BACHELOR OF COMPUTER APPLICATIONS (BCA)

(Revised Syllabus)

ASSIGNMENTS

(July - 2016 & January - 2017)

(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
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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/16-17**
Maximum Marks   : **100**
Weightage   : **25%**
Last Dates for Submission : **15th October, 2016 (For July 2016 Session)**
             15th April, 2017 (For January 2017 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.

1. Develop SRS as per IEEE standard for a Student Admission System *(30 Marks)*

2. Develop Design document for the system mentioned in Question 1. *(30 Marks)*

3. What is Re-Engineering ? How does it differ from Reverse *(20 Marks)*
   Engineering.

Course Code	:	BCS-052
Course Title	:	Network Programming and Administration
Assignment Number	:	BCA(5)/052/Assignment/16-17
Maximum Marks	:	100
Weightage	:	25%
Last Dates for Submission	:	15th October, 2016 (For July 2016 Session)
		15th April, 2017 (For January 2017 Session)

There are four questions in this assignment, which carries 80 marks. Rest 20 marks are for viva voce. You may use illustrations and diagrams to enhance the explanations. Please go through the guidelines regarding assignments given in the Programme Guide for the format of presentation. Answer to each part of the question should be confined to about 300 words. Make suitable assumption is necessary.

1. (a) Why flow control is used at both Data-Link layer and Transport Layer of OSI model? Also, compare the working of Sliding Window protocol of Data-Link layer and Transport layer. *(8 Marks)*

(b) Explain the various HTTP request methods using an example of each. *(6 Marks)*

(c) How a domain name is mapped to its equivalent network address? Explain using an example. *(4 Marks)*

(d) Suppose the class B network uses 20 out of 32 bits to define a network address. How many Class B Network are possible in this case? *(2 Marks)*

2. (a) List and describe all elementary socket systems calls and data transfer calls. *(8 Marks)*

(b) Write a connection-oriented client and server algorithm (using socket system calls) where client program interact with the Server as given below: *(12 Marks)*

- A client machine begins by sending a request to calculate a factorial of a number; the server sends back a confirmation of the service (if server is having any method for calculating factorial) to the respective client.

- If Server confirmation is positive, client sends a number and server replies as the factorial of that number to the client.

3. (a) Compare the security features, reliability approaches and delivery mechanisms of IPv4 and IPv6. *(6 Marks)*

(b) Why do LANs tend to use broadcast networks? Why not use networks consisting of multiplexers and switches. *(6 Marks)*

(c) Identify the Address Class of the following IP addresses: *(4 Marks)*

(a) 255.255.190.0
(b) 216.111.52.12
(c) 150.156.10.10
(d) 92.2.1.1

(d) Why would an application use UDP instead of TCP? Also, explain how can TCP handle urgent data? *(4 Marks)*

4. (a) Assume you are chief network administrator of a company. This company is having its offices in different cities. Each office is having more than 50 machines and a server. These servers and network of all offices are further controlled and managed by the main server. Discuss the security issues and threats in such network. Make a chart to explain the available solutions for each issue/threat. *(10 Marks)*

(b) Describe the activities to be performed at every layer in the TCP/IP model when information flows from layer to another layer. *(4 Marks)*

(c) The size of the option field of an IP diagram is 20 bytes. What is the value of HLEN field in binary? *(2 Marks)*

(d) Write short notes on following: *(4 Marks)*

(i) ICMP.
(ii) IP Encapsulation
(iii) Sockets.
(iv) SNMP.

Course Code	:	BCS-053
Course Title	:	Web Programming
Assignment Number	:	BCA(5)/053/Assignment/16-17
Maximum Marks	:	100
Weightage	:	25%
Last Dates for Submission	:	15th October, 2016 (For July 2016 Session)
		15th April, 2017 (For January 2017 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.

