CSE 1110: Introduction to Computer Systems

Problem Set for C programming

Basic problems

Introduction to printf function

1. Write a C program that will print "Hello World!"

Sample input	Sample output
	Hello World!

2. Write a C program that will print the lines given in the sample output:

Sample input	Sample output
	Hello World! Welcome to C programming. This is going to be fun!

3. Write a C program that will print a short composition of your choice.

Introduction to variables and arithmetic operations

1. Write a C program where you will declare an integer, a floating point and a character variable, initialize them by values of your choice, and print these values.

Sample input	Sample output
	Integer value = 17 Floating point value = 3.508 Character value = W

2. Write a C program where you will declare two integer variables, initialize them by values of your choice, and perform the basic arithmetic operations on them. The basic arithmetic operations are addition (+), subtraction (-), multiplication (*), division (/) and remainder (%).

Sample input	Sample output
	18 + 7 = 25 18 – 7 = 11 18 * 7 = 126 18 / 7 = 2 18 % 7 = 4

3. Write a C program where you will declare two floating point variables, initialize them by values of your choice, and perform the basic arithmetic operations on them. Note that the remainder operation is invalid for floating point numbers.

Sample input	**Sample output**
	95.401 + 22.622 = 118.023 95.401 – 22.622 = 72.779 95.401 * 22.622 = 2158.161422 95.401 / 22.622 = 4.217178

4. Write a C program where you will declare four integer variables (say a, b, c and d), initialize them by values of your choice, and calculate a * b + (a – c) / d + b.

Sample input	**Sample output**
	21 * 15 + (21 – 34) / 6 + 15 = 327

5. Write a C program where you will declare four floating point variables (say a, b, c and d), initialize them by values of your choice, and calculate (a + b – c) * d – a / d.

Sample input	**Sample output**
	(2.3 + 5.8 – 1.1) * 3.5 – 2.3 / 3.5 = 23.842857

The scanf function and uses of arithmetic oprators

1. Write a C program where you will declare an integer and a floating point variable, input them using scanf, and print these values.

Sample input	**Sample output**
17 3.508	Integer value = 17 Floating point value = 3.508

2. Write a C program where you will declare two integer variables, input them using scanf, and perform the basic arithmetic operations on them.

Sample input	**Sample output**
18 7	18 + 7 = 25 18 – 7 = 11 18 * 7 = 126 18 / 7 = 2 18 % 7 = 4

3. Write a C program where you will declare two floating point variables, input them using scanf, and perform the basic arithmetic operations on them.

Sample input	Sample output
95.401 22.622	95.401 + 22.622 = 118.023 95.401 – 22.622 = 72.779 95.401 * 22.622 = 2158.161422 95.401 / 22.622 = 4.217178

4. Write a C program where you will declare four integer variables (say a, b, c and d), input them using scanf, and calculate a * b + (a – c) / d + b.

Sample input	Sample output
21 15 34 6	21 * 15 + (21 – 34) / 6 + 15 = 327

5. Write a C program where you will declare four floating point variables (say a, b, c and d), input them using scanf, and calculate (a + b – c) * d – a / d.

Sample input	Sample output
2.3 5.8 1.1 3.5	(2.3 + 5.8 – 1.1) * 3.5