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INTRODUCTION TO C PROGRAMMING

PART A QUESTION & ANSWERS

UNIT-I

1. What is Token? **(CO1)(K2)**
   Token is a building block of a program. A C program consists of various token sand a token is either a keyword, an identifier, a constant, a string literal, or a symbol.
2. What is Keyword? **(CO1)(K2)**
   Keywords are special reserved words associated with some meaning.
3. What is keyword auto for? **(CO1)(K2)**
   By default, every local variable of the function is automatic (auto). In thebelow function both the variables „x‟ and „y‟ are automatic variables.

```
void fun()
{
int x,
auto int q;
}
```

4. What are main characteristics of C language? **(CO1)(K2)**
   C is a procedural language. The main features of C language include low-levelaccess to memory, simple set of keywords, and clean style. These features make it suitable for system programming like operating system or compiler development.

5. What are reserved words? **(CO1)(K2)**

Reserved words are words that are part of the standard C language library.This means that reserved words have special meaning and therefore cannot be used for purposes other than what it is originally intended for. Examples of reserved words are float, default, and return.

6. What are the types of C tokens? **(CO1)(K2)**C

tokens are of six types. They are, Keywords(eg:

int, while),

Identifiers (eg: main, total),

Constants (eg: 10, 20),

Strings (eg: “total”, “hello”),

Special symbols (eg: (), {}),

Operators (eg: +, /,-,*)

7. What is the use of printf() and scanf()? **(CO1)(K2)**

printf(): The printf() function is used to print the integer, character, float and stringvalues on to the screen.

Following are the format specifier:

- **%d**: It is a format specifier used to print an integer value.
- **%s**: It is a format specifier used to print a string.
- **%c**: It is a format specifier used to display a character value.
- **%f**: It is a format specifier used to display a floating point value.

scanf(): The scanf() function is used to take input from the user.

8. What is data types in C? **(CO1)(K2)**

- Data types in C language are defined as the data storage format that a variable can store a data to perform a specific operation.
- Data types are used to define a variable before to use in a program.
- Size of variable, constant and array are determined by data types.

9. What is typecasting? **(CO1)(K2)**

The typecasting is a process of converting one data type into another is known as typecasting. If we want to store the floating type value to an int type, then we will convert the data type into another data type explicitly.

(type-name) expression

10. What is the difference between variable declaration and variable definition? **(CO1)(K2)**

Declaration associates type to the variable whereas definition gives the value to the variable.

11. What are global variable and how do you declare them? **(CO1)(K1)**

Global variables are variables that can be accessed and manipulated anywhere in theprogram. To make a variable global, place the variable declaration on the upper portion of the program, just after the pre_processor directives section.

12. What is local variable in C **(CO1)(K2)**

- The variables which are having scope/life only within the function are called local variables.
- These variables are declared within the function and can‟t be accessed outside the function.

13. What is constant in C **(CO1)(K2)**

- Constants refer to fixed values. They are also called as literals.
- C Constants are also like normal variables. But, only difference is, constant values can‟t be modified by the program once they are defined. Constants may be belonging to any of the data type.

14. What are the types of constants in C? **(CO1)(K2)**

- Integer constants
- Real or Floating point constants
- Octal & Hexadecimal constants
- Character constants
- String constants
- Backslash character constants

15. What is the difference between = and == symbol? **(CO1)(K2)**

The = symbol is often used in mathematical operations. It is used to assign a valueto a given variable. On the other hand, the == symbol, also known as "equal to" or "equivalent to", is a relational operator that is used to compare two values.

PART-B

1.Describe the structure of C program with example? (13)

2.What is data type? Explain different types of data types in detail with example. (13)

3.Describe the various types of operators in ‘C’ language along with its priority. (13)

4.What is loop? Explain its types in detail with example. (13)

5.i. Create a C Program to perform swapping of two numbers (6)

ii. Create a C program to find the sum of even numbers (7)

6. Apply the various decision-making statements in a single ‘C’ program (13)

7.Write a Menu driven program in C to find the area of different shapes. (15)

UNIT -II

1) What is an Array in C language.? CO4)(K3)

A group of elements of same data type.

2) In general what is correct statement about C language arrays.An array address is the address of first element of array itself. An array size must be declared if not initialized immediately. Array size is the sum of sizes of all elements of the array.

3) What are the Types of Arrays.?

Types of arrays includes; A) int, long, float, double B) struct, enum and

C) char

4) How do An array Index starts with?

It always starts with 0.

6) What is the output of C Program.? int main() { int a[]; a[4]= {1,2,3,4}; printf("%d", a[0]); }

Output will be a Compiler error

7) What is the output of C Program.? int main() { int a[] = {1,2,3,4}; int b[4] = {5,6,7,8}; printf("%d,%d", a[0], b[0]);}

Output will be 1,5

8) What is the output of C Program.? int main() { char grade[]= {'A','B','C'}; printf("GRADE=%c, ", *grade); printf("GRADE=%d",grade); }

Output will be GRADE=A, GRADE=some address of array

9) What is the output of C program.? int main() { char grade[]= {'A','B','C'}; printf("GRADE=%d, ", *grade); printf("GRADE=%d",grade[0]); }

The output will be 65 65

10) What is the output of C program.? int main() { float marks[3]= {90.5, 92.5, 96.5}; int a=0; while(a<3) { printf("%.2f,", marks[a]);a++; } }

The resultant value will be 90.5 92.5 96.5

11) What is the output of C Program.? int main() { int a[3] = {10,12,14}; a[1]=20; int i=0; while(i<3) { printf("%d ", a[i]); i++; }

}

The output will be 10 20 14

Explanation: a[i] is (i+1) element. So a[1] changes the second element.