1. (covers Block 1)

(a) List important technologies of Web 2.0. Explain the term Mashups in the context of Web 2.0 with the help of an example. List the process of creating a Mashup. *(6 Marks)*

(b) Create a simple Registration form consisting of the following information – First and Last Name, date of birth (it should be validated), email ID (it should be validated), Employment status (Yes or No), Locality (to be selected from drop down list of Metropolitan, Urban, Semi-Urban, Rural), proposed user name and password, and a SUBMIT button. You must perform validations using JavaScript. *(6 Marks)*

(c) Create a simple web page using HTML consisting of two paragraphs about your School. Both the paragraphs should be created in different divisions. You must also create an external CSS file which ensures the following: *(6 Marks)*

    (i)   The first paragraph should use font Arial. The background of this paragraph should be light yellow and text colour green.

    (ii) The second paragraph should have light green background and text colour as blue.

    (iii) Both the paragraphs should have one heading which should have same format in both the paragraphs.

Also show how CSS can change the display format.

(d) A Library maintains detailed record of its books using XML. Every book has a unique book procurement number. A book has a Title, one or more authors, a publisher, year of publication, price, and an optional abstract. Create an XML documents containing information of five such Books. Also create the DTD for the XML Books document. *(8 Marks)*

(e) Write a script using JavaScript that changes the content of a title – **First Assignment** to the title – **Ready for Assignment**. The script should change the colour of the content **Ready for Assignment** after every 4 seconds. Make suitable assumptions, if any. *(8 Marks)*

(f) Explain any five Formatting and Link elements in WML with the help of an example each. Create a simple WML program that should ask for an input from a list of options. *(6 Marks)*

2. (Covers Block 2)

(a) Differentiate between Static and Dynamic websites. How does MVC help in creating dynamic websites? Explain with the help of an example. Also differentiate between GET and POST methods of HTTP. *(10 Marks)*

(b) Explain the following in the context of JSP with the help of an example. *(10 Marks)*

    (i) page Directive
    (ii) scriptlet code
    (iii) <jsp:getProperty>
    (iv) <jsp:param>
    (v) Request and Response objects

(c) What is the need of Session management in HTTP? Explain with the help of an example. Create a simple form consisting of two user input fields – username and password. Check these username and password from a database (consisting of username, password and name of account holder) using JSP/Servlet. In case the username or password does not match then display a message "Username or password is not valid" else the following message is displayed "Welcome <name of account holder from the database>". *(10 Marks)*

(d) Assume that you have a database of the accounts of the students of a University in a local bank. The database fields include account number, name, phone number, address, and balance. Write a program using JSP which displays all the details of the accounts whose balance is less than 100 Rupees. *(10 Marks)*

Course Code	:	BCS-054
Course Title	:	Computer Oriented Numerical Techniques
Assignment Number	:	BCA(5)/054/Assignment/16-17
Maximum Marks	:	100
Weightage	:	25%
Last Dates for Submission	:	15th October, 2016 (For July 2016 Session)
		15th April, 2017 (For January 2017 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.

1. (a) For the following questions use an eight-decimal digit floating point representation as given in your Block 1, Unit 1, Section 1.3.1 page 29. Perform the following operations: *(3 marks)*

   (i) Represent 3456789 and 3455155 as floating point numbers using chopping in normalised form.
   (ii) What are the advantages of representing these numbers in normalised form?
   (iii) Compare the error in representation when chopping is used to error in representation when rounding is used for these numbers.
   (iv) Subtract the two numbers and find the error in result.
   (v) Divide the first number by second. The result should be in normalised form.
   (vi) Explain the concept of overflow and underflow using any two numbers.

   (b) Explain the concept of Ill-conditioned problem with the help of an example other than given in the unit. *(2marks)*

   (c) Find the Maclaurin series for calculating sin x using the first four terms of this series. Also find the bounds of truncation error for such cases. *(3 marks)*

   (d) Obtain approximate value of $(2.8)^{-1}$ using first four terms of Taylor's series expansion. *(2 marks)*

2. (a) Solve the system of equations *(5marks)*

   $$4x + 2y + z = 14$$
   $$2x + 4y + 3z = 18$$
   $$2x + 3y - 2z = 06$$

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

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

(i) Gauss - Jacobi Method and
(ii) Gauss-Seidel method ,

for the following system of equations.

