Structure Related Problems
(Total 14 questions)

<table>
<tr><th>SL</th><th>Problem statement</th><th>Difficulty levels</th></tr>
<tr><td>1.</td><td>Write a program (WAP) to take as input the name, student ID and CGPA of a student, and prints it.

<table><tr><th>Sample input</th><th>Sample output</th></tr><tr><td>Mr. A
011131144
3.86</td><td>Name: Mr. A
Student ID: 011131144
CGPA: 3.86</td></tr></table></td><td>*</td></tr>
<tr><td>2.</td><td>Take user input N (integer). Take an array of structures Room (three integer members: num, length, width) as input. Determine the room with maximum area and show it as output.

<table><tr><th>Sample input</th><th>Sample output</th></tr><tr><td>4

101 2 3
102 4 5
133 5 2
233 1 2</td><td>102 4 5</td></tr></table></td><td>*</td></tr>
<tr><td>3.</td><td>WAP to take as input names, student IDs and CGPA of n students, and print them. Caution: Between the calls to the scanf and gets functions, call getchar() once.

<table><tr><th>Sample input</th><th>Sample output</th></tr><tr><td>3
Mr. A
011131144
3.86
Mr. B
011131155
3.76
Mr. C
011131166
3.66</td><td>Student 1: Mr. A
Student ID: 011131144
CGPA: 3.86
Student 2: Mr. B
Student ID: 011131155
CGPA: 3.76
Student 3: Mr. C
Student ID: 011131166
CGPA: 3.66</td></tr></table></td><td>*</td></tr>
</table>

4. WAP to take as input the 2D coordinates (x,y) of two points and calculate the distance between them. *

Sample input	Sample output
0 0 3 4	The distance is 5.00 unit
1 2 2 3	The distance is 1.41 unit

5. WAP to take as input the 2D coordinates (x,y) of three points and calculate the area of the triangle with the points taken as vertices. If no such triangle is possible, print "They are in the same line". *

Sample input	Sample output
0 0 0 3 3 4	The distance is 4.50 unit
0 0 0 15 0 -5	They are in the same line

6. WAP to take as input the real and imaginary parts of a complex number, and print it in a+bi form. *

Sample input	Sample output
5 6	5.00+6.00i
5 -6	5.00-6.00i

7. WAP to take as input two complex numbers, and add and subtract them. *

Sample input	Sample output
3 4 5 -2	(3+4i)+(5-2i)=8+2i (3+4i)-(5-2i)=-2+6i

8. WAP to take as input two complex numbers, and multiply them. **

Sample input	Sample output
3 4 5 -2	(3+4i)*(5-2i)=23+14i

9. WAP to take as input two complex numbers and divide them. **

Sample input	Sample output
3 4 5 -2	(3+4i)/(5-2i) = 0.24+0.89i

10. WAP to take as input the real and imaginary parts of a complex number, and calculate its modulus and argument. **

Sample input	Sample output
3 4	Modulus = 5.0000 Argument = 0.9272

11. WAP to take as input the meter and centimeter components of a length, and show the length in meter and in centimeter. *

Sample input	Sample output
3 15	Length in meter: 3.15 Length in centimeter: 315

12. WAP to take as input two lengths as their meter and centimeter components, and calculate their sum **without calculating total meter and centimeter length**. (e.g. to add 3m 33cm and 7m 70cm, you cannot add 3.33m and 7.7m. You have to add the components individually) **

Sample input	Sample output
3 33 7 70	The sum is 11 meter 40 centimeter

13. WAP to take as input the hour, minute and second components of a time interval, and show the time interval in hour, in minute and in second. **

Sample input	Sample output
3 45 48	Time interval in hour: 3.75 Time interval in minute: 225.00 Time interval in second: 13548

14. WAP to take as input the hour, minute and second components of two times of a day, and find out their difference (assume the latest time is given first). ***

Sample input	Sample output
3 45 48 1 55 50	1 49 58

15. Take user input **N** (integer). Take an array of structure **Student** (integer type **ID**, float type **CGPA**, char array type **name**) as input. Sort the students in ascending order of CGPA. Print this sorted array. *

Sample input	Sample output
3 12 3.5 rafeed 23 3.6 maruf 25 2.4 Joshim	25 2.4 Joshim 12 3.5 rafeed 23 3.2 maruf

16. Take user input **N** (integer). Take an array of structure **Student** (integer type **ID**, float type **CGPA**, char array type **name**) as input. Sort the students in ascending order of name. Print this sorted array. **

Sample input	Sample output
3 12 3.5 rafeed 23 3.2 maruf 25 2.4 Joshim	25 2.4 Joshim 23 3.2 maruf 12 3.5 rafeed

17. Take user input **N** (integer). Take an array of structure **Student** (integer type **ID**, float type **CGPA**, char array type **name**) as input. Sort the students in ascending order of CGPA. If some students have equal CGPA, then sort them in ascending order of their names. Print this sorted array. ***

Sample input	Sample output
5 12 3.5 rafeed 23 3.2 maruf 25 3.5 joshim 34 3.2 manna 10 3.2 panna	34 3.2 manna 23 3.2 maruf 10 3.2 panna 25 3.5 joshim 12 3.5 rafeed

18. Take user input **N** (integer). Take an array of structure **Student** (integer type **ID**, float type **CGPA**, char array type **name**) as input. Sort the students in ascending order of CGPA. Print all the students' information who have maximum CGPA. *

Sample input	Sample output
5 12 3.5 rafeed 23 3.2 maruf 25 3.5 Joshim 34 3.2 manna 10 3.2 panna	12 3.5 rafeed 25 3.5 Joshim