

**Programming and Data Structures Laboratory | 2021-22 Autumn semester, Section 20**  
**Assignment 2 | December 21, 2021**

**Submission instructions**

\* Submit one .c file for each part of the assignment. Each of your .c files should be named as:

**<your roll number>\_A<assignment number>\_<part number>.c**

For instance, if your roll number is 21CS10023, and if you are presently doing Assignment 2 which has 4 parts, then you should submit 4 separate .c files named as:

21CS10023\_A2\_1.c    21CS10023\_A2\_2.c    21CS10023\_A2\_3.c    21CS10023\_A2\_4.c

\* Submissions must be through the course Moodle, before the end of Lab session (11:55 AM). Late submissions will be penalized / not accepted.

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1. [10 marks] Write a C program that reads two non-negative integers, a and b. Then it finds which one is larger, and decides whether the larger is divisible by the smaller. It should finally print in the terminal which one divides (or not) which one.

**Example 1**

Enter two positive integers: 18 12

Result: 12 does not divide 18.

**Example 2**

Enter two positive integers: 6 18

Result: 6 divides 18.

2. [10 marks] Write a C program which reads an integer (say x). If the integer is even then print sum of the integers from 1 to that integer (x). If integer is odd then print sum of integers from 1 to the twice of that integer (x). For example, if input is 3, then sum would be 21 or if the input is 4, then the sum would be 10.

3. [15 marks] Write a C program that reads the coordinates of the three vertices of a triangle ABC and determines whether the triangle is equilateral or isosceles or neither. In case the triangle is isosceles, your program should also report the two sides that are of equal length. You can use math library functions if required. Check the output of your program on the following triangles:

(1,1), (4,-3), (8,0)

(1,1), (4,3), (8,0)

(1.1,-2.1), (6.6,6.8), (10.0,-7.6)

(2,-2), (-4,4), (-2,0)

-----Example Output-----

Point A: 0,0

Point B: 5,0

Point C: 0,-5

The triangle is isosceles with |AB| = |AC|.

Point A: 2,3

Point B: 3,5

Point C: 5,8

The triangle is neither isosceles nor equilateral.

4. [15 marks] In a car manufacturing company, the number of cars manufactured on a day depends on which day of the week it is. Monday means Day 1, Tuesday means Day 2, ..., Sunday means Day 7. Let there be  $m$  machines in the company. You have to take  $m$  as an input from the user. Let  $n$  be the number of cars manufactured on a day.

- For Day 1,  $n$  is given by the number of available machines i.e.,  $n$  is exactly same as  $m$ .
- For Day 2,  $n$  is  $7m/4$ , rounded off to the nearest integer.
- For Day 3 and Day 6,  $k$  machines ( $k$  is user input) are kept out for maintenance, and so  $n$  becomes  $7(m-k)/4$ , rounded off to the nearest integer.
- For the other days,  $n$  is  $m$  plus a boosting factor  $f$  of  $m$ , rounded off to the nearest integer. Assume that  $f$  is a positive real number less than 1 and taken as user input.

Given the week day (1 to 7) as input, find the number of manufactured cars ( $n$ ) on that day. You should use switch-case statements.

-----Example Output-----

```
Enter the number of machines: 127
Enter the day number (1-7): 2
Number of manufactured cars = 222.
```

```
Enter the number of machines: 127
Enter the day number (1-7): 3
Enter no. of machines under maintenance: 25
Number of manufactured cars = 179.
```

```
Enter the number of machines: 127
Enter the day number (1-7): 5
Enter boosting factor: .35
Number of manufactured cars = 171.
```