12) What is an array Base Address in C language.?

Base address in c include A) Base address is the address of 0th indexelement.

B) An array b[] base address is &b[0]

C) An array b[] base address can be printed with printf("%d", b);

13) What is the output of C Program with arrays and pointers.?

voidchange(int[]);

int main() { int a[3] = {20,30,40};

change(a);

printf("%d %d", *a, a[0]); }

void change(int a[]) { a[0] = 10; }

Output: 10 10

Explanation: Notice that function change () is able to change the value ofa[0] of main(). It uses Call By Reference. So changes in called function affected the original values.

14) Define an 2D array in C with two difference egs.? (CO4)(K3)

C looks a two dimensional array as an array of a one dimensional array.The 2-D array be visualized as a rectangular grid of rows and columns.

15) What is multi-dimensional array? (CO4)(K3)

An array with more than one subscript is called multi-dimensional array.In General an array with n subscripts is called n-dimensional array.

PART-B

1. Define one dimensional array? Give the syntax? Explain with example (13)
2. Describe the basic operations using array example
   i. Insertion (6)
   ii. Deletion (7)
3. Discuss basic operations in two-dimensional array
   i. Sum and print the elements in array (6)
   ii. Transpose the elements in array (7)
4. Explain in detail about type of sorting the array elements. (13) Write a C program to multiply two matrices. (13)
5. Discuss how you can evaluate Mean, Median and Mode for an array of numbers. Write a C program to evaluate Mean, Median and Mode for an array of n numbers and explain. (15)
6. Write a C program to Print the number of positive and negative
7. Values present in the array (15)
8. Write a C program to find whether the given matrix is diagonal matrix is diagonal or not. Justify the need for it. (15)

Unit-3

1. What is the difference between „a‟ and “a”?

„a‟ is a character constant and “a” is a string.

2. What is the use of „\0‟ character?

When declaring character arrays (strings), „\0‟ (NULL) character isautomatically added at end. The „\0‟ character acts as an end of character array.

3. Define Strings.

The group of characters, digit and symbols enclosed within quotes iscalled as String (or) character Arrays. Strings are always terminated with „\0‟ (NULL) character. The compiler automatically adds „\0‟ atthe end of the strings.

Example for character arrays [strings].#include
<stdio.h> main()

{

static char name1[] = {'H','e','l','l','o'}; static char name2[] = "Hello";printf("%s\n", name1);

printf("%s\n", name2);}

4. List the different methods for reading and writing a string.The different methods for reading a string are,

scanf() gets()
getchar()

getch() or getche()

5. The different methods for writing a string are,printf()

puts()

putchar()

6. Write a C program to get a string input and print it.

#include<stdio.h> #include<conio.h> void main()

{ **Output:**

Excellent

char str[20]; The given string

Excellent

gets(str);

printf("The given string\n");printf("%s",str);

}

7. What is the use of gets() function?

The gets() function allows a full line entry from the user. When theuser presses the enter key to end the input, the entire line of characters is stored to a string variable.

8. Write a C program to find the length of given string.

```
#include <stdio.h> int main()
{
char s[1000], i;
printf("Enter a string: ");
scanf("%s", s);
for(i = 0; s[i] != '\0'; ++i);
printf("Length of string: %d", i);
return 0;
}
```

Output:

Enter a string: hai

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Length of string:16

9. Write a C program to get a string input and print it.

```
#include<st
dio.h>
#include<co
nio.h>      void
main()
{
char str[20];
gets(str);
printf("The given
string\n");
printf("%s",str);
}
```

Output:

Excellent

The given string

Excellent

10. Why is it necessary to give the size of an array in an array declaration?

When an array is declared, the compiler allocates a base address and reserves enough space in the memory for all the elements of the array. The size is required to allocate the required space. Thus, the size must be mentioned.

11. What is the use of gets() function?

The gets() function allows a full line entry from the user. When the userpresses the enter key to end the input, the entire line of characters is stored to a string variable.

12. What is pointer?

Every variable in C has a name and a value associated with it. When a variable is declared, a specific block of memory within the computer is allocated to hold the value of that variable. The size of the allocated block depends on the data type. A pointer is a variable thatcontains theaddress of another variable.

