1. Programming Language : 10 hrs

1. Which of the following is not a type of programming language?

a) High-level language
b) Assembly language
c) Markup language
d) Machine language

Answer: c) Markup language

2. A program that translates high-level programming code into machine language is known as a:

a) Compiler
b) Interpreter
c) Assembler
d) Linker

Answer: a) Compiler

3. Which of the following is an example of a language processor?

a) Operating system
b) Compiler
c) Editor
d) Text processor

Answer: b) Compiler

4. Which of the following is not a common type of error in a program?

a) Syntax error
b) Runtime error
c) Logical error
d) Format error

Answer: d) Format error

5. Which feature of a good program makes it easy to understand and modify?

a) Portability
b) Efficiency
c) Readability
d) Security

Answer: c) Readability

6. In which programming paradigm does a program consist of a series of statements that change the state of the program?

a) Object-oriented programming
b) Functional programming
c) Imperative programming
d) Declarative programming

Answer: c) Imperative programming

7. What is the first phase of the Software Development Life Cycle (SDLC)?

a) Design
b) Implementation
c) Testing
d) Requirement gathering

Answer: d) Requirement gathering

8. Which of the following is a system design tool used to represent the flow of data and control in a system?

a) Data flow diagram (DFD)
b) Entity relationship diagram (ERD)
c) Gantt chart
d) Use case diagram

Answer: a) Data flow diagram (DFD)

9. Which programming paradigm focuses on the use of objects and classes to model real-world entities?

a) Procedural programming
b) Object-oriented programming
c) Functional programming
d) Logic programming

Answer: b) Object-oriented programming

10. Which of the following best describes the purpose of a language processor?

a) It helps execute the program
b) It manages system resources
c) It converts code from one language to another
d) It organizes the program structure

Answer: c) It converts code from one language to another

---

2. Programming Technique : 5 hrs

1. Which programming technique focuses on developing a system by breaking it down into smaller modules that can be individually designed, developed, and tested?

a) Object-oriented programming
b) Structured programming
c) Modular programming
d) Functional programming

Answer: c) Modular programming

2. The process of starting with the high-level design and breaking it down into smaller, more detailed components is known as:

a) Top-down approach
b) Bottom-up approach
c) Iterative approach
d) Structured approach

Answer: a) Top-down approach

3. A program developed using the bottom-up approach begins with:

a) A high-level design of the system
b) Writing detailed specifications for each module
c) Testing the program
d) Building small, independent modules and combining them later

Answer: d) Building small, independent modules and combining them later

4. Which of the following describes a system where all parts are closely related and the module performs a single, well-defined task?

a) High coupling
b) Low cohesion
c) High cohesion
d) Low coupling

Answer: c) High cohesion

5. The goal of reducing the dependencies between modules, where changes in one module do not significantly affect others, is known as:

a) Cohesion
b) Coupling
c) Modularity
d) Encapsulation

Answer: b) Coupling

6. Which of the following programming paradigms encourages the use of sequence, selection, and iteration structures to improve clarity and reduce complexity?

a) Object-oriented programming
b) Structured programming
c) Event-driven programming
d) Imperative programming

Answer: b) Structured programming

7. In which technique is the outcome of each operation predictable and consistent, regardless of external factors?

a) Non-deterministic technique
b) Recursive technique

c) Deterministic technique
d) Randomized technique

Answer: c) Deterministic technique

8. If a technique produces different results each time for the same input, it is considered to be:

a) Non-deterministic
b) Iterative
c) Deterministic
d) Recursive

Answer: a) Non-deterministic

9. In iterative logic, a task is repeated by using:

a) A function calling itself
b) A loop that repeats the operation
c) Multiple modules performing different tasks
d) Sequential execution of code

Answer: b) A loop that repeats the operation

10. The use of functions calling themselves to solve a problem, such as calculating factorials, is known as:

a) Iterative logic
b) Structured programming
c) Recursion
d) Modular programming

Answer: c) Recursion

---

3. Basic concept of C : 5 hrs

1. Which of the following was the main reason for the creation of the C programming language?

a) To create a high-level programming language for system programming
b) To develop web applications
c) To improve hardware design
d) To replace assembly language completely

