



COCHIN UNIVERSITY OF SCIENCE AND TECHNOLOGY  
DEPARTMENT OF COMPUTER SCIENCE

Programme: II Semester Five Year Integrated M.Sc in Computer Science (Artificial Intelligence & Data Science)

Course Code & Title: 24-813-0201 Fundamentals of Programming

Name of Examination: Series I	Max. Marks: 20	Semester: II
Batch: 2024-29	Duration: 2 Hours	Date: 05.02.2025 Time: 02.00 pm– 04.00 pm

Q :1)

- a) State the difference between the declaration of a variable and the definition of a symbolic name with examples. (1 mark) [CO1, DL-2, BTL-2]
- b) Illustrate the hierarchy of operations and find the final value  
i)  $9-12/3+3*2-1$  (1 mark) [CO1, DL-2, BTL-2]
- c) Differentiate implicit type conversion and explicit type conversion with an example. (1 mark) [CO1, DL-2, BTL-2]
- d) What is the error in each of the following statements?
- (i) `if(m==1&n!=0){`  
`printf("OK");`  
`}`
- (ii) `if(x=<5){`  
`printf("Jump")`  
`}` (1 marks) [CO1, DL-1, BTL-2]
- e) The formula  $v^2=u^2+2as$  is the third equation of motion in physics. It describes how an object moves with a constant acceleration, where  
 $v$ : The final velocity of the object       $u$ : The initial velocity of the object  
 $a$ : The constant acceleration of the object  
 $s$ : The displacement or distance travelled by the object.  
Write a program to find the final velocity of the object. (2 marks) [CO1, DL-3, BTL-2]

Q:2)

- a) Assuming that  $x=5$ ,  $y=0$  and  $z=1$  initially, what will be their values after executing the following code segment (.5 marks) [CO1, DL-3, BTL-2]

```
if(x==0||x&&y){  
    if(!y){  
        z=0;}  
    else{  
        y=1;  }}}
```

- b) Assuming that  $x=2$ ,  $y=1$  and  $z=0$  initially, what will be their values after executing the following code segments? (.5 marks) [CO1, DL-3, BTL-2]

```
switch(x)
{
    case 2:
        x=1;
        y=x+1;
    case 1:
        x=0;
        break;
    default:
        x=1;
        y=0;
}
```

- c) Write a program to perform the operation of a calculator using switch case and function with arguments and no return type. (Call each arithmetic operation operations as functions in each case). (2 marks) [CO2, DL-3, BTL-4]

Q:3)

- a) Give general syntax of for loop and do while loop and write a program to find the reverse of a number. (2 mark) [CO2, DL-3, BTL-4]

Q:4)

- a) Write a program to read elements into an integer array and perform bubble sort. (2 marks) [CO2, DL-3, BTL-4]  
b) Which of the following declarations are correct? (2 marks) [CO2, DL-3, BTL-4]  
i) char name[]="John";      iii) int counter[]={2,2,2,2};  
ii) int number[3]={1,2,3,40}    iv) int m[3][5]={{0},{0},{0}}

Q:5)

- a) Write a program to perform any 4 string handling functions in an array. (2 marks) [CO2, DL-3, BTL-4]  
b) What is the output for the following codes? (.5 mark) [C02, DL1, BTL-4]  
i)      x='a';  
      printf("%d\n",x);  
c) Read a character using getchar() (.5 mark) [C02, DL1, BTL-4]

Q:6) Write a program to display sum of diagonal elements in a square matrix.

(2 marks) [CO2, DL-3, BTL-4]



COCHIN UNIVERSITY OF SCIENCE AND TECHNOLOGY  
DEPARTMENT OF COMPUTER SCIENCE

COPY



Programme: II Semester CS Minor DSC

Course Code & Title: 24-813-0202 :Computer Fundamentals 1

Name of Examination: Series I	Max. Marks: 20	Semester: II	
Batch: 2024-29	Duration: 2 Hours	Date: 18.02.2025	Time: 10:00 AM – 12:00 PM

1. A teacher, Ms. Rodriguez, has a spreadsheet with student names in column A and their test scores in column B. She wants to analyze the data to understand her class's performance.