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

With initial estimates as $(0,0,0)^T$. The exact solution is $(2,1, 1)^{T.}$
Which method gives better approximation to the exact solution?

3.   Determine the smallest positive root of the following equation: *(10 marks)*

$$f(x) \equiv x^2 - \cos(x) = 0$$

to three significant digits using

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

4. (a)   Find Lagrange's interpolating polynomial for the following   *(5marks)*
data. Hence obtain the value of f(3).

x	0	2	5	6
f(x)	7	21	51	61

(b)   Using the inverse Lagrange's interpolation, find the value of x   *(5 marks)*
when y=3 for the following data:

x	42	65	95	106
y=f(x)	-1	1	4	6

5. (a)   By decennial census, the population of a town was given below.   *(3+2+3 =*
8 marks)

Year (x)   : 1976 1986 1996 2006   2016
Population (y): 37   43   53   58   72
(in lakhs)

(i)   Using Stirling's central difference formula, estimate the
population for the year 2001

(ii) Using Newton's forward formula, estimate the population
for the year 1984.

(iii) Using Newton's backward formula, estimate the
population for the year 2010.

(b)   Derive the relationship between the operators E and δ.   *(2 marks)*

6. (a) Find the values of the first and second derivatives of $y = x^{3/2}$ at   *(5 marks)*
x = 23 from the following table. Use forward difference
method. Also, find Truncation Error (TE) and actual errors.

x	:	20	25	30	35
y	:	89.4427	125.0000	164.3168	207.0628

(b) Find the values of the first and second derivatives of $y = x^{3/2}$ at   *(5 marks)*
x = 23 from the following table using Lagrange's interpolation
formula. Compare the results with part (a) above.

x	:	20	25	30	35
y	:	89.4427	125.0000	164.3168	207.0628

7.   Compute the value of the integral   *(10 marks)*

$$\int_{2}^{10} (3 x^3 + 2x^2 + 3x + 5) \ dx$$

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

8. (a) Solve the Initial Value Problem, using Euler's Method   *(4 marks)*

$$y' = 1+xy, \ y(0) = 1.$$

Find y(1.0) taking (i) h = 0.2 and then (ii) h = 0.1

(b) Solve the following Initial Value Problem using   *(6 marks)*

(i) R-K method of $O(h^2)$ and (ii) R-K method of $O(h^4)$

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

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

Course Code	:	BCS-055
Course Title	:	Business Communication
Assignment Number	:	BCA(5)/055/Assignment/16-17
Maximum Marks	:	100
Weightage	:	25%
Last Dates for Submission	:	15th October, 2016 (For July 2016 Session)
		15th April, 2017 (For January 2017 Session)

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

1. (a) Read the passage below and answer the questions that follow:

One of the ways I attempt to keep my own stress under control is to avoid, whenever possible, the bad habit of keeping other people waiting. Time is precious to everyone. I've observed that almost everyone feels that one of their most valued commodities is their time. This being the case, one of the surefire ways to annoy someone is to keep them waiting. While most people are somewhat forgiving, keeping them waiting is a sign of disrespect and a lack of acknowledgement. The subtle message is, "My time is more important that yours." Consider the magnitude of this suggestion. Do you feel that anyone else's time is more precious than yours? I doubt it. Doesn't it make sense then that everyone else feels the same way?

Deep down, we all know that no one likes to be kept waiting. Therefore, it's highly stressful to keep other people waiting because you know you are disappointing someone. In the back of your mind, you know darn well the person is looking at his watch, wondering where you are and why you are late. You may be keeping him from personal or professional commitments and that could make him angry or resentful.