Answer: a) To create a high-level programming language for system programming

2. Which of the following is a feature of the C programming language?

a) Object-oriented programming support
b) High-level abstraction from hardware
c) Portability across different platforms
d) Lack of built-in support for data structures

Answer: c) Portability across different platforms

3. Which of the following is NOT an advantage of using the C programming language?

a) High performance
b) Low-level access to memory
c) No need for manual memory management
d) Portability

Answer: c) No need for manual memory management

4. What is the structure of a basic C program?

a) Header files, main function, statements
b) Main function, variables, functions
c) Preprocessor directives, functions, comments
d) Preprocessor directives, functions, header files

Answer: a) Header files, main function, statements

5. Which of the following is the purpose of C preprocessor directives?

a) To manage memory during execution
b) To include external files or define constants before compilation
c) To handle errors during program execution
d) To optimize the program for better performance

Answer: b) To include external files or define constants before compilation

6. Which of the following is an example of a C library function?

a) printf()
b) main()
c) include()
d) return()

Answer: a) printf()

7. In C programming, what is the purpose of the escape sequence `\n`?

a) To insert a tab character
b) To insert a newline character
c) To represent a null character
d) To insert a quotation mark

Answer: b) To insert a newline character

8. Which of the following is NOT a valid token in C?

a) Keywords
b) Identifiers
c) Constants
d) Functions

Answer: d) Functions

9. What type of data does the `float` data type represent in C?

a) Whole numbers
b) Characters
c) Decimal numbers
d) Boolean values

Answer: c) Decimal numbers

10. Which of the following preprocessor directives is used to include a header file in a C program?

a) #define
b) #include
c) #ifdef
d) #error

Answer: b) #include

---

4. Input and Output : 3 hrs

1. Which of the following functions is used for reading formatted input from the user in C?

a) scanf()
b) getch()
c) getchar()
d) gets()

Answer: a) scanf()

2. The function `printf()` in C is used for:

a) Reading formatted input from the user
b) Writing unformatted output to the screen
c) Writing formatted output to the screen
d) Reading unformatted input from the user

Answer: c) Writing formatted output to the screen

3. Which of the following functions reads a single character from the user without echoing it on the screen?

a) getch()
b) getchar()
c) gets()
d) scanf()

Answer: a) getch()

4. Which function is used to print a single character to the screen in C?

a) putchar()
b) printf()
c) putch()
d) getchar()

Answer: a) putchar()

5. Which of the following functions is used to display output without a newline character in C?

a) printf()
b) putchar()
c) puts()
d) getch()

Answer: b) putchar()

6. Which function in C reads a string from the user and stores it in a character array?

a) getchar()
b) getch()
c) gets()
d) scanf()

Answer: c) gets()

7. What is the difference between `getch()` and `getchar()` in C?

a) `getch()` waits for a newline, `getchar()` does not
b) `getch()` does not echo the character, `getchar()` does
c) `getch()` returns an integer, `getchar()` returns a character
d) There is no difference between the two

Answer: b) `getch()` does not echo the character, `getchar()` does

8. Which of the following functions is used for reading a character from the standard input and displaying it immediately?

a) getche()
b) getch()
c) getchar()
d) puts()

Answer: a) getche()

9. Which of the following functions in C is used to write a string with a newline character?

a) printf()
b) puts()
c) getch()
d) putchar()

Answer: b) puts()

10. Which of the following C functions is used for reading a line of text from the user?

a) scanf()
b) getch()

c) getchar()
d) gets()

Answer: d) gets()

5. Operators and Expressions : 3 hrs

1. Which of the following operators is used to add two numbers in C?

a) `*`
b) `+`
c) `-`
d) `/`

Answer: b) `+`

2. What is the result of the expression `5 > 3 && 2 < 4` in C?

a) 1 (True)
b) 0 (False)
c) Undefined
d) 5

Answer: a) 1 (True)