- (a) Ms. Rodriguez wants to find the average test score. What Excel function should she use, and how would she apply it to the data in column B (assume that the test scores are in cells B2 to B20)

Or

- (b) She also wants to know the highest and lowest test scores. What Excel functions should she use for this, and how would she apply them? (assume that the test scores are in cells B2 to B20)

(3 marks) [CO2, DL-3, BTL-3]

2. An online store offers a discount if a customer meets at least one of the following conditions: they are a premium member (column D, TRUE/FALSE) or they have a coupon code (column E, TRUE/FALSE). Column F will indicate if a discount applies (TRUE/FALSE).

- (a) What Excel function should be used in column F to determine if a discount applies?  
(b) Write the Excel formula for cell F2, assuming the premium member status is in D2 and the coupon code status is in E2.

(c) If a customer is a premium member (D2 = TRUE) and does not have a coupon code (E2 = FALSE), what will be the value in cell F2, and why?

(3 marks) [CO2, DL-1, BTL-3]

3. A student, Alex, frequently writes lab reports for his science class. He always applies the same formatting: 12-point Times New Roman font, 1.5 line spacing, and a specific header and footer. He wants to automate this process.

- (a) What MS Word feature can Alex use to record and automate these repetitive formatting tasks?  
(b) Describe the basic steps Alex would apply the above MS Word feature that applies the desired formatting to a document.

(c) How can Alex run the above MS Word feature on a new lab report document?

4. Prepare a short note on if and ifs function in MS Excel with example

(2 marks) [CO2, DL-1, BTL-2]

5. Prepare a note on operating system

(4 marks) [CO1, DL-2, BTL-2]

6. Prepare a note in detail on different types of memory

(4 marks) [CO1, DL-2, BTL-2]



COCHIN UNIVERSITY OF SCIENCE AND TECHNOLOGY  
DEPARTMENT OF COMPUTER SCIENCE

Programme: II Semester CS Minor DSC

Course Code & Title: 24-813-0202 :Computer Fundamentals I

Name of Examination: Series II

Max. Marks: 20

Semester: II

Batch: 2024-29

Duration: 2 Hours

Date: 24.03.2025

Time: 10:00 AM - 12:00 PM

(ANSWER ALL QUESTIONS)

1. Define network

(1 marks) [CO4, DL-1, BTL-1]

2. Define the following objectives of computer security.

a) Confidentiality

b) Integrity

(1 marks) [CO5, DL-1, BTL-1]

3. Encrypt the message "MEET AT MIDNIGHT" using a Caesar Cipher. Decrypt the following ciphertext, which was encrypted using a Caesar Cipher: "KHOOR ZRUOG". Show the steps.

(2 marks)[CO5, DL-2,BTL-3]

4. Prepare a note on different types of data flow( different modes of data communication) between devices in network

(3 marks)[CO4, DL-2, BTL-4]

5. Prepare a note in detail on 'steps to ensure the computer security'.

(3 marks)[CO5, DL-1, BTL-2]

6. Prepare note in detail on Network topology

(10 marks) [CO4, DL-2, BTL-2]

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**Cochin University of Science and Technology  
Department of Computer Science  
Five Year Integrated MSc Degree– (DSC A)  
Computer Science (Artificial Intelligence & Data Science)-April 2025  
End Semester Examination 24-813-0201: Fundamentals of Programming  
(2024 Scheme)**

Duration: 3 Hours

Maximum Mark: 50

**Course Outcome**

On completion of the course, the student will be able to:

CO1	Understand the fundamentals of programming and learn to write programs.
CO2	Analyze the different programming structures such as decision making statements, loops, arrays and functions.
CO3	Understand the basic concepts of OOP and learn how to create and initialize objects using constructors.
CO4	Understand and analyze the different types of inheritance.
CO5	Understand the usage of polymorphism, template classes, namespaces and exception handling.

**BL – Bloom's Taxonomy Levels**

(L1- Remember, L2- Understand, L3- Apply, L4- Analyze, L5- Evaluate, L6- Create)

PSO – Program Specific Outcomes

**PART- A**

**Answer ALL Questions (10x2=20 Marks)**

Qn No	Questions	Marks	BL	CO	PSO
I (a)	What do you mean by symbolic constants? Which of the following are valid symbolic constants. <code>#define X=2.5 #define STRENGTH 100 #define MAX 200 #define N 25</code>	2	L1	CO1	1,2

