of WAP? Explain the following WML elements with the help of an example: **(6)**

- Tables in WML
- Images in WML
- WML <input> element

Q2. (Covers Block 2) **(10×4=40)**

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

(i) Client-Server 2-Tier architecture and its advantages

(ii) Illustration of MVC architecture (other than the one given in the Block 2 Unit 1)

(iii) Features of Server-side scripting and related constructs

(iv) Request and Response in the context of HTTP

(v) GET and HEAD methods of HTTP

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

a) JSP Life cycle.

b) Purpose of JSP directives and taglib directive of JSP.

c) Write a JSP scriptlet to display a list of numbers which are divisible by 3. You may display this list till the number 21.

d) <jsp:param> and <jsp:include> action elements of JSP

e) *page* and *exception* implicit objects in JSP

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

(i) Write the JSP code to create a webpage that requires input of three variables a, b, and c; after successful input of values in the variables, the JSP program checks if these three variables are Pythagorean triple or not. The code then displays the appropriate message about the findings.

(ii) Create a registration page for a library consisting of three fields namely memberID, password and membership type (Library Administrator, Staff or the organization, Student member). Successful registration should create two cookies one for the memberID and second for the membership type.

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

StudentInformation (<u>EnrolmentNo</u>, StudentName, ProgCode)

Programme (<u>ProgCode, CourseCode</u>, Credits)

Develop and deploy a web based "Student Registration System" using JSP, 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 the tables. The system should output list of all the students of BCS053 course on the screen.

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/2023-24**
Maximum Marks	:	**100**
Weightage	:	**25%**
Last Dates for Submission	:	**31ˢᵗ October, 2023 (For July, Session)**
		30ᵗʰ April, 2024 (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)**

(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)**

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

(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)**

Q2. (a) Solve the system of equations **(5)**

$2x + y + z = 3$
$x + 3y + 3z = 4$
$x - 4y + 2z = 9$

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

(b) Perform four iterations (rounded to four decimal places) using **(5)**
(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 $\mathbf{x}^{(0)} = (0, 0, 0)^T$. 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)**

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

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)**

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)**

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)**

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)**

Q6. (a) Find the values of the first and second derivatives of $y = f(x)$ for x=2.1 using the **(5)** 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

(b)   Find the values of the first and second derivatives of $y = f(x)$ for x=2.1 from the   **(5)**
following table using Lagrange's interpolation formula. Compare the results with (a)
part above.

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

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

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

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/2023-24
Maximum Marks	:	100
Weightage	:	25%
Last date of submission	:	31st October, 2023 (For July, Session)
		30th April, 2024 (For January, Session)

This assignment has 09 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:

It is rare to find someone with good technical and communication skills. You can get far ahead of your colleagues if you combine the two early in your career. People will judge, evaluate, promote or block you based on your communication skills. Since habits form by repeating both good and bad forms of communication, learn to observe great communicators and adapt their styles and traits in written and verbal forms. The art of listening and learning from each and every interaction is another secret recipe. Develop the subconscious habit of listening to yourself as you speak and know when to pause.

Learning what not to say is probably more important than learning what to say. As your career develops, you will realise that the wise speak less. Speak when you have value to add, else refrain. Poorly constructed e-mails with grammatical errors are acceptable between friends, but they should be seriously avoided while communicating formally with your seniors. Avoid any communication in an emotional state when you might say things you will regret later. One unnecessary word uttered at the wrong time or place can ruin a relationship, career or even your life. Such is the power of words. If such a thing happens, you should immediately apologise, else it may haunt you for life.

Another problem to overcome is speaking too fast since our minds are working faster than our speech, we are inclined to speak fast. This does not necessarily mean that the person hearing it will get it any faster. On the contrary, it is always the reverse. So slow down, think before you speak. "When I get ready to speak to people," Abraham Lincoln said, "I spend two-thirds of the time thinking what they want to hear and one-third thinking what I want to say." Adding humour and it is also essential. But realise that not all jokes are funny and observe certain boundaries. Never say anything that could offend. Remember you are not a comedian who must offend as many people as you can to be witty.

(a) Why is it necessary to have good communication skills? **(2)**

(b) How can communication skills be developed? **(2)**

(c) What according to the writer should be avoided while communicating? **(2)**

(d) Why should you be careful when you tend to be humorous? **(2)**

(e) Choose the most appropriate meaning of the given words from the options provided.
Evaluate: **(2)**
(i) estimate   (ii) assume   (iii) punish   (iv) evolve

(f) Choose the most appropriate meaning of the given words from the options provided.