3. Which of the following operators is used for assigning a value to a variable in C?

a) `==`
b) `=`
c) `&&`
d) `!=`

Answer: b) `=`

4. What will be the output of the following C code:

```c
int x = 5;
printf("%d", ++x);
```

a) 5
b) 6
c) 4
d) Undefined

Answer: b) 6

5. Which operator is used for performing a bitwise AND operation in C?

a) `&&`
b) `&`
c) `|`
d) `^`

Answer: b) `&`

6. Which of the following expressions uses the conditional (ternary) operator in C?

a) `x = a + b;`
b) `x = (a > b) ? a : b;`
c) `x = a && b;`
d) `x = a | b;`

Answer: b) `x = (a > b) ? a : b;`

7. What is the output of the following code segment in C?

```c
int a = 10, b = 5;
a = a-- - --b;
printf("%d", a);
```

a) 4
b) 5
c) 6
d) Undefined

Answer: c) 6

8. Which operator is used to determine the size of a variable or data type in C?

a) `sizeof`
b) `&`
c) `sizeofof`
d) `lengthof`

Answer: a) `sizeof`

9. Which of the following is true about operator precedence in C?

a) Operators with higher precedence are evaluated first
b) Operators with lower precedence are evaluated first
c) The precedence of operators doesn't matter in C
d) Operators with equal precedence are evaluated randomly

Answer: a) Operators with higher precedence are evaluated first

10. What does type casting in C allow you to do in an expression?

a) Change the data type of a variable explicitly
b) Convert a variable to a string
c) Automatically choose the best data type
d) Perform bitwise operations

Answer: a) Change the data type of a variable explicitly

---

6. Control Structure : 6 hrs

1. Which of the following is used to control the flow of execution in a program based on certain conditions?

a) Looping structures
b) Control structures
c) Functions
d) Preprocessor directives

Answer: b) Control structures

2. Which of the following is a correct syntax for the `if` statement in C?

a) `if condition { statement; }`
b) `if (condition) statement;`
c) `if (condition) { statement; }`
d) `if condition (statement);`

Answer: c) `if (condition) { statement; }`

3. In which of the following control structures is the condition checked after the execution of the loop body?

a) `for` loop
b) `while` loop
c) `do-while` loop
d) `if-else` statement

Answer: c) `do-while` loop

4. What is the purpose of the `switch` statement in C?

a) To check multiple conditions and execute corresponding blocks of code
b) To iterate through a block of code until a condition is met
c) To compare two values and execute based on equality
d) To execute a block of code only once if the condition is true

Answer: a) To check multiple conditions and execute corresponding blocks of code

5. Which of the following statements is true about the `for` loop in C?

a) It is used when the number of iterations is not known.
b) It executes at least once regardless of the condition.
c) The initialization, condition, and increment/decrement can be specified in a single line.
d) It only executes when the condition is true.

Answer: c) The initialization, condition, and increment/decrement can be specified in a single line.

6. What happens if the condition in a `while` loop is false at the beginning?

a) The loop executes once before checking the condition.
b) The loop does not execute at all.
c) The program exits immediately.
d) The program continues to the next statement.

Answer: b) The loop does not execute at all.

7. Which statement is used to immediately exit from a loop in C?

a) `break`
b) `continue`
c) `goto`
d) `exit`

Answer: a) `break`

8. Which control structure is used to skip the current iteration and move to the next iteration of a loop?

a) `continue`
b) `break`
c) `goto`
d) `return`

Answer: a) `continue`

9. In C, a `goto` statement is used for:

a) Jumping to the beginning of the loop
b) Jumping to the next statement
c) Jumping to a specific label in the program
d) Jumping to a predefined function

Answer: c) Jumping to a specific label in the program

10. What is a nested control structure in C?

a) Using the same type of control structure inside itself
b) Using a loop inside a function
c) Using one control structure inside another control structure
d) Using `goto` inside a loop

Answer: c) Using one control structure inside another control structure

---

7. Array : 6 hrs

1. How is a one-dimensional array declared in C?

a) `int arr[10];`
b) `int arr(10);`
c) `int arr[];`
d) `array int[10];`

Answer: a) `int arr[10];`

2. Which of the following is the correct way to initialize a one-dimensional array in C?

a) `int arr = {1, 2, 3, 4, 5};`
b) `int arr[5] = {1, 2, 3, 4, 5};`

c) `int arr[5] = (1, 2, 3, 4, 5);`
d) `int arr[5] = [1, 2, 3, 4, 5];`

Answer: b) `int arr[5] = {1, 2, 3, 4, 5};`

3. How do you access the third element of an array `arr[]` in C?

a) `arr[3]`
b) `arr[2]`
c) `arr(3)`
d) `arr{3}`

Answer: b) `arr[2]` (because array indexing starts at 0)