(b)	Determine the value of x,y,z using the concept of precedence and associativity of operators in C . Given a=9,b=12,c=3; y=a-b/(3+c)*(2-1); z=a-(b/3(3+c)*2)-1;	2	L3	CO1	I,2
(c)	Consider the values of x=2,y=1 and z=0 initially. Determine the values of x,y,z after executing the following code.  switch(y) { case 0: x=0; y=0; case 2: x=2; z=2; default: x=1; y=2; }	2	L3	CO2	I,2
(d)	Given a code in C programming. (Assume there are no errors in the program). Differentiate strcpy() and strcat() with the help of the output of this code  char a[30] = "ASIA"; char b[20] = "PAKISTHAN"; int length1 = strlen(a); printf("%d", length1); printf("%s", a); printf("%s", b); strcpy(a, b); strcat(a, b); printf("%s", a); printf("%s", b);	2	L4	CO2	I,2
(e)	Define destructor and its properties.	2	L1	CO3	I,2,3
(f)	Describe constructor and its properties and types.	2	L2	CO3	I,2,3
(g)	Analyze friend function and friend class with its syntax.	2	L4	CO4	I,2,3

(h)	Explain the different types of inheritance in C++.	2	L2	CO4	1,2,3
(i)	Prepare a note on inline functions.	2	L3	CO5	1,2,3
(j)	Analyze the use of virtual methods and pure virtual methods	2	L2	CO5	1,2,3

### PART- B

Answer ALL Questions (5x6=30 Marks)

Qn No	Questions	Marks	BL	CO	PSO
II	What are different types of operators in C? How are each operator used?	6	L1	CO1	1,2
<b>OR</b>					
III	The straight line method of computing the yearly depreciation of the value of an item is given by $\text{Depreciation} = \frac{(\text{PurchasePrice} - \text{SalvageValue})}{\text{Years of Service}}$ Write a program to determine the salvage value of an item when the purchase price, year of service and the annual depreciation are given.	6	L1	CO1	1,2
IV	Explain how to pass an array to a function? Write a program to perform bubble sort in an array.	6	L2	CO2	1,2
<b>OR</b>					
V	Describe the concept of recursion with the help of a program to print the fibonacci series (Write each step to print fibonacci series using recursion)	6	L2	CO2	1,2
VI a)	Summarize the concept of entry controlled loops and exit controlled loop. Write a program using any loop to print the following pattern	3	L2	CO2	1,2

	1 1 2 1 2 3 1 2 3 4				
b)	Illustrate multilevel inheritance with the help of a C++ program. Give necessary comments.	3	L3	CO4	1,2,3

**OR**

VII a)	Explain the program to display the diagonal elements in a two dimensional array.	3	L2	CO2	1,2
b)	Apply your understanding of friend function and friend class in C++ to access members of a class by a nonmember function.	3	L3	CO4	1,2,3
VIII	Articulate the use of three different types of constructors with the help of C++ programs.	6	L3	CO3	1,2,3

**OR**

IX	Describe how member function defined inside a class and member function defined outside a class. Write two separate C++ programs to illustrate this.	6	L3	CO3	1,2,3
X	Analyze the concept of operator overloading using two programs that are implemented with friend function and without friend function.	6	L4	CO5	1,2,3
XI	Analyze the role of exception handling to deal with runtime errors. Elaborate with an example program. Give necessary comments.	6	L4	CO5	1,2,3

L1-10%, L2=15%. L3-15%, L4-10%



COCHIN UNIVERSITY OF SCIENCE AND TECHNOLOGY  
DEPARTMENT OF COMPUTER SCIENCE

Programme: II Semester CS MDC

Course Code & Title: 24-813-0203: Foundations of Programming

Name of Examination: Series II	Max. Marks: 20	Semester: II
Batch: 2024-26	Duration: 2 Hours	Date: 02.04.2025 Time: 11.00 AM – 1:00 PM

Answer All questions

1. Statements written in -----loop get executed for once even if the condition is false.

(1 marks) [CO1, DL-1, BTL-1]

2. Every instruction in a C program must end with \_\_\_\_\_

(1 marks) [CO1, DL-1, BTL-1]

3. Point out the errors, if any in the following program.

```
#include<stdio.h>
int main()
{
    int a,b,c;
    scanf("%d%d%d",a,b,c);
}
```

(1 marks) [CO2, DL-2, BTL-3]

4. The length and breadth of a rectangle and radius of a circle are input through the keyboard. Write a program to calculate the area and perimeter of the rectangle , and the area and circumference of the circle.

