CS3101: Class Test 2

Duration: 45 mins **Total marks: 20**

Instructions

- All programs should be compatible with GNU C compiler.
- There will be a plagiarism check. The suspected copies will attract a deduction of marks for the problem irrespective of who is the original author of the code. Copying from internet will also be considered as plagiarism.
- Late submissions will attract marks deduction.
- You are advised to compile the code before submitting them to WeLearn. If a code does not compile at our end, marks will be deducted for the problem.
- Each program should follow a strict naming convention: **QNo.c** (e.g. Q1.c, Q2a.c etc.). Programs not adhering to the convention will not be corrected.
- All codes (.c files) should be submitted in a single zipped folder (folder name containing your WeLearn ID e.g. 17MS001) to WeLearn.
- You should put appropriate comments in the code.

1. **(Marks: 3)** Write a C program to take three integer variables as input from the console, store the minimum value in a variable *min* using `?operator` and print *min* on the console.

2. **(Marks: 2)** Eliminate `goto` statement in the following code and rewrite (an equivalent code) using `while` statement.

```c
#include<stdio.h>

int main()
{
    int i = 1;

    in: if(i > 5)
        goto out;

    printf("i = %d\n", i);
    i++;

    goto in;

    out: printf("Loop ended!\n");

    return 1;
}
```

3. **(Marks: 4)** Write a C program to take full name (first name, surname, middle name etc.) (e.g. Kripabandhu Ghosh), age (e.g. 37), Aadhaar number (e.g. 2472 3481 7699), full address: street name (e.g. 12, S.N.N. Ganguly Road), city name (Howrah), district name (Howrah), post office (Shibpur), pin code (6 digits) (e.g. 711104), state (West Bengal) and country (India) as input (in separate variables) from the console and use `sprintf` to generate a single string *Hello everyone! My name is Kripabandhu Ghosh. I am 37 years old. My Aadhaar number is 2472 3481 7699. I stay at 12, S.N.N. Ganguly Road, Howrah district, Howrah - 711104, P.O.: Shibpur, West Bengal, India*, printing it on the console.

Group	*Pentagon*	*Unicorn*	*Double Feluda*	*Three idiots*	*Sign of four*
sum	$5n$	$5n + 1$	$5n + 2$	$5n + 3$	$5n + 4$

Table 1: Group distribution

Note that during the input, (whenever applicable) space separated values should be considered; for pin code make sure exactly 6 digits are entered.

4. **(Marks: 4)** Write a C program to first take marks of three subjects (as integers) of a student as input from the console and store their sum in a variable *sum*; using `switch` statement only (you CAN NOT use `if` or any other decision making and branching statement except `switch`) print the group of the student using the scheme shown in Table 1, based on the form of the value in variable *sum*. E.g. the name of the group of the student will be *Pentagon* if the value of *sum* is of the form $5n$ and so on, where n is a positive integer.

5. **(Marks: 4)** Under old tax regime, given the the gross total income (G) of a tax payer, taxable income (T) is calculated as T = G - D_{80C} - 50% of D_{80G}, where D_{80C} denotes the deductions under Section 80C (e.g. health insurance premium) and D_{80G} denotes deduction under Section 80G (e.g. donations to NGOs). The slab-wise income tax rates are given in Table 2.

Taxable income slab	**Tax rate**
₹0 - ₹2,50,000	Nil
₹2,50,001 - ₹5,00,000	5% of taxable income
₹5,00,001 - ₹7,50,000	₹12,500 + 20% of taxable income exceeding ₹5,00,000
₹7,50,001 - ₹10,00,000	₹62,500 + 20% of taxable income exceeding ₹7,50,000
₹10,00,001 - ₹12,50,000	₹1,12,500 + 30% of taxable income exceeding ₹10,00,000
₹12,50,001 - ₹15,00,000	₹1,87,500 + 30% of taxable income exceeding ₹12,50,000
Above ₹15,00,000	₹2,62,500 + 30% of taxable income exceeding ₹15,00,000

Table 2: Income tax rates

Suppose G = ₹11,00,000, D_{80C} = ₹3,00,000 and D_{80G} = ₹2,00,000. Then, T = ₹11,00,000 - ₹3,00,000 - 50% of ₹2,00,000 = ₹7,00,000. So, using Table 2, the income tax payable (I) = ₹12,500 + 20% of taxable income exceeding ₹5,00,000 = ₹12,500 + 20% of ₹2,00,000 = ₹12,500 + ₹40,000 = ₹52,500.

Write a C program to take as input from the console, gross total income (G), D_{80C} (deductions under Section 80C) and D_{80G} (deduction under Section 80G) and using `if-else-if` statement only print income tax payable (I) on the console.

6. **(Marks: 3)** An integer number is called a palindrome number if it reads the same in both directions (e.g. 121). Write a C program to take an integer number as input from the console; if the number contains zero as a digit you must print an appropriate message on the console, otherwise print on the console if it is a palindrome number. You must use `while` statement for accessing the digits of the input number. You can not use string-handling or arrays.