

**EVEN SEMESTER EXAMINATION, 2023 – 24**  
**B.Tech I yr- Computer Science Engineering)**  
**Fundamentals of Computers and Programming in C**

Duration: 3:00 hrs

Max Marks: 100

*Note: - Attempt all questions. All Questions carry equal marks. In case of any ambiguity or missing data, the same may be assumed and state the assumption made in the answer.*

Q 1.	<p>Answer any four parts of the following.</p> <p>a) Explain the primary functions of an operating system.</p> <p>b) Where is a program stored before and after execution? Explain the process briefly.</p> <p>c) Define an algorithm. What are the key characteristics that make an algorithm effective?</p> <p>d) What is the difference between a flowchart and pseudocode? Provide one advantage of using each.</p> <p>e) Draw a flowchart to represent the algorithm for checking whether a given number is prime.</p> <p>f) Define source code and explain its role in program development.</p>	5x4=20
Q 2.	<p>Answer any four parts of the following.</p> <p>a) What is conditional branching? Provide an example in a programming language of your choice.</p> <p>b) Explain the concept of iteration in programming. Discuss different types of loops and their use cases. Provide code examples to illustrate your explanation.</p> <p>c) Write a program in C language that uses a for loop to print the first 10 positive integers. Explain the loop's structure and how it functions.</p> <p>d) Write a program to find the greatest common divisor (GCD) of two numbers.</p> <p>e) Explain the difference between a for loop and a while loop with examples.</p> <p>f) Explain how you would access the elements of a two-dimensional array. Provide an example.</p>	5x4=20
Q 3.	<p>Answer any two parts of the following.</p> <p>a) Write a program in C language to reverse the elements of a one-dimensional array.</p> <p>b) Explain the Bubble Sort algorithm with program. What is its time complexity in the best, average, and worst-case scenarios?</p> <p>c) Create a program that sorts an array of integers using Insertion Sort. The program should display the array before and after sorting.</p>	10x2= 20
Q 4.	<p>Answer any two parts of the following.</p> <p>a) Write a program that implements the Bubble Sort algorithm and includes a counter to track the number of swaps made.</p> <p>b) Explain the difference between call by value and call by reference. Provide an example of each.</p> <p>c) Create a program to implement Selection Sort and sort a list of strings provided by the user. Ensure the program handles different string cases (uppercase and lowercase) correctly.</p>	10x2= 20

Q 5.	Answer any two parts of the following. a) What is the Ackermann function? Explain its recursive nature and discuss its significance in computational theory. b) Write a program to implement Quick Sort or Merge Sort in C language . Test the sorting algorithm with a sample array. c) Explain the role of pointers in dynamic memory allocation. How are pointers used to allocate and deallocate memory dynamically?	10x2= 20
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**EVEN SEMESTER EXAMINATION, 2023 – 24**  
**FIRST yr B.Tech. – CSE**  
**PROGRAMMING FOR PROBLEM SOLVING (WITH C)**

Duration: 3:00 hrs

Max Marks: 100

*Note: - Attempt all questions. All Questions carry equal marks. In case of any ambiguity or missing data, the same may be assumed and state the assumption made in the answer.*

Q 1.	Answer any four parts of the following. a) Differentiate between PROM and EPROM. b) What are the major functions of operating system? c) Differentiate between syntax and logical error with example. d) What is an algorithm? What are the characteristics necessary for a sequence of instructions to qualify as an algorithm? e) What is precedence and associativity? f) Draw a flowchart for an algorithm to add all the numbers from 1 to 50.	5x4=20
Q 2.	Answer any four parts of the following. a) Write a program to check a number is even or odd. b) Differentiate between continue and break statement with example. c) Write a program to print following pattern: * ** *** d) What is the use of switch keyword? Explain with the help of example. e) Explain 2-d array with the help of suitable example. f) Write a program to concatenate two strings.	5x4=20
Q 3.	Answer any two parts of the following. a) Explain insertion sort. Differentiate between insertion sort and selection sort. b) Write an algorithm for bubble sort. Also discuss its complexity analysis. c) What do you understand with call by value and call by reference? Explain with suitable example.	10x2= 20
Q 4.	Answer any two parts of the following. a) What is recursion? Write a recursive function to find the factorial of any number. b) What is Quick sort? Write down all steps to sort the following numbers using quick sort. ( 23 , 45 , 56 , 12 , 29 , 85 , 61 , 38 ) c) Explain Pointers with example. Also differentiate between “pointer to an array” and “array of pointers”.	10x2= 20
Q 5.	Answer any two parts of the following. a) Write a program to accept and display the name, rollno and percentage of 60 students. b) What is linked list? Also explain self-referential structure with example. c) What is structure? Also explain “array of structure” with example.	10x2= 20