(3marks) [CO2, DL-2, BTL-3]

5. What will be the output of the following program

```
#include<stdio.h>

int main()
{
    int a=5,b=2;
    int c;
    c=a%b;
    d=a/2;
    printf("%d",c);
    printf("%d",d);
    return 0;
}
```

(1 marks) [CO2, DL-2, BTL-3]

6. What will be the output

```
int main()
{
    int i=1;
    while(i<=10)
    {
        printf("%d",i);
        i++;
    }
}
```

(1 marks) [CO2, DL-2, BTL-3]

7. Write a program to print the multiplication table of the number

(3 marks) [CO2, DL-2, BTL-3]

8. Explain while, do-while, for loop using a c program .  
( 3 marks) [CO2, DL-1, BTL-2]
9. Write a C++ program to read a student details, name, roll number and marks of 4 subjects using read function and display the sum and average of marks using display function.  
( 3 marks) [CO4, DL-2, BTL-3]
10. Write a C++ program to read ‘ n’ number of student details , name, roll number and marks of 4 subjects using read function and display the sum and average of marks using display function.

( 3 marks) [CO4, DL-2, BTL-4]

SFI-DCS



**COCHIN UNIVERSITY OF SCIENCE AND TECHNOLOGY**  
**DEPARTMENT OF COMPUTER SCIENCE**

**Programme: II Semester CS MDC**

**Course Code & Title:24-813-0203: Foundations of Programming**

Name of Examination: Series III	Max. Marks: 20	Semester: II
Batch: 2024-26	Duration: 2 Hours	Date: 10.04.2025 Time: 11.00 AM – 1:00 PM

**Answer All questions**

1. If class B is a subclass of class A, and Class C is a derived class of class B, which type of inheritance does this demonstrate?  
(1marks) [CO4, DL-2, BTL-3]
2. What is ‘constructor’ in object oriented programming ? Explain with example.  
(3 marks) [CO5, DL-1, BTL-1]
3. Write a C++ program that demonstrates single inheritance?  
(3 marks) [CO4, DL-2, BTL-3]
4. Write a C++ program for ‘function overloading’?  
(3 marks) [CO5, DL-2, BTL-2]
5. What is a ‘friend’ function. How it is used in a class  
(3marks) [CO5, DL-1, BTL-2]
6. Describe the different types of inheritance in C++.  
(7 marks) [CO4, DL-1, BTL-4]



Cochin University of Science and Technology  
Department of Computer Science

Five Year Integrated MSc Multi-Disciplinary Course – CS MDC  
End Semester  
Examination in Computer Science (Artificial Intelligence & Data Science),  
April 2025  
24-813-0203: Foundations of Programming  
(2024 Scheme)

Duration: 3 Hours

Maximum Mark: 50

Course Outcome

On completion of the course, the student will be able to:

CO1	Understand the fundamentals of programming and learn to write programs
CO2	Analyze the different programming structures such as decision-making statements, loops, arrays and functions.
CO3	Understand the basic concepts of OOP and learn how to create and initialize objects using constructors.
CO4	Understand and analyze the different types of inheritance.
CO5	Understand the usage of polymorphism, template classes, namespaces and exception handling

BL – Bloom's Taxonomy Levels

(L1- Remember, L2- Understand, L3- Apply, L4- Analyze, L5- Evaluate, L6- Create)

PO – Programme Outcome

**PART- A**  
**Answer ALL questions**

(10x2=20Marks)

Q.No	Questions	Marks	BL	CO	PSO
I (a)	What is meant by identifier and keyword in C?	2	L1	1	1
(b)	List out the comparison operators and logical operators in C with examples.	2	L1	1	1
(c)	What is a 'while' loop and how does it vary from the 'for' loop.	2	L2	2	1
(d)	Compare 'break', 'continue' and 'goto' statement.	2	L2	2	1

(e)	What is meant by the function arguments, function call and return values?	2	L2	3	1
(f)	Write a program in C to find the sum of the following series Sum=1+2+3+4+.....+n using function.	2	L3	3	2
(g)	What is the difference between constructor and destructor?	2	L1	4	1
(h)	What is the difference between class and object?	2	L1	4	1
(i)	What is polymorphism?	2	L1	5	2
(j)	Compare hybrid inheritance and multilevel inheritance.	2	L2	5	2

### PART B

(5\*6=30 Marks)

