



Victoria University of Bangladesh

Assessment Topic:

Final Examination

Course Title: Structure Programming Language

Course Code: CSE-211

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Ans: to the question no-01 (a)

1
a

* Ans:- Function:- A function is defined as a relation between a set of inputs having one output each. In simple words, a function is a relationship between inputs where each input is related to exactly one output. Every function has a domain and codomain or range. A function is generally denoted by $f(x)$ where x is the input. The general representation of a function is $y=f(x)$.

These functions are also classified into various types, which we will discuss here, check Relations and functions lesson for more information.

* The Syntax of C-function:- The basic syntax of the C program consists of the header, main() function, variable declaration, body and return type of the program. The header is the first line in the C program with extension, h which contains macro definitions and C functions. The syntax of the programming language is the set of rules governing writing of software in C. C was the first widely successful high-level language for portable operating system development.

Ans: to the question no- 1 (b)

⑥

★ Ans:- C- Program to Calculate average for the given three numbers using function:- C program to calculate the average of 3 numbers using function in this article. The program takes three numbers from the user as input, calculates their average and prints the result on the output window.

Example:-

① Enter three numbers: 10 20 30
average of 10, 20 and 30 is: 20.000000

② Enter three numbers: 5 2 7
average of 5, 2 and 7 is: 4.666667

To calculate the average of three numbers using a user defined function, we have to create a function that takes the three numbers as argument, calculates their average and returns the result.

As the average of three numbers can be an integer or a float value, therefore, we will keep the return type of the function a float which will take care

of both integer and decimal point numbers. A float value is nothing but a decimal point value.

See implementation in the following program:

```
// C Program to find the average  
// of three numbers using a function
```

```
#include <stdio.h>
```

```
// Function declaration
```

```
float average (int, int, int):
```

```
int main () {
```

```
int num1, num2, num3;
```

```
float avg;
```

```
printf ("Enter three numbers:");
```

```
scanf ("%d %d %d", &num1, &num2, &num3);
```

```
// Get average using average () function
```

```
avg = average (num1, num2, num3);
```

```
printf ("Average of %d, %d and %d is: %f",
```

```
"Function to calculate average of three numbers  
float average (int x, int y, int z) {
```

```
float avg;
```

```
avg = (x + y + z) / 3.0;
```

```
return avg; }
```

Ans: to the question no-1 (c)

A
C
★

Ans:- The advantages of using function:- There

are many advantages of function in c are bellow —

* The use of functions makes a program more readable. It's frequently difficult to read a large program. Breaking the code down into smaller functions keeps the program restructured, understandable, and reusable.

① ★ The function can be reused countless times after it is defined.

② ★ Using a function, it is possible to reduce the size of a program by calling the using the function at different places in the program.

③ ★ Functions help in code modularity, which means that the entire code is divided into separate blocks, each of which is self contained and performs a different task. This makes each block implementation and debugging much easier.

④ ★ In top-down structured programming, dividing a program into function is more efficient and easy to understand.

⑤ ★ If you are just using the function in your program then you don't have to worry about how it works inside.

Example: printf()

2
(a)

Ans: to the question no-2 (a)

* Ans:- Array:- Array is a collection of same data type. It is used to group same data type elements, such as roll numbers, names of a class students etc. It is known as one of the data structure in C. To declare an array we should have prior info of data types and size of information.

Example:- To store marks of 10 subjects we can declare 10 size array of float data type.

float marks [10];

Note:- In array of size n index starts from 0 to n-1. To access 5th element of array, it can be accessed by marks [4]. To access nth element in array it can be accessed at (n-1)th index.

2
b

Ans: to the question no-2 (b)

★ Ans:- C-Program to find average marks obtained by a class of 30 students in a Structure programming test:- C-

Program to find average marks obtained by a class of 30 students in a structure programming test — Average marks

=

Sum / 30

Statement of C program :- This program accepts the marks obtained by 30 students of a class in a test and compute the Average marks.

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

```
}
```

```
int i;
```

```
int Avg;
```

```
int marks[40]
```

/* Array Declaration */

```
clrscr();
```

```
sum = 0;
```

```
for (i = 0; i <= 29; i++)
```

```
{ printf ("Enter marks/m");
```

```
scanf ("%d", &marks[i]);
```

/* store data in array */

```
} for (i = 0; i <= 29; i++)
```

/* Read data from an array */

```
{ sum = sum + marks[i];
```

```
Avg = sum / 30;
```

```
printf ("Average marks = %d\n", Avg);
```

/* End of main() */

Q
C

Ans: to the question no-2(c)

* Ans:- The advantages of using Array:- The advantages of using array there are bellow —

① In an array, accessing an element is very easy by using the index number.

② The search process can be applied to an array easily.

③ 2D Array is used to represent matrices.

④ Any reason a user wishes to store multiple values of similar type then the array can be used and utilized efficiently.

⑤ Arrays have low overhead.

⑥ C provides a set of built-in functions for manipulating arrays, such as sorting and searching.

⑦ C supports arrays of multiple dimensions which can be useful for representing complex data structures like matrices.

⑧ Arrays can be easily converted to pointers, which allows for passing arrays to functions as arguments or returning arrays from functions.

