

# C Questions & Answers

1. What is C?

- C is a general-purpose, procedural programming language developed by Dennis Ritchie.

2. What are the features of C?

- Fast execution, portability, modularity, low-level access, and structured programming.

3. What is a pointer in C?

- A pointer is a variable that stores the memory address of another variable.

4. What is the difference between ``malloc()`` and ``calloc()``?

- ``malloc()`` allocates uninitialized memory, while ``calloc()`` allocates zero-initialized memory.

5. What is ``free()`` in C?

- The ``free()`` function deallocates dynamically allocated memory.

6. What is a segmentation fault?

- A segmentation fault occurs when a program tries to access restricted memory.

7. What is the difference between ``printf()`` and ``scanf()``?

- ``printf()`` prints output, while ``scanf()`` takes user input.

8. What is a structure in C?

- A structure is a user-defined data type that groups different types of variables.

9. What is a union in C?

- A union is a user-defined data type where all members share the same memory.

10. What is the difference between `==` and `=`?

- `=` is an assignment operator, while `==` is a comparison operator.

11. What is an array in C?

- An array is a collection of elements of the same data type stored in contiguous memory.

12. What is a function in C?

- A function is a block of code that performs a specific task.

13. What is recursion?

- Recursion is a technique where a function calls itself.

14. What is a header file in C?

- A header file contains declarations of functions and macros.

15. What are macros in C?

- Macros are preprocessor directives used for constant values and inline functions.

16. What is a file pointer?

- A file pointer is used to interact with files in C (`FILE *ptr`).

17. What is the difference between `getchar()` and `putchar()`?

- `getchar()` reads a character from input, while `putchar()` writes a character to output.

18. What is a static variable?

- A static variable retains its value across function calls.

19. What is an enum in C?

- An enum is a user-defined type that assigns names to integer constants.

20. What is the `volatile` keyword?

- `volatile` tells the compiler that a variable may change unexpectedly.

21. What is a memory leak?

- A memory leak occurs when dynamically allocated memory is not freed.

22. What is `typedef` in C?

- `typedef` defines an alias for a data type.

23. What is the `sizeof` operator?

- `sizeof` returns the size of a data type or variable.

24. What is a dangling pointer?

- A pointer that refers to a freed or invalid memory location.

25. What is the difference between `exit()` and `return`?

- `return` exits a function, while `exit()` terminates the entire program.

26. What is the `const` keyword?

- `const` declares variables as read-only.

27. What is pointer arithmetic?

- Pointer arithmetic allows performing operations on memory addresses.

28. What is the difference between `stack` and `heap` memory?

- Stack is for local variables, while heap is for dynamically allocated memory.

29. What is the `#define` preprocessor directive?

- `#define` creates macros that replace text before compilation.

30. What is inline function in C?

- Inline functions are expanded at the call site to optimize performance.