Q.No	Questions	Marks	BL	CO	PSO
II (a)	What are the differences between procedure-oriented language and object-oriented language?	3	L1	1	1
(b)	Write a C program to calculate the sum of numbers from 1 to 100.	3	L2	1	1
<b>OR</b>					
III (a)	Write a simple calculator program using 'switch' statement in C.	3	L3	1	1
(b)	Write a C program to print a multiplication table of number n.	3	L2	1	1
<b>OR</b>					
IV (a)	What are the different types of loop statement used in c?	3	L1	2	1
(b)	Write a C program that implements sorting in ascending order.	3	L3	2	1
<b>OR</b>					
V (a)	Write C program to find largest of n numbers.	3	L2	2	1
(b)	Write a program in C to find the square of the numbers from 1 to 50 using (i) for loop (ii) while loop (iii) do... While loop	3	L2	2	1
<b>OR</b>					
VI (a)	Explain the concepts of 'function without argument and return value', 'function with argument and no return value', 'function with argument and return value' with examples.	4	L4	3	2
(b)	Write a C program to find factorial of a number using function	2	L3	3	1
<b>OR</b>					
VII (a)	Write a program in C to find area, perimeter of a rectangle and circle using function.	3	L2	3	1
(b)	Write C program to print prime numbers using function.	3	L3	3	1

VIII(a)	What is the difference between a constructor and a regular member function and write a C++ program that demonstrates the use of a constructor.	3	L4	4	2
(b)	Write a C++ program that defines a class called "Bank Account" with data members for account number and balance and member functions to deposit and withdraw money.	3	L3	4	2
<b>OR</b>					
IX (a)	Write a C++ program that defines a class called 'student' with data members name, roll number and marks of 4 subjects and member functions to calculate sum and average of marks of n number of students.	3	L3	4	2
(b)	Write a C++ program that defines a class called 'Rectangle' with data members for width and height and member functions to calculate area and perimeter.	3	L3	4	2
X (a)	Describe the different types of inheritance in object-oriented programming.	6	L4	5	2
XI (a)	Explain function overloading and operator overloading with examples.	6	L4	5	2

L1- 20%, L2- 27%, L3-25%, L4-28%



Cochin University of Science And Technology  
Department of Computer Science

Five Year Integrated MSc Minor Degree/ Discipline Mention – DSC B)  
End Semester  
Examination in Computer Science (Artificial Intelligence & Data Science),  
April 2025  
24-813-0202: Computer Fundamentals 1  
(2024 Scheme)

Duration: 3 Hours

Maximum Mark: 50

**Course Outcome**

On completion of the course, the student will be able to:

CO1	Understanding of the basic components of a computer system, including the CPU, memory, and storage
CO2	Gain proficiency in using common operating systems such as Windows or Linux
CO3	Acquire basic skills in computer programming and algorithmic thinking
CO4	Understand fundamental concepts of computer networking, including protocols, topologies, and network devices.
CO5	Know ethical issues related to computer technology, including privacy, intellectual property, and social implications of automation

BL – Bloom’s Taxonomy Levels

(L1- Remember, L2- Understand, L3- Apply, L4- Analyse, L5- Evaluate, L6- Create)

PO – Programme Outcome

**PART- A**  
**Answer ALL questions**

(10x2=20Marks)

Q.No	Questions	Marks	BL	CO	PSO
I (a)	Differentiate between IP address and MAC address	2	L4	4	3
(b)	Differentiate between RAM and ROM	2	L4	1	1
(c)	Discuss the limitations of SMTP Protocol	2	L2	4	3
(d)	Prepare a note on MIME protocol	2	L2	4	2,3

(e)	A company hosts its website, "companywebsite.com", on a server with an IP address of 192.0.2.1. Explain the process that occurs when a user types "companywebsite.com" into their web browser, including the role of DNS.	2	L3	4	2,3
(f)	Describe a scenario where recording or creating a macro in Word could significantly improve efficiency. Outline the basic steps involved in recording a simple macro.	2	L4	2	1
(g)	Template structures in MS word contain the basic structure, formatting, styles, and sometimes boilerplate text for a specific type of document (e.g., resumes, reports, newsletters). Write down the extension of Microsoft word template file. write down the steps to insert an mathematical equation in MS Word document.	2	L1	2	1
(h)	Convert the hexadecimal color code #A3B52F into its equivalent decimal values for Red, Green, and Blue components. (#RRGGBBformat)	2	L3	3	1
(i)	A seemingly legitimate email, mimicking the company's IT department and branding, instructs an employee to reset their "expired" password via a provided link. This link leads to a fake login page closely resembling the company's official one. The employee enters their credentials, unknowingly compromising their account. Identify the specific type of cyberattack described in this scenario. Outline at least three distinct technical security measures the company can implement to mitigate the risk of such attacks targeting its employees.	2	L3	5	2,4
(j)	Using the Row Transposition Cipher with the keyword MALABAR, encrypt Bidder A's message: HIGHESTBIDDERWINSAGREEDPRICE. Show the grid formation and the column rearrangement based on the alphabetical order of the letters in the keyword.	2	L3	5	2