There are obviously exceptions to the rule – times when factors beyond your control prevent you from being on time. Things happen to all of us, and no one has a perfect record. Truthfully, however, a vast majority of the time, being late is preventable. But instead of planning ahead, allowing a little extra time, or making allowances for unexpected problems, we wait just a little too long, or don't allow quite enough time – so we end up late. We then compound the problem by making excuses like "traffic was horrible," when, in reality, traffic is virtually always horrible. The problem wasn't traffic – but the fact that we didn't factor enough time in our schedule for the traffic.

(i)   Why is it stressful to oneself to keep another person waiting?   *(2 Marks)*

(ii) What message do we convey to a person when we keep   *(2 Marks)*
      him/her waiting?

(iii) Is it possible to be always on time? Why?   *(2 Marks)*

(iv) ….being late is preventable …'. Discuss in the context of the passage. *(3 Marks)*

(v) Give an appropriate title to the passage. *(1Marks)*

(b) Pick out the words from the passage which mean the opposite of the following words given below: *(5 Marks)*

i	cheap and useless	(para 1)
ii	make happy	(para 1)
iii	very obvious	(para 1)
iv	early	(para 2)
v	small	(para 3)

(c) Write sentences using the following words from the passage: *(5 Marks)*

i	under control	(para 1)
ii	surefire way	(para 1)
iii	resentful	(para 2)
iv	factors beyond one's control	(para 3)
v	horrible	(para 3)

2. Write short notes on the following: *(20 Marks)*

(a) Purpose and characteristics of report writing
(b) Effectively facing a job interview

3. Your office has asked you to prepare a proposal for a Yoga Centre and Gym at the workplace which employees can use after office hours. Write the steps of the proposal. *(10 Marks)*

4. Make a presentation on one of the following topics: *(10 Marks)*

(a) Internet will replace physical libraries
(b) How to make a good Presentation
(c) An effective Group Discussion

5. Write a paragraph on any **one** of the following in 200 words: *(20 Marks)*

(a) The long term effects of unemployment on a person
(b) Internet is an aid to lifelong learning
(c) The advantages of a distance education course

6. (a) Fill in the blanks with *a/an, the* or *no article*. *(5 Marks)*

Sanwa Bank, one of ……… world's largest banks, is offering its clients……… savings account for ……… pets. Client's pets can hold accounts where they can save for special treats, ……… holidays, or visits to ……… vet.

(b) Write short notes on the following: *(5 Marks)*

Asmita told her father that she had lost her mobile phone. He asked her when she had last used it. She replied that she had last received a phone call at her friend's birthday party. Her father enquired if she had looked for it at her friend's house. She replied that she was sure she hadn't lost it at her friend's house.

(c) Use a suitable verb in agreement with the subject of the sentence. *(5 Marks)*

i   The crowd…………….dispersed by the police.
ii   The great philosopher and statesman of our country……………. dead.
iii Slow and steady…………….the race.
iv   …………….any of the participants arrived?
v   …………….any one of the children interested in a summer job?

(d) Complete the following sentences with suitable modals from the box. There are more modals than you need to use. You can use the same modal more than once. *(5 Marks)*

shouldn't	might	would
needn't	should	could

i   I ……………..have reached the party on time, nobody arrived for a long time.
ii   Why didn't you take a Metro train? It …………….. have been easy for me to pick you up from the station.
iii It was a good idea to have taken shelter under a tree, otherwise you …………….. have been drenched.
iv   You…………….have borrowed my book without asking me.
v   …………….you mind passing the salt, please.

| Course Code	:	BCSL-056
Course Title	:	Network Programming and Administration Lab
Assignment Number	:	BCA(5)/L-056/Assignment/16-17
Maximum Marks	:	50
Weightage	:	25%
Last Dates for Submission	:	15th October, 2016 (For July 2016 Session)
		15th April, 2017 (For January 2017 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 suitable assumption is necessary.