**III SEMESTER EXAMINATION, 2023 – 24**  
**II<sup>nd</sup> year, B Tech – Computer Science & Engineering**  
**Principles of Information Security**

Duration: 3:00 hrs

Max Marks: 100

*Note: - Attempt all questions. All Questions carry equal marks. In case of any ambiguity or missing data, the same may be assumed and state the assumption made in the answer.*

Q 1.	<p>Answer any four parts of the following.</p> <p>a) Define computer networks and explain their significance in modern computing. Provide examples of different types of computer networks.</p> <p>b) Compare and contrast the OSI and TCP/IP reference models. Highlight the key layers in each model and explain their functions.</p> <p>c) Enumerate and describe common security attacks on computer networks. Discuss how these attacks can compromise the confidentiality, integrity, and availability of data.</p> <p>d) Define security services in the context of computer networks. Provide examples of security services and explain how they contribute to network protection.</p> <p>e) Investigate and discuss emerging trends in network security. Highlight how advancements in technology are impacting the landscape of network security, and what challenges and opportunities they bring.</p> <p>f) Outline the key considerations in designing a secure computer network. Discuss the role of network architecture in achieving a balance between performance and security.</p>	5x4=20
Q 2.	<p>Answer any four parts of the following.</p> <p>a) Explain the concept of integer arithmetic and its relevance in cryptography. Provide examples to illustrate how integer arithmetic is used in cryptographic operations.</p> <p>b) Define modular arithmetic and discuss its significance in cryptography. Illustrate the process of encryption and decryption using modular arithmetic with an example.</p> <p>c) Compare and contrast traditional symmetric key ciphers. Discuss the strengths and weaknesses of substitution ciphers and transposition ciphers.</p> <p>d) Explain the RSA cryptosystem, including the key generation process, encryption, and decryption. Discuss the security features of RSA and its applications in secure communication.</p> <p>e) Provide an overview of the Elliptic Curve Cryptosystem (ECC). Explain how elliptic curves are utilized in cryptography and discuss the advantages of ECC over traditional asymmetric algorithms.</p> <p>f) Provide an introduction to asymmetric cryptography. Explain the fundamental differences between symmetric and asymmetric cryptography, highlighting scenarios where asymmetric cryptography is preferred.</p>	5x4=20
Q 3.	<p>Answer any two parts of the following.</p> <p>a) Define Message Authentication Code (MAC) and explain its role in ensuring message integrity. Describe the process of generating and verifying a MAC. Discuss scenarios in which MACs are commonly used for secure communication.</p> <p>b) Provide an in-depth explanation of SHA-512 (Secure Hash Algorithm 512-bit). Discuss the key features of SHA-512, including its hash function properties and the</p>	10x2= 20

	<p>use of padding. Explain how SHA-512 contributes to message integrity in cryptographic applications.</p> <p>c) Introduce the concept of digital signatures and their importance in message authentication. Compare digital signatures with Message Authentication Codes (MACs). Discuss the properties of a secure digital signature scheme.</p>	
Q 4.	<p>Answer any two parts of the following.</p> <p>a) Explore the principles of firewalls in network security. Discuss types (e.g., packet-filtering, stateful inspection) and their roles in preventing unauthorized access. Explain the importance of firewall placement.</p> <p>b) Compare and contrast Pretty Good Privacy (PGP) and Secure/Multipurpose Internet Mail Extensions (S/MIME) in terms of providing security at the application layer. Discuss the key features, strengths, and weaknesses of each cryptographic protocol.</p> <p>c) Explain the principles of Intrusion Detection Systems (IDS). Discuss the different types of IDS (e.g., host-based and network-based) and their respective roles in identifying and responding to security incidents. Provide examples of situations where IDS would be particularly effective.</p>	10x2= 20
Q 5.	<p>Answer any two parts of the following.</p> <p>a) Explore the importance of effective password management. Discuss best practices for creating and managing secure passwords, addressing challenges, and considering multi-factor authentication.</p> <p>b) Provide an overview of viruses and related threats. Discuss common types, impact, and countermeasures, including antivirus solutions. Evaluate limitations and propose additional mitigation strategies.</p> <p>c) Explain the key steps and considerations in implementing trusted systems. Discuss benefits and potential drawbacks.</p>	10x2= 20

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## ODD SEMESTER EXAMINATION, 2024 – 25

1<sup>st</sup> Year (1<sup>st</sup> Sem) B.Tech.

