

Daffodil International University

## **Department of Computer Science and Engineering**

Faculty of Science & Information Technology

Final Exam Examination, Fall 2020 @ DIU Blended Learning Center

Course Code: CSE122 (Day), Course Title: Programming & Problem Solving

Level: 1 Term: 2 Section: All

Instructor: SI Modality: Open Book Exam

Date: Wednesday- 17 December, 2020 Time: 09:00-01:00pm

Four hours (4:00) to support online open/case study based assessment Marks: 40

- The following code generates errors. Why? How the code can be fixed. Provide the full corrected code.
  (1.5+1.5+2 = 5)
  - 1. #include<stdio.h>
  - 2. struct pp{
  - 3. int x,y,z; char ch[10];
  - 4. }pp={3,2,1};
  - 5. typedef struct pp pq;
  - 6. int main(){
  - 7. struct pp p= {1,2,3,"PPS and CSE"};

- 8. structure pq={3,3,3};
- 9. struct pq q={1,"skjr",5,6};
- 10. printf("%d %d %d\n",p.x,p.y,p.z);
- 11. printf("%d %d %d\n",pp.x,pp.y,pp.z);
- 12. return 0;
- 13. }
- 2. Write a full C Program for each of the following problems:

(4+5+5+6+7=27)



This is a story of me **The\_unknown** and How I became a Junior (Currently My Big Sister, **Shehjadi Meherima Sulatana** in short **SRS**) from a senior. Alas! Now I know the reason why the proverb exists!! Oh! The proverb is "গড়া লিখা করে যে গাড়ি ঘোড়া চড়ে সে". Everyday I am getting more and more frustrated. I am starting to believe that my brain is getting damp by the second.

a) I started my B.Sc. in the Year 1991. But every year I fail at least 99 times out of 100. My Little sister SRS started her B.Sc. in 2016. She is an exceptional Talent in many ways. Finally I reached the 3rd Year last semester. But SRS is going for her Defense this semester. Both of us are studying in the same University named "Churi Kore Pass Kore". If she is successful she will join the Faculty in this University and I have to be a student of her. But to Complete her defense she has to face the Defense board where she will present her robot "G- Calculator". But this robot has a major bug. If you tell it to perform mathematical operation (i.e. addition, subtraction, division, multiplication) then it does a lot of blunder. At the time of addition it performs subtraction. It performs multiplication. It



can only perform division accurately. Now can you write a program to Calculate the output of this G-Calculator N times.

**Input:** An integer **N** (No. of Operations). Followed by an integer **A(1st input)**, a character(**Mathematical Operator + -** \* /) and another integer **B (2nd input)** in the next N line defining the equation of each N times.

Output:	Value that	will be	generated by	y the G-Calc	ulator for	each equation	on in each
line.							

Sample Input	Sample Output
3	4
7 + 3	6
3 - 2	9
4 * 5	

- b) **G-Calculator** was a failed project and SRS could not pass the final defense. I was happy but the problem is that now I am also a member of her team. But I am facing a problem with the robot. Now I want that the robot will be able to do the following:
  - Input N numbers
  - Total Unique numbers
  - Print EACH unique number and the count of each unique number in a separate line from smallest to largest
  - If the count is not even then a message saying "Round Dunia".
  - This process has to be repeated for **T** times.

**Input:** An integer **T** (No. of test cases). Then for each **T** a **M** (the number of integer values) followed by M integers in the next line.

Output: As described above.

Sample Input	Sample Output
2 9 1 2 2 4 5 4 4 2 2 8 1 2 1 2 1 2 1 2	Case 1: 4 1 1 Round Dunia 2 4 4 3 Round Dunia 5 1 Round Dunia Case 2: 1 4 2 4



c) G-Calculator wants to know how many vowels and Consonant are there in your name. Can you help.



**Input:** A line to input your full name.

Output: Number of Vowels and Consonants in your name..

Sample Input	Sample Output
Saiful Islam	There are 5 vowels There are 6 consonants

d) The\_unknown and SRS watched the news today where they found that every day some goons are killing innocent people who come to visit Dhaka City. So they decided that they will build traps at all of the goons' hideouts. A team of goons hides in a MxM building where M defines the number of floors, also the number of rooms in each floor. All the rooms in the floor are attached to one another and one can represent the building in a 2D matrix. From their Robot G-Calculator, **they** found that to instantly kill the goons in a room they have to color it with **Red**. To kill them slowly with poison they have to color it with **Blue**. But there is a third color that is Green which will not be able to kill anyone. As killing someone is not that easy, from their robot they have now received complicated steps to set the traps so that they can kill the Goons. Initially the rooms had no color. They have to start from a random room (a,b) where both a & b is less than M. Here a is the number of Floor and b is the number of rooms. The room they are in is of red color, as they want to kill the goons instantly. From there they have to set the trap in the top & bottom floors' room which is connected with their room, also left and right room of that same floor if there are any. But they can use only blue color if the room is already not colored. If any of these rooms is already colored then they have to color it with Green. Now your job is to color all the rooms such that the Red and Blue color is maximized and the Green color is minimized. But you can start coloring the top, left, right and down room if and only if you have at least 1 uncolored room in any of these four positions. Also you are not allowed to color the four rooms from any of the green or uncolored boxes. Your job is to define how many of each colors' boxes are there after you are done coloring them all. You will have only **M** a b as input. You can output any if there is more then one output.



Sample Input	Sample Output		
3 1 2	Green color box = 2 Red color box = 3		
	Blue color box = $4$		







- e) Solve the above problem using recursion.
- 3. Write a summary of your thoughts about this Course. Be sure sure to mention the following:

(2x4 = 8)

- a) Why do you think this course is important?
- b) What do you think is lacking in this course?
- c) Do you believe that C language was a good choice to teach you in this course as the world is buzzing with python or other more recent and popular languages?
- d) If you were the course teacher what would have you done differently in this course