1. Write a UDP client and UDP server program in C language on   *(20 Marks)*
    Unix/Linux, where client program interact with the Server as given
    below:

    (i)   The client begins by sending a request to send a string of 10
           characters or series of 10 numbers, the server sends back a
           characters or numbers as per the request of the client.
    (ii)   In case of series of numbers: The client sends a
           multiplication of numbers, to the server.
    (iii) In case of a string of characters: The client sends a reverse
           order of string to the server..
    (iv)   Server will send an acknowledgment to the client after
           receiving the correct answer.

2. (a) Write the step by step procedure to create a Peer to Peer   *(10 Marks)*
         Wireless Network.

    (b) Install the network monitor application. Show the use of   *(10 Marks)*
         'capture filter' and 'display filter' with the help of examples.

Course Code	:	BCSL-057
Course Title	:	Web Programming Lab
Assignment Number	:	BCA(5)/L-057/Assignment/16-17
Maximum Marks	:	50
Weightage	:	25%
Last Dates for Submission	:	15th October, 2016 (For July 2016 Session)
		15th April, 2017 (For January 2017 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.

1. Create a website for an e-commerce company selling only the electronic goods. The website uses divisions and an external CSS file. Every page of the website is divided into four divisions namely – HEADING, FOOTER, MENU and CONTENT as displayed in the following figure:

(12 + 05 + 05 + 18 = 40Marks)
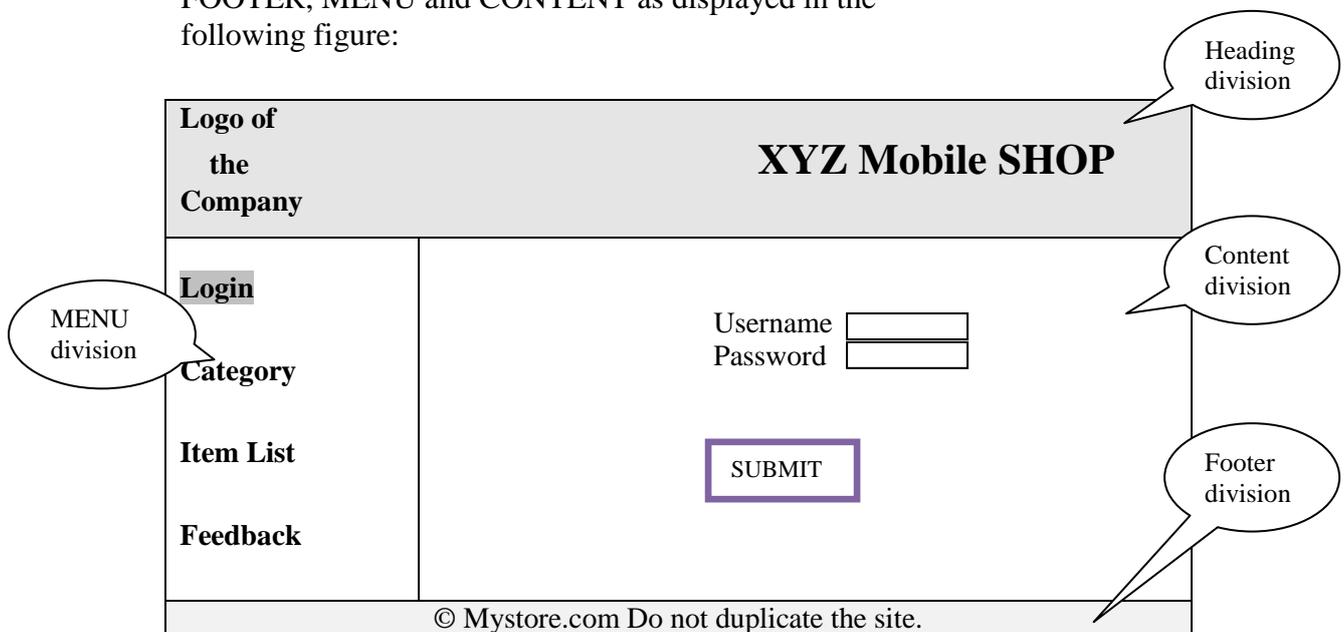
Perform the following tasks for the website as given above