Trait: **(2)**

(i) treaty   (ii) trail   (iii) quality   (iv) liberty

(g) Choose the most appropriate meaning of the given words from the options provided

Utter: **(2)**

(i) flatter   (ii) speak   (iii) rot   (iv) unique

(h) Choose the most appropriate meaning of the given words from the options provided
Haunt: **(2)**

(i) hunt   (ii) chant   (iii) trouble   (iv) avoid

(i) Make two sentences using any of the two words given below: **(2+2)**

Avoid, verbal, subconscious, inclined, adapt, interaction

Q2. The students in your study centre do not have a clean place to eat in the campus. Write a letter to the head of the study centre, persuading him/her to get one built. Describe in detail the requirements and give suggestions for the same on how this might be done. **(10)**

Q3. Write short notes on any two of the following: **(5 x 2= 10)**

     a) Phone interviews.
     b) Walk-in interviews.
     c) Active Listening Skills.
     d) Using Positive Influencing Skills in the Workplace.

Q4. Complete the sentences with the comparative or superlative form of the adjective/adverb. **(5)**

     1. The little boy ran _____ (fast) than his friends.
     2. He played ____(good) than any player.
     3. You are driving _____(bad) today than yesterday!
     4. Jim works ___(hard) than his brother.
     5. Everyone in the race ran fast, but John ran the____(fast) of all.

Q5. Change the following into passive voice: **(5)**

     1. The teacher asked a difficult question.
     2. She made an attempt.
     3. She wrote an award-winning novel.
     4. The police caught the thief.
     5. We must speak the truth.

Q6. Complete the following sentences by putting the verbs in the Simple Past, Past Perfect or Past Continuous Tense: **(10)**

(a) Although we…………..(invest) a lot of money in the project, we ………….. (decide) to   pull out of it.

(b) When her father…………..(die), she …………..(run) the business.

(c) Vikas Mathur…………..(be) in charge of the shop in Gurgaon before he …………..(take) over the company.

(d) While my father…………..(build up) the business in the North, I …………..(do) the same in   the South. (e) While Nautan…………..(talk) to the Manager, the workers………….. (pack) the garments ready for dispatch.

Q7. Fill in the blanks with suitable articles (a/an, the or no article) **(10)**

(a) I saw ____ bird flying in ____ sky. We went to ____ beach and enjoyed ____ sun and ____ sand.

(b) …………..mangoes are selling at Rs. 40 …………..kilo.

(c) Is this …………..book you were telling me about? Yes, it is about …………..life of …………..Ambedkar.

Q8. Elaborate on different kinds of communication with suitable examples. Discuss kinds of communication and their appropriateness **(20)**

Q9. Write an e-mail to your friend sharing your carrier goals. Give appropriate reasons for your choice and how that would be meaningful for the society at large. **(10)**

Course Code	:	BCSL-056
Course Title	:	Network Programming and Administration Lab
Assignment Number	:	BCA(V)/L-056/Assignment/2023-24
Maximum Marks	:	50
Weightage	:	25%
Last date of Submission	:	31st October, 2023 (For July, Session)
		30th April, 2024 (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: **(12)**

1. The client will send a string to the client.
2. Server program send an acknowledgement for receiving the string.
3. Sever program will find the length of the sting and send it to respective client.
4. Client will send the acknowledgement for receiving the response to the server.

Q1. (b) Write the steps to install network monitor application on Unix/Linux. Demonstrate the use of capture filter and display filter with the help of examples for each. **(8)**

Q2. (a) Run the following Linux commands on your machine and show the output: **(8)**

➢ cat
➢ sort
➢ ping
➢ more

Q2. (b) Configure the DHCP server on the Linux operating system. Write all the steps and also, sort each column of the table and show the result. **(12)**

Course Code	:	**BCSL-057**
Course Title	:	**Web Programming Lab**
Assignment Number	:	**BCA(V)/L-057/Assignment/2023-24**
Maximum Marks	:	**50**
Weightage	:	**25%**
Last Dates for Submission	:	**31ˢᵗ October, 2023 (For July, Session)**
		30ᵗʰ April, 2024 (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.

Q1.