4. What will be the value of `arr[4]` if the array is declared as `int arr[5] = {2, 4, 6, 8, 10};`?

a) 2
b) 4
c) 6
d) 10

Answer: d) 10

5. How is a multi-dimensional array declared in C?

a) `int arr[2, 3];`
b) `int arr[2][3];`
c) `int arr[2, 3][][];`
d) `int arr(2, 3);`

Answer: b) `int arr[2][3];`

6. Which sorting algorithm has the worst time complexity of $O(n^2)$ in its worst case?

a) Merge Sort
b) Quick Sort
c) Bubble Sort
d) Radix Sort

Answer: c) Bubble Sort

7. Which of the following sorting algorithms works by repeatedly finding the smallest element and placing it at the beginning of the array?

a) Merge Sort
b) Selection Sort
c) Insertion Sort
d) Quick Sort

Answer: b) Selection Sort

8. What is the time complexity of sequential (linear) search in an array?

a) O(1)
b) O(n)

c) O(log n)
d) O(n²)

Answer: b) O(n)

9. Which of the following functions is used to find the length of a string in C?

a) `strlen()`
b) `length()`
c) `strlength()`
d) `size()`

Answer: a) `strlen()`

10. Which of the following is true about a string in C?

a) A string is an array of characters ending with a null character (`'\0'`).
b) A string is an array of characters without any terminator.
c) A string is always fixed-length and cannot change.
d) A string in C is a dynamic memory structure.

Answer: a) A string is an array of characters ending with a null character (`'\0'`).

---

8. User Defined Function : 5 hrs

1. What is the main advantage of using user-defined functions in C?

a) They allow code reuse and modularity.
b) They provide faster execution.
c) They reduce memory usage.
d) They allow only integer data types.

Answer: a) They allow code reuse and modularity.

2. Which of the following is the correct syntax to define a function in C?

a) `void functionName {}`
b) `functionName() {}`
c) `returnType functionName() {}`
d) `returnType {functionName()}`

Answer: c) `returnType functionName() {}`

3. Which of the following is a valid function parameter type in C?

a) `int[]`
b) `int*`
c) `char[]`
d) All of the above

Answer: d) All of the above

4. Which statement is true about recursion in C?

a) A function cannot call itself directly or indirectly.
b) A recursive function always leads to an infinite loop.
c) A recursive function must have a base case to terminate.
d) Recursion is not allowed in C.

Answer: c) A recursive function must have a base case to terminate.

5. What happens when an array is passed to a function in C?

a) A copy of the array is passed.
b) The array is passed by reference, meaning any changes affect the original array.
c) Only the first element of the array is passed.
d) The array is passed by value.

Answer: b) The array is passed by reference, meaning any changes affect the original array.

6. Which type of function call passes the argument by reference in C?

a) Call by Value
b) Call by Reference
c) Call by Address
d) None of the above

Answer: b) Call by Reference

7. Which of the following is true about macros in C?

a) Macros are functions that are executed at runtime.
b) Macros are replaced by their definition during the preprocessing phase.
c) Macros are slower than regular functions.
d) Macros take parameters and can be recursive.

Answer: b) Macros are replaced by their definition during the preprocessing phase.

8. Which storage class keyword is used to define a variable that retains its value between function calls?

a) `auto`
b) `static`
c) `extern`
d) `register`

Answer: b) `static`

9. What is the difference between a library function and a user-defined function?

a) Library functions are predefined, while user-defined functions are written by the user.
b) Library functions can only be used once, while user-defined functions can be reused.
c) User-defined functions cannot have parameters, whereas library functions can.
d) Library functions are always faster than user-defined functions.

Answer: a) Library functions are predefined, while user-defined functions are written by the user.

10. What is the purpose of the `return` statement in a function?

a) It terminates the program.
b) It passes control to the calling function and can return a value.
c) It prevents the function from being called again.
d) It defines the function’s return type.

Answer: b) It passes control to the calling function and can return a value.