## PART B

**(5\*6=30 Marks)**

Q.No	Questions	Marks	BL	CO	PSO
II (a)	<p>An online retailer has a list of products with their details in an Excel sheet. They need a way to quickly find the price of a product by entering its name into a specific cell. The data is organized as follows:</p> <ul style="list-style-type: none"> <li>• <b>Column A:</b> Product Name</li> <li>• <b>Column B:</b> Product ID</li> <li>• <b>Column C:</b> Price</li> <li>• <b>Column D:</b> Stock Quantity</li> </ul> <p>The retailer wants to be able to type a product name into cell <b>E1</b> and have the corresponding price automatically displayed in cell <b>F1</b>. Write an Excel formula using the VLOOKUP function to achieve this. Explain how the formula works. State the significance of each parameter of function.</p>	4	L3	2	1
(b)	Differentiate absolute and relative reference in MS Excel	2	L2	2	1
OR					
III (a)	<p>A small bookstore is managing its inventory in an Excel sheet. The sheet has the following columns:</p> <ul style="list-style-type: none"> <li>• <b>Column A:</b> Book Title</li> <li>• <b>Column B:</b> Author</li> <li>• <b>Column C:</b> Genre (e.g., Fiction, Non-Fiction, Sci-Fi, etc.)</li> <li>• <b>Column D:</b> Stock Quantity</li> <li>• <b>Column E:</b> Status (either "In Stock" or "Out of Stock")</li> </ul> <p>The bookstore owner wants to analyse the inventory data. They need to determine two things:</p> <ol style="list-style-type: none"> <li>1. How many books are currently "In Stock"?</li> <li>2. How many books have any information entered (Title, Author, etc.)?</li> </ol> <p>Write Excel formulas to calculate these two values. state the purpose of IFS function in MS Excel with an example .</p>	4	L3	2	1
(b)	Write the steps to change the page orientation in MS Word	2	L1	2	1
IV (a)	Give an example of instant messaging app	1	L1	4	2,3
(b)	With the help of a neat diagram explain the architecture of E mail	5	L4	4	1,2

**OR**

V (a)	Compare POP3 and IMAP Protocol	2	L1	4	1,2
(b)	With an example explain the working of SMTP Protocol	4	L2	4	1,2
VI (a)	Define operating System and explain the function of operating system	4	L1	2	1
(b)	Prepare a short note on any popular operating system	2	L2	2	1
<b>OR</b>					
VII (a)	With the help of a neat diagram explain memory hierarchy in computer.	5	L4	1	1
(b)	Define base in number system give an example	1	L2	1	1
VIII(a)	Write down the algorithm to find out public and private key in RSA algorithm	4	L3	5	2
(b)	Consider Public key $(e, n) = (7, 33)$ Private key is $(d, n) = (3, 33)$ , $p=3$ and $q=11$ , $e = 7$ , $c = 29$ . Define encryption and find out the original message message using RSA algorithm	2	L3	5	2

**OR**

IX (a)	State any two law with purpose which enforce computer privacy	2	L1	5	4
(b)	Write a note on firewall	4	L2	5	2
X (a)	With a neat diagram prepare a note on different components of data communication	3	L2	4	2,3
(b)	Write a note in detail about different types of connection	3	L1	4	2
<b>OR</b>					
XI (a)	Prepare a note on search engine in detail.	4	L2	4	2
(b)	Find out number of ports and link if we connect 6 computers in mesh topology	2	L3	4	2

L1- 20%, L2- 30%, L3-30% L4-20%

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**Cochin University of Science and Technology**  
**Department of Computer Science**  
**Five Year Integrated MSc Minor Degree—(DSC C)**  
**Computer Science (Artificial Intelligence & Data Science)-April 2025**  
**End Semester Examination 24-813-0201: Fundamentals of Programming**  
**(2024 Scheme)**

Duration: 3 Hours

Maximum Mark: 50

**Course Outcome**

On completion of the course, the student will be able to:

CO1	Understand the fundamentals of programming and learn to write programs.
CO2	Analyze the different programming structures such as decision making statements, loops, arrays and functions.
CO3	Understand the basic concepts of OOP and learn how to create and initialize objects using constructors.
CO4	Understand and analyze the different types of inheritance.
CO5	Understand the usage of polymorphism, template classes, namespaces and exception handling.

