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| **PROGRAM** | **MASTER OF COMPUTER APPLICATIONS (MCA)** |
| **SEMESTER** | **I** |
| **COURSE CODE & NAME** | **DCA6110** |
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**Set-I**

**1. Describe the basic structure of a C program. Explain scanf() function with an example.**

**Ans 1.**

**Basic Structure of a C Program and Explanation of scanf() Function**

**Basic Structure of a C Program**

A C program typically follows a standard structure that helps organize the code and facilitates its compilation and execution. The structure is as follows:

1. **Header Files Section**: This is the first part of a C program and includes preprocessor directives such as #include to include libraries. These libraries contain predefined functions and macros that can be used in the program. For example, #include <stdio.h> is used to include the standard input-output library.
2. **Global Declaration Section**: In this section, variables, constants, or functions that need to be accessed throughout the program are declared. These are known as global variables or

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**2. What are decision control statements in C? Explain the various types of decision control statements in C programming.**

**Ans 2.**

**Decision Control Statements in C and Their Types**

Decision control statements are an essential feature of C programming that allow the program to make decisions based on conditions. These statements enable conditional execution, which means that a particular block of code is executed only if a specific condition evaluates to true. This helps in controlling the flow of the program and implementing decision-making logic.

In C, decision control statements are classified into various types, each serving a unique purpose in conditional execution.

**3. What is the purpose of storage classes in C? Discuss the different types of storage classes available in C.**

**Ans 3.**

**Purpose of Storage Classes in C and Their Types**

In C programming, storage classes define the scope, lifetime, visibility, and default initial value of variables. These characteristics dictate how and where variables can be accessed and how long they retain their values during program execution. The purpose of storage classes is to optimize memory usage, control variable accessibility, and manage variable persistence.

Storage classes play a crucial role in efficient programming by:

1. Determining whether variables are stored in memory or CPU registers.

**Set-II**

**4. What is the difference between call by value and call by reference in C? Provide an explanation of recursion with a suitable example.**

**Ans 4.**

**Difference Between Call by Value and Call by Reference, and Explanation of Recursion**

In C, functions can be invoked in two primary ways: call by value and call by reference. The difference lies in how the arguments are passed to the function and how they affect the original data.

1. **Call by Value**: In this method, a copy of the actual variable is passed to the function. Any changes made to the parameter within the function do not affect the original variable, as the function operates on a separate copy.

Example:

**5. Define pointers in C. Explain pointer arithmetic with an appropriate example.**

**Ans 5.**

**Pointers in C and Pointer Arithmetic**

Pointers in C are special variables that store the memory address of another variable. Instead of holding a value directly, a pointer points to a location in memory where the value is stored. Pointers provide a powerful way to manipulate memory directly and efficiently, allowing for tasks such as dynamic memory allocation, accessing arrays, and implementing data structures like linked lists.

A pointer is declared using the asterisk (\*) symbol, followed by the type of data it points to. For example, int \*ptr; declares a pointer to an integer.

The key operators used with pointers are:

**6. What is the difference between structure and union in C? Explain various functions used in dynamic memory allocation.**

**Ans 6.**

**AllocationDifference Between Structure and Union**

Structures and unions in C are user-defined data types that allow grouping variables of different types under one name. However, there are significant differences between them:

1. **Memory Allocation**:
   * In a structure, each member has its own memory, and the total size of the structure is the sum of the sizes of all its members.
   * In a union, all members share the same memory space, and the size of the union is