PART-B

1. Describe the string handling functions in C (13)
2. What is pointer? How variable will be declared to the pointer? (13)
3. Build a C program to count the number of lines, words and characters in a given text (13)
4. Write a C program to find number of vowels, consonants, digits and whitespace in a string. (13)
5. Create a C program i. to find whether the given string is palindrome or not. (6) ii. to find out the length of given string. (7)
6. Assess in detail about various pointer arithmetic operations in detail (15)

7.Write a C program to find the frequency of a character in astring

UNIT-4

1. **What is Function? CO4 (K3)**

A function definition in C programming consists of a function headerand a function body. Return Type − A function may return a value.

2. **List out the type of function in C programming. CO4 (K3)**

Built-in Function
User-Defined Function

3. **Give the syntax of function prototype. CO4 (K3)**

returnType functionName(type1 argument1, type2 argument2, ...);

4. **Give the syntax of calling function. CO4 (K3)**

functionName(argument1, argument2, ...);

5. **Write a synyax for Function with arguments and return value CO4 (K3)**

Function declaration : int function (int);

Function call : function(x);

Function definition:

int function(int x)

{

Statemen

ts; return x;

}

6. What is static function? CO4 (K3)

They can directly refer to other static members of the class.Static member functions do not have this pointer.
Static member function can not be virtual.

7. What is recursion? CO4 (K3)

Recursion is a common method of simplifying a problem into subproblems of same type. This is called divide and conquer technique. A basic **example** of **recursion** is factorial function.

8. Difference between strcmpi() and strncmp()? CO4 (K3)

strcmp compares both the strings till null-character of either string comes whereas strncmp compares at most num characters of both strings. But if num is equal to the length of either string than strncmp behaves similar to strcmp

9. Difference between the formal argument and the actual argument

CO4 (K3)

The major difference between actual and formal arguments is that actual arguments are the source of information; calling programs pass actual arguments to called functions. The called functions access the information using correspondingformal arguments. The following piece of code demonstrates actual and formal arguments.

10. Write a Syntax of return statement. CO4 (K3)

return (expression);

11. How arguments are passed to functions in C? CO4 (K3)

The call by reference method of passing arguments to a function copies the address of an argument into the formal parameter. Inside the function, the addressis used to access the actual argument used in the call. It means the changes made to the parameter affect the passed argument.

12. What is main() function? CO4 (K3)

In C, the "main" function is treated the same as every function, it hasa return type (and in some cases accepts inputs via parameters). The only difference isthat the main function is "called" by the operating system when the user runs the program.

13. What is pre-defined function? CO4 (K3)

predefined function (plural predefined functions) (computing) Any of aset of subroutines that perform standard mathematical functions included in a programming language; either included in a program at compilation time, or called when a program is executed.

PART -B

1. List the Function Prototypes and explain it with examples (13)
2. Recall the various types of functions supported by C. Give examples for each of the C functions. (13)
3. Illustrate a program to find the factorial of a number using recursion (13)
4. Create a C program to calculate the total amount of power consumed by „n‟ devices using passing an array to a function
5. Create a Menu-driven program to count the numbers which are divisible by 3, 5 and by both using passing an array to a function
6. Explain call by value and pass by reference with an example.

UNIT-5

1. What is Structure? Write the syntax for structure.

A structure is a key word that create user defined data type in C. A structure creates a data type that can be used to group items of possibly different types into a single type.

struct structureName { dataType member1; dataType member2; ... };

2. How the members of structure object is accessed?

Array elements are accessed using the Subscript variable, Similarly Structure members are accessed using dot [.] operator.

(.) is called as "Structure member Operator".

Use this Operator in between "Structure name" & "member name"

3. What is a nested structure?

A nested structure in C is **a structure within structure**. One structure can be declared inside another structure in the same way structure members are declared inside a structure.

4. How typedef is used in structure?

The C language contains the typedef keyword **to allow users to provide alternative names for the primitive (e.g., int) and user- defined (e.g struct) data types**.

5. What is meant by Self-referential structures?

A self referential data structure is essentially **a structure definition which includes at least one member that is a pointer to the structure of its own kind**

6. Develop a structure namely Book and create array of Book structure with size of ten.

7. Invent the application of size of operator to this structure. Consider thedeclaration:

```
struct
{
char name; int num;
} student;
```

7.List the use of typedef.

A typedef may be used to simplify the declaration of a compound type (struct, union) or pointer type.[4] For example,

```
struct MyStruct {
    int data1;
    char data2;
};
```

8.Differentiate between Structure and Array.

Array refers to a collection consisting of elements of homogeneous data type. Structure refers to a collection consisting of elements of heterogeneous data type.

9.Define the meaning of Array structure.

An array of structres in C can be defined as **the collection of multiple structures variables where each variable contains information about different entities**.

PART-B

1. What is Structure? How is it different from an array? How they are defined and initialized? Explain with examples.
2. Define and declare a structure to store date, which including day, month and year
3. Construct a C program to read and display student details using structure
4. Assess in detail about the self-referential structures
5. Explain the following i. Nested structures (6) ii. Array of structures (7)
6. Create a C program to compute the age of a person using structure and functions using passing a structure to a function
7. Bring out the meaning of array of structures. Write a C program to read the following information of 60 students: student name, student roll number and marks of 5 subjects. Print the roll numbers and names of the students who have secured more than 60 percent