**BL – Bloom's Taxonomy Levels**

(L1- Remember, L2- Understand, L3- Apply, L4- Analyze, L5- Evaluate, L6- Create)

PSO – Program Specific Outcome

**PART- A**

**Answer ALL Questions (10x2=20 Marks)**

Qn No	Questions	Marks	BL	CO	PSO
I (a)	What are the 4 rules for naming identifiers or variables in a C program.	2	L1	CO1	1,2
(b)	Evaluate the value of k using the concept of precedence and associativity of operators in C . Given $k=2*3/4+4/4+8-2+5/8$	2	L3	CO1	1,2

(c)	Determine the output of the following program. Assume no errors in the program.  int main() { int i=4,z=12; if(i==5  z>50) printf("Hello"); else printf("Hai"); return 0; }	2	L3	CO2	1,2
(d)	Given a code in C programming. (Assume there are no errors in the program). Differentiate strcpy() and strcat() with the help of this code  char country[20] = "INDIA"; char continent[10] = "ASIA"; int length1 = strlen(country); printf("%d", length1); strcpy(country, continent); printf("%s", country); printf("%s", continent); strcat(country, continent); printf("%s", continent); printf("%s", country);	2	L4	CO2	1,2
(e)	Define Class, Objects, encapsulation and Abstraction	2	L1	CO3	1,2,3
(f)	Describe Object Oriented Programming and Procedure Oriented Programming	2	L2	CO3	1,2,3
(g)	Analyze public private and protected access specifiers in C++	2	L4	CO4	1,2,3
(h)	Explain the advantages and disadvantages of inheritance in C++?	2	L2	CO4	1,2,3
(i)	Prepare a note on polymorphism and its classification.	2	L3	CO5	1,2,3
(j)	Analyze the use of try, catch and throw in C++. How do they work together to handle run time errors.	2	L2	CO5	1,2,3

## PART- B

**Answer ALL Questions (5x6=30 Marks)**

Qn No	Questions	Marks	BL	CO	PSO
II	Why are decision making statements called branching statements? How the “if else if” ladder works. (Write syntax and an example program)	6	L1	CO1	1,2
<b>OR</b>					
III	What is type casting in C? Define implicit type casting and explicit type casting with the help of examples.	6	L1	CO1	1,2
IV	Explain the working of do..while loop and for loop with a program to find the sum of cubes of first n numbers.(Write 2 separate programs using both loops)	6	L2	CO2	1,2
<b>OR</b>					
V	Describe the concept of recursion with the help of a program to find the factorial of 5. (Write each step to calculate factorial using recursion)	6	L2	CO2	1,2
VI a)	Summarize the concept of break and continue statement.	3	L2	CO2	1,2
b)	Demonstrate the concept of multipath inheritance with a neat figure. How can ambiguity in multipath inheritance be overcome?	3	L3	CO4	1,2,3
<b>OR</b>					
VII a)	Explain the program to search an element in a one dimensional array.	3	L2	CO2	1,2
b)	Apply your understanding of different types of inheritance in C++ to explain how each type can be used in real world scenarios.	3	L3	CO4	1,2,3

VIII	Articulate the need for a friend function and friend class in C++? Illustrate with the help of programs.	6	L3	CO3	1,2,3
<b>OR</b>					
IX	Describe constructor and destructor with its properties and classifications. Illustrate with a C++ program.	6	L3	CO3	1,2,3
X	Analyze the concept of function overloading with the help of an example program.	6	L4	CO5	1,2,3

  

XI	Analyze the role of pure virtual function and abstract class in C++ with the help of a program.	6	L4	CO5	1,2,3
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L1-10%, L2-15%, L3-15%, L4-10%

SEI-DG

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**Cochin University of Science and Technology**  
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**BL – Bloom's Taxonomy Levels**

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**PSO – Program Specific Outcomes**