## Fundamentals of Computer &amp; Programming in C

Duration: 3:00 hrs

Max Marks: 100

*Note: - Attempt all questions. All Questions carry equal marks. In case of any ambiguity or missing data, the same may be assumed and state the assumption made in the answer.*

Q 1.	Answer any two parts of the following. (10x2= 20) a) (i) Define an algorithm and explain its characteristics with an example. (ii) Describe the components of a computer system with their roles. b) Explain the difference between a compiler and an interpreter with examples. c) Explain the concept of pseudocode with an example for finding the maximum of three numbers.
Q 2.	Answer any two parts of the following. (10x2= 20) a) (i) Explain conditional branching with an example program in C. (ii) Discuss the use of loops in programming. Provide a C program to calculate the sum of the first ten natural numbers using a loop. b) Describe arrays in C and illustrate the concept of a 2-D array with a program for matrix addition. c) Explain the differences between character arrays and strings in C with examples.
Q 3.	Answer any two parts of the following. (10x2= 20) a) (i) Write a C program to implement the Bubble Sort algorithm. Explain the working of the algorithm with an example. (ii) What is the difference between call by value and call by reference? Illustrate with a suitable program. b) Describe the concept of function prototypes and their importance in C programming. c) Write a C program to find the roots of a quadratic equation using functions.
Q 4.	Answer any two parts of the following. (10x2= 20) a) (i) Explain recursion with an example to calculate the factorial of a number in C. (ii) Describe the difference between Quick Sort and Merge Sort. Write the steps of Quick Sort. b) Define a structure in C. Write a program that uses a structure to store and display the details of a student (name, roll number, marks). c) Explain the concept of an array of structures with an example program.
Q 5.	Answer any two parts of the following. (10x2= 20) a) (i) What are pointers in C? Explain with an example program how pointers are used to access array elements. (ii) Discuss the concept of a linked list and its advantages over arrays. b) Explain basic file handling in C. Write a simple program to create and write to a file. c) Describe the use of pointers in dynamic memory allocation in C.

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## ODD SEMESTER EXAMINATION, 2024 – 25

I<sup>st</sup>Year (I Sem) B.Tech.

## PROGRAMMING FOR PROBLEM SOLVING

Duration: 3:00 hrs

Max Marks: 100

*Note: - Attempt all questions. All Questions carry equal marks. In case of any ambiguity or missing data, the same may be assumed and state the assumption made in the answer.*

Q 1.	Answer any two parts of the following. (10x2= 20) a) (i) Write a program and algorithms to find whether a number is even or odd. (ii) Explain the types of errors with suitable examples in C. b) Draw the block diagram of a digital computer and explain working of each component. c) What are computer languages? Explain types and working of each language with suitable examples.
Q 2.	Answer any two parts of the following. (10x2= 20) a) (i) Explain the ternary operator .Write a program to find the largest number using ternary operator. (ii) Explain the relational operator with suitable example. b) Explain the decision control statements with suitable example of each statement. c) Explain the differences between while, do-while, and for loops with suitable examples.
Q 3.	Answer any two parts of the following. (10x2= 20) a) (i) Write a program to find the mean of first ten numbers using an array. (ii) Write an algorithm for Bubble sort. b) What is recursion function? Write a program to calculate the Fibonacci series using recursion function. c) Explain the difference between call by value and call by references with suitable example.
Q 4.	Answer any two parts of the following. (10x2= 20) a) (i) Explain the Dynamic memory allocation with suitable example. (ii) Write a program to find the length of string using for loop. b) Explain the string handling functions with suitable example. c) What will be the output of this program? <pre>#include&lt;stdio.h&gt; int main() { int arr[] = {12, 24, 36, 48, 60, 72};   int *ptr1 = arr;   int *ptr2 = arr + 4;   printf ("ptr2 - ptr1 = %d\n", ptr2 - ptr1);   printf ("(char*)ptr2 - (char*) ptr1 = %d", (char*)ptr2 - (char*)ptr1);   getchar();   return 0; }</pre>
Q 5.	Answer any two parts of the following. (10x2= 20) a) (i)What are the difference between binary file and text file? (ii)Explain the self referential structures with suitable example. b) Explain the differences between structure and union with suitable example. c) Write a program how to read and write a data from a file in C.