---

9. Pointer : 6 hrs

1. Which operator is used to access the value stored at a memory address in C?

a) `&`
b) `*`
c) `->`
d) `[]`

Answer: b) `*`

2. What is the correct way to declare a pointer in C?

a) `int *ptr;`
b) `ptr int*;`
c) `*ptr int;`
d) `int ptr*;`

Answer: a) `int *ptr;`

3. What does the `&` operator do in C?

a) It is used to dereference a pointer.
b) It is used to assign values to variables.
c) It returns the address of a variable.
d) It increments the pointer by one.

Answer: c) It returns the address of a variable.

4. How do you access the value stored at the memory address pointed to by a pointer `ptr`?

a) `ptr()`
b) `&ptr`
c) `*ptr`
d) `ptr[]`

Answer: c) `*ptr`

5. Which of the following is the correct syntax for pointer to pointer?

a) `int **ptr;`
b) `int *ptr*;`

c) `ptr **int;`
d) `ptr int**;`

Answer: a) `int **ptr;`

6. What is pointer arithmetic in C?

a) Incrementing or decrementing the value of the pointer
b) Performing arithmetic operations directly on the pointer values
c) Incrementing or decrementing the pointer to move between array elements
d) All of the above

Answer: d) All of the above

7. When passing a pointer to a function, what is passed to the function?

a) A copy of the value stored at the pointer
b) A copy of the pointer
c) The memory address pointed to by the pointer
d) The memory location of the pointer variable

Answer: c) The memory address pointed to by the pointer

8. How do you access an element of an array using a pointer?

a) `arr[]`
b) `*arr[]`
c) `arr[*]`
d) `*(arr + index)`

Answer: d) `*(arr + index)`

9. What is a "pointer to a string" in C?

a) An array of characters
b) A string literal
c) A pointer that stores the address of the first character of a string
d) A function that returns a string

Answer: c) A pointer that stores the address of the first character of a string

10. What is the correct way to allocate memory dynamically for an array of 5 integers in C?

a) `int *arr = malloc(5 * sizeof(int));`
b) `int *arr = new int[5];`
c) `int arr = malloc(5 * sizeof(int));`
d) `int *arr = calloc(5, sizeof(int));`

Answer: a) `int *arr = malloc(5 * sizeof(int));`

---

10. Structure : 5 hrs

1. Which of the following is the correct way to declare a structure in C?

a) `struct Person { int age; char name[20]; };`
b) `struct { int age; char name[20]; } Person;`
c) `Person { int age; char name[20]; } struct;`
d) `struct Person { int age, name[20]; };`

Answer: a) `struct Person { int age; char name[20]; };`

2. What is the correct way to access the members of a structure variable `person` in C?

a) `person.age`
b) `person->age`
c) `age.person`
d) `person:age`

Answer: a) `person.age`

3. How do you initialize a structure variable in C?

a) `struct person = { 25, "John" };`
b) `struct person = (25, "John");`
c) `struct person = { 25, 'John' };`
d) `struct person = 25, "John";`

Answer: a) `struct person = { 25, "John" };`

4. What is a nested structure in C?

a) A structure that contains another structure as its member
b) A structure that has no members
c) A structure with only one data type
d) A structure that has an array as a member

Answer: a) A structure that contains another structure as its member

5. Which of the following is the correct way to pass a structure to a function?

a) `void func(struct person p);`
b) `void func(struct person *p);`
c) `void func(struct person p[]);`
d) `void func(struct *person p);`

Answer: b) `void func(struct person *p);`

6. What happens when an array of structures is passed to a function in C?

a) The array is passed by value
b) A copy of the array is created
c) The array is passed by reference, allowing modification of original values
d) Only the first element of the array is passed

Answer: c) The array is passed by reference, allowing modification of original values

7. How do you access the members of a structure pointer in C?

a) `->` operator
b) `.` operator
c) `[]` operator
d) `&` operator

Answer: a) `->` operator

8. What is the primary difference between a structure and a union in C?

a) A structure uses more memory than a union.
b) A structure stores data of different types in the same memory location.
c) A union stores all members in different memory locations.
d) A union can only store one member at a time, while a structure can store multiple.

Answer: d) A union can only store one member at a time, while a structure can store multiple.