(a)   Create four pages for the website viz Login, Category, Item List and Feedback; all the four pages should have same Heading, Footer and Menu division but different Content division. The Menu division should be linked to these pages. The content division of the four pages should display information as given below:

   (i) The content division of login page should display the form containing the fields as shown in the figure above, viz. Username, Password and a SUBMIT button.

   (ii) The Category page should display four categories – Mobile Phone, Laptops, iPads and Storage Devices

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(iii)The Item List displays four item names related to a category (you are requested to restrict item names to four in every category)

(iv)Feedback page displays a form asking for the name of the person, product of interest, comment and a Submit Feedback button using this CSS.

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

(c)   Create a JavaScript program that checks if any of the field in Login form is left blank when a user clicks Submit button, if so an error message is displayed and the user is taken back to Login page.

(d)   You must implement the following using jsp pages, servlets, java classes, database(s), etc. in the pages as described under:

(i) If a user presses Submit button in Login form after filling both login name and password, then this information should be checked from the Login table in the database having similar structure (you must create this table as well as create some data against which you check a Login). On successful login the category page may be displayed. (Please note that you can directly display category page from the Menu division without Login)

(ii) When you select any one category displayed in the category page then it should show related four items in the content division of the Item List page. In case you select Item List from the Menu then it should display items of any category of your choice.

(iii)The information submitted through feedback form must be stored in a database.

Course Code	:	BCSL-058
Course Title	:	Computer oriented Numerical techniques Lab
Assignment Number	:	BCA(5)/L-058/Assignment/16-17
Maximum Marks	:	50
Weightage	:	25%
Last Dates for Submission	:	15th October, 2016 (For July 2016 Session)
		15th April, 2017 (For January 2017 Session)

This assignment has eight problems of 40 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.

1. Write a program that implements (with pivot condensation) *(5 Marks)* Gaussian elimination method for solving *n* linear equations in *n* variables, that calls procedures

    (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:
    $$x+ y+z= 3$$
    $$5x+ 2y+7z=14$$
    $$3x+y+ 5z =9$$

2. Write a program that uses **Gauss-Jacobi method** to solve system of *(5 Marks)* linear equations. Use the method to solve the system of linear equations given in Q. No. 1 above.

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

4. Write a program that uses Lagrangian polynomials, for which at *(5 Marks)* most three nodes are given (hence interpolating polynomial will be at most quadratic). Use the program to find approximate value of *f* $(x) = x^4$ at x=1.5. The nodes given may be assumed as $x_0 = 1$, $x_1 = 2$, $x_2 = 3$.

5. Repeat Problem No. 4 using Newton's Interpolating polynomial *(5 Marks)*
(instead of Lagrangian Polynomial).

6. Write a program that approximates the derivative of a given *(5 Marks)*
(differentiable) function $f(x)$ *at* $x = x_0$, using forward–difference
formula. Using the program find the derivative of
$f(x) = e^x$ *at* $x = 1$.

7. Write a program that approximates the value of a definite integral *(5 Marks)*

$$\int_z^b f(x)dx$$ using **Trapezoidal Rule**, with M sample points. Find

an approximate value of the integral of sin (2 √x) using the program
with 6 intervals over the interval [1, 7].

8. Write a program that approximates the solution of the initial value *(5 Marks)*
problem: $y' = f(t, y)$ with $y(a) = y_0$ over $[a,b]$ using **Euler's**
method. Using the program to approximate the solution of the
initial value problem:

$$y' = -2ty^2 \quad \text{with} \quad y(0) = 1$$