3
a

Ans: to the question no-3(a)

* Ans:- C- Program to calculate GCD for two positive integer:-

This GCD (Greatest Common Division) of two numbers in the C program allows the user to enter two positive integer values. Then, we are going to calculate the gcd of those two values,

Next, using the for loop, it will calculate the GCD. To find the GCD, we have to pass at least one non-zero value.

```
#include <stdio.h>

int main()
{
    int num1, num2, i, gcd;
    printf("please two integer values \n");
    for (i=1; i <= num1 && i <= num2; i++)
    {
        if (num1%i == 0 && num2%i == 0)
            gcd = i;
    }
    printf("GCD of %d and %d is = %d", num1, num2, gcd);
    return 0;
}
```

C program to GCD of two integer output
please enter two integer values

8
12
GCD of 8 and 12 is = 4

This GCD of two numbers program in C allows the user to enter two positive integer values. Next we are going to calculate the GCD of those two values using the "While Loop".

```
#include <stdio.h>
int main ()
{
    int Num1, Num2, Temp, GCD;
    printf ("please Enter two integer values\n");
    scanf ("%d %d", &Num1, &Num2);
    while (Num2 != 0) {
        Temp = Num2;
        Num2 = Num1 % Num2;
        Num1 = Temp;
    }
    GCD = Num1;
    printf ("GCD = %d", GCD);
    return 0;
}
```

Output

Enter two integer:

40

16

GCD of given integers is: 8

Process returned 0 (0x0) execution time: 12.475 s

Press any key to continue

3
6

Ans: to the question no - 3b)

★ Ans:- C- Program to calculate sum of the series using goto statements:- To calculate the sum of the digits of a number inc using goto, you can use the following statement approach:

```
#include <stdio.h>
int main() {
    int n, sum = 0;
    printf("Enter a number: ");
    scanf("%d", &n);

    while(1) {
        sum += n % 10;
        n /= 10;
        if (n == 0) {
            break;
        }
        goto LOOP;
    }
    printf("sum of the digits: %d\n", sum);
    return 0;
}
```

P.T.O

This code first reads a number from the user using `scanf()` and stores it in the `num` variable. Then it enters an infinite loop using `while (1)`. Inside the loop, it adds the last digit of `num` to `sum`, then divides `num` by `10` to remove the last digit. The loop continues until `num` becomes `0`.

The `goto` statement is used to jump to the loop label, causing the loop to continue. The `break` statement is used to exit the loop when `num` becomes `0`.

Finally, the code prints the sum of the digits using `printf()`.

4

Ans: to the question no-4 (a)

(a)

★ Ans:- C- Program to ~~test~~ test a year is "Leap year" or "NOT":- Generally a year has 365 days in a year, but a leap year has 366 days which comes after four year. Below are some points related to leap year:

① A leap year is a year, which is different than a normal year having 366 days instead of 365.

② A leap year comes once in four years, in which February month has 29 days. With this additional day in February, a year becomes a leap year.

③ Some leap years examples are- 1600, 1988, 1992, 1996 and 2000.

④ Although 1700, 1800 and 1900 are century years not leap years.

Below conditions are used to check that year is a leap year or not.

1. year must be divisible by 4

2. year is divisible by 400 and not divisible by 100.

By putting these conditions in your code, you can check year is a leap or not. If the above conditions are satisfied the year will be leap year. These conditions can be put with if-else or with && (and) and || (OR).

4

Ans: to the question no - 4(b)

⑤

* Ans:- C - Program to calculate LCM for two positive integers:- LCM is an abbreviation for Least Common Multiplier. It is the smallest positive number with no remainder that is totally divisible by both number n_1 and n_2 . LCM (a,b) or LCM(a,b). The LCM of two positive number is 360, for example 72 and 120.

We can compute the LCM of two numbers, n_1 and n_2 , using one of two methods:-

- / Making use of a while loop
- // Making use of the gcd function.

Let us now look at how to use these methods to find the LCM of two numbers, n_1 and n_2 .

* Making use of a while loop:- We can use the while loop along with the if-else statement to find the LCM of two numbers in C by following the steps outlined below:-

- ① Set the positive integer variables A and B to zero.
- ② Put the common multiple of A and B into the max variable.

③ Check to see if the maximum is divisible by both variables A and B.

④ Show max as the LCM of two numbers if max is max is divisible.

⑤ otherwise, the value of max is increased and the process returns to step 3.

⑥ Terminate the program

* Making use of the GED function; - using the following formula we can calculate the LCM of two numbers:

* $LCM = (n_1 n_2) / GCD(n_1, n_2)$, ** Where n_1 and n_2 are the two numbers. LCM must be found, and GED is the function used to find the greatest common divisor of two numbers. Let's look at how to use GED function of C

① Start

② Define the variables n_1, n_2, ged_value and lem_value .

③ Get the user's input values for n_1 & n_2 .

④ using the ged function, compute the ged_value .

⑤ Determine the lem_value as $(n_1 * n_2) / ged_value$.

⑥ Print the result as "LCM of n_1 & n_2 equals lem_value ."

⑦ End.