9. What is the correct way to define a structure that contains an array within it?

a) `struct { int arr[5]; } person;`
b) `struct { int arr[]; } person;`
c) `struct person { int arr[5]; };`
d) `struct person { int arr[]; };`

Answer: a) `struct { int arr[5]; } person;`

10. What is the purpose of bit fields in C?

a) To allocate a specific number of bits for a structure member, saving memory
b) To store large data in small memory locations
c) To perform bitwise operations on structure members
d) To convert integers into binary format

Answer: a) To allocate a specific number of bits for a structure member, saving memory

---

11. Data File Handling : 4 hrs

1. Which function is used to open a file in C?

a) `open()`
b) `fopen()`
c) `fileopen()`
d) `openfile()`

Answer: b) `fopen()`

2. What is the correct syntax for closing a file in C?

a) `close(file)`
b) `fclose(file)`
c) `fileclose()`
d) `file.close()`

Answer: b) `fclose(file)`

3. Which of the following modes is used to open a file for writing in C?

a) `"r"`
b) `"w"`
c) `"rw"`
d) `"a"`

Answer: b) `"w"`

4. Which function is used to read data from a file in C?

a) `read()`
b) `fread()`
c) `fscanf()`
d) `get()`

Answer: b) `fread()`

5. How do you write a string to a file in C?

a) `fwrite(file, string)`
b) `fprintf(file, string)`
c) `fputc(file, string)`
d) `write(file, string)`

Answer: b) `fprintf(file, string)`

6. Which of the following is used to update the content of a file in C?

a) `fwrite()`
b) `fscanf()`
c) `fseek()`
d) `fputs()`

Answer: c) `fseek()`

7. Which function is used to print the contents of a file to the console in C?

a) `printf()`
b) `print()`
c) `fprint()`
d) `fputs()`

Answer: a) `printf()`

8. What does the `ftell()` function do in C?

a) It reads a specific byte from the file.
b) It returns the current file pointer position.
c) It moves the file pointer to a specific location.
d) It closes the file.

Answer: b) It returns the current file pointer position.

9. Which function is used to randomly access a file in C?

a) `fseek()`
b) `ftell()`
c) `fread()`
d) `fopen()`

Answer: a) `fseek()`

10. How can you read a line from a file in C?

a) `fscanf()`
b) `fget()`
c) `fgets()`
d) `get()`

Answer: c) `fgets()`

---

12. Introduction to Graphics : 2 hrs

1. Which of the following is used to initialize graphics in C?

a) `initgraph()`
b) `startgraph()`
c) `graphinit()`
d) `begingraph()`

Answer: a) `initgraph()`

2. What is the first step before using graphics functions in C?

a) Setting up the color mode
b) Initializing the graphics mode
c) Defining the coordinates
d) Opening the graphics window

Answer: b) Initializing the graphics mode

3. What function is used to close the graphics mode in C?

a) `closegraph()`
b) `endgraph()`
c) `exitgraph()`
d) `shutdowngraph()`

Answer: a) `closegraph()`

4. Which header file is required to work with graphics in C?

a) `graphics.h`
b) `graph.h`
c) `draw.h`
d) `visual.h`

Answer: a) `graphics.h`

5. Which function is used to set the color of a drawing object in C graphics?

a) `setcolor()`
b) `setcolorvalue()`
c) `setfillcolor()`
d) `setdrawcolor()`

Answer: a) `setcolor()`

6. Which of the following functions is used to draw a circle in C graphics?

a) `drawcircle()`
b) `circle()`
c) `setcircle()`
d) `circleshape()`

Answer: b) `circle()`

7. Which function is used to draw a line in C graphics?

a) `drawline()`
b) `line()`
c) `setline()`
d) `draw()`

Answer: b) `line()`

8. What is the default graphics mode for a program using the `initgraph()` function in C?

a) Text mode
b) Graphics mode
c) Windowed mode
d) Turbo mode

Answer: b) Graphics mode

9. What does the `getmaxx()` function return in C graphics?

a) The maximum height of the graphics window
b) The maximum color value
c) The maximum x-coordinate for drawing
d) The maximum y-coordinate for drawing

Answer: c) The maximum x-coordinate for drawing

10. How do you set the background color in C graphics?

a) `setbgcolor()`
b) `setfillcolor()`
c) `setbkcolor()`
d) `backgroundcolor()`

Answer: c) `setbkcolor()`