(a) Design and implement a website/web application having three web pages. All the three web pages should have the following layout:
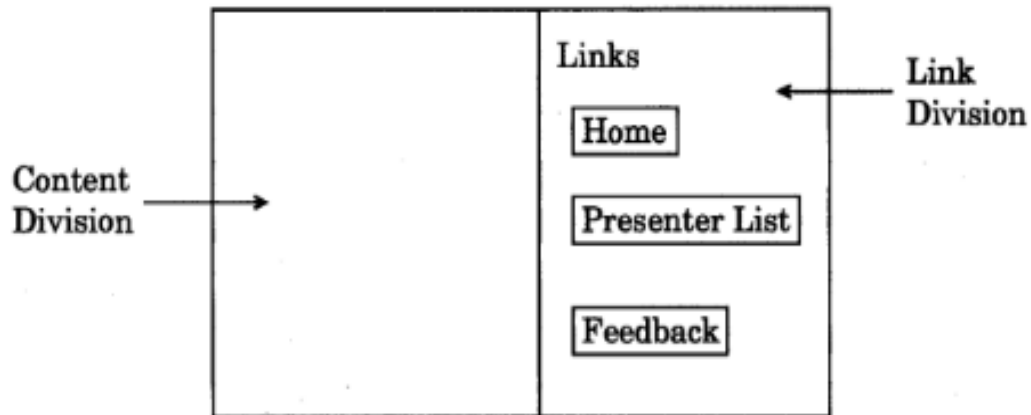

Figure 1 : Layout of Web Pages

The Link Division should be same in all the three pages. **Home**, **Presenter List** and **Feedback** are links to Home Page, Presenter List Page and Feedback Page respectively.

The Content Division of the three pages should be as under:

(i) The Content Division of Home Page should display workshop name, list of authors and address of the venue. **(6)**

(ii) The Presenter List should be generated using a database named **"Presenter"** having the fields **Presenter_name** and **Expertise**. You should write JSP program which connects to the database and creates the list in the Content Division of Presenter List Page. The list in the Content Division should be as under :

Presenter List

Presenter   Name Expertise
Rohit   DBMS
Rahim   Web Programming
.

.

.

The list should have at least five presenter names.   **(18)**

(iii)   The Feedback Form should display a form. The Content Division of this page should be as
         under (please do not write any code for processing or verification of the form):   **(6)**

(b)   Create an external CSS file that ensures that format of all the three pages is as per
         the layout of Figure 1. The background colour of Link Division should be light blue.

(10)

You may make suitable assumptions, if needed.

Course Code	:	**BCSL-058**
Course Title	:	**Computer oriented Numerical techniques Lab**
Assignment Number	:	**BCA(V)/L-058/Assignment/2023-24**
Maximum Marks	:	**50**
Weightage	:	**25%**
Last Dates for Submission	:	**31ˢᵗ October, 2023 (For July Session)**
		30ᵗʰ April, 2024 (For January Session)

This assignment has eight questions of 40 marks, each of 5 marks. All questions 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 C/C++ program that implements (Do not use pivot condensation) Gaussian elimination method for solving n linear equations in n variables, that calls procedures **(5)**

    (i) Exchange of rows
    (ii) lower-triangularisation and
    (iii) back substitutions
       (Codes of procedures are also to be written).

  Use the program for solving the following system of linear equations:
     2x + y + z = 7
     3x + 2y + 3z = 16
     4x + 5y + 3z = 23

Q2. Write a program in C/C++ to find the root of the following equation by using "Bisection Method". Equation: $x^3 - 5x + 1 = 0$; $x \in [1, 2]$ **(5)**

Q3. Write a C/C++ program that approximates a root of the equation f(x) = 0 in an interval [a, b] using Newton-Raphson method. The necessary assumptions for application of this method should be explicitly mentioned. Use the method to find one root of the equation: $x^3 + 4x^2 - 19 = 0$. **(5)**

Q4. Write a C/C++ program that approximates the value of a definite integral $\int_z^b f(x)dx$ using Trapezoidal Rule, with M sample points. Find an approximate value of the integral of $4x^2$ using the program with 6 intervals over the interval [0, 3]. **(5)**

Q5. Write a C/C++ program that approximates the solution of the initial value problem: y' = f(t, y) with y(a) = y₀ over [a, b] using Euler's method. Using the program approximate the solution of the initial value problem: $y' = -2ty^2$ with y(0) = 1 **(5)**

Q6. Write a program in C/C++ to calculate the value of "cos x" by using the series expansion given below: **(5)**

$$\cos x = 1 - \frac{x^2}{2!} + \frac{x^4}{4!} + \frac{x^{62}}{6!} + \dots\dots$$

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.

Q7. 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 **(5)**

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

Q8. Write a program that approximates the value of a definite integral $\int_z^b f(x)dx$ using Simpson 1/3 Rule, with M sample points. Find an approximate value of the integral of $2x^{3/2}$ using the program with 8 intervals over the interval [1, 9]. **(5)**