**PART- A**

**Answer ALL Questions (10x2=20 Marks)**

Qn No	Questions	Marks	BL	CO	PSO
I (a)	What do you mean by symbolic constants? Which of the following are valid symbolic constants. #define X=2.5 #define STRENGTH 100 #define MAX 200 #define N 25	2	L1	CO1	1,2

(b)	Determine the value of x,y,z using the concept of precedence and associativity of operators in C . Given a=9,b=12,c=3; y=a-b/(3+c)*(2-1); z=a-(b/3(3+c)*2)-1;	2	L3	CO1	1,2
(c)	Consider the values of x=2,y=1 and z=0 initially. Determine the values of x,y,z after executing the following code.  switch(y) { case 0: x=0; y=0; case 2: x=2; z=2; default: x=1; y=2; }	2	L3	CO2	1,2
(d)	Given a code in C programming. (Assume there are no errors in the program). Differentiate strcpy() and strcat() with the help of the output of this code  char a[30]=""ASIA"; char b[20]=""PAKISTHAN"; int length1=strlen(a); printf("%d",length1); printf("%s",a); printf("%s",b); strcpy(a,b); strcat(a,b); printf("%s",a); printf("%s",b);	2	L4	CO2	1,2
(e)	Define destructor and its properties.	2	L1	CO3	1,2,3
(f)	Describe constructor and its properties and types.	2	L2	CO3	1,2,3
(g)	Analyze friend function and friend class with its syntax.	2	L4	CO4	1,2,3

(h)	Explain the different types of inheritance in C++.	2	L2	CO4	1,2,3
(i)	Prepare a note on inline functions.	2	L3	CO5	1,2,3
(j)	Analyze the use of virtual methods and pure virtual methods	2	L2	CO5	1,2,3

### PART- B

Answer ALL Questions (5x6=30 Marks)

Qn No	Questions	Marks	BL	CO	PSO
II	What are different types of operators in C? How are each operator used?	6	L1	CO1	1,2
<b>OR</b>					
III	The straight line method of computing the yearly depreciation of the value of an item is given by $\text{Depreciation} = \frac{(\text{PurchasePrice} - \text{SalvageValue})}{\text{Years of Service}}$ Write a program to determine the salvage value of an item when the purchase price, year of service and the annual depreciation are given.	6	L1	CO1	1,2
IV	Explain how to pass an array to a function? Write a program to perform bubble sort in an array.	6	L2	CO2	1,2
<b>OR</b>					
V	Describe the concept of recursion with the help of a program to print the fibonacci series(Write each step to print fibonacci series using recursion)	6	L2	CO2	1,2
VI a)	Summarize the concept of entry controlled loops and exit controlled loop. Write a program using any loop to print the following pattern	3	L2	CO2	1,2

	1 1 2 1 2 3 1 2 3 4				
b)	Illustrate multilevel inheritance with the help of a C++ program. Give necessary comments.	3	L3	CO4	1,2,3

**OR**

VII a)	Explain the program to display the diagonal elements in a two dimensional array.	3	L2	CO2	1,2
b)	Apply your understanding of friend function and friend class in C++ to access members of a class by a nonmember function.	3	L3	CO4	1,2,3
VIII	Articulate the use of three different types of constructors with the help of C++ programs.	6	L3	CO3	1,2,3

**OR**

IX	Describe how member function defined inside a class and member function defined outside a class. Write two separate C++ programs to illustrate this.	6	L3	CO3	1,2,3
X	Analyze the concept of operator overloading using two programs that are implemented with friend function and without friend function.	6	L4	CO5	1,2,3

**OR**

XI	Analyze the role of exception handling to deal with runtime errors. Elaborate with an example program. Give necessary comments.	6	L4	CO5	1,2,3
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L1-10%, L2=15%, L3-15%, L4-10%

$$y = 9 - 12 / (3+3) * (2-1)$$

$$= 9 - \cancel{12} / \cancel{6} * 1$$

$$= 9 - \cancel{2} * 1$$

$$= 9 - 2$$

$$= 7$$

$$z = 9 - (12 / 3 * (3+3) * 2) - 1$$

$$= 9 - (12 / 3 * (3+3) * 2) - 1$$

$$= 9 - (12 / 3 * 6 * 2) - 1$$

$$= 9 - (4 * 6 * 2) - 1$$

$$= 9 - 48 - 1$$

$$= -39 - 1 = \underline{\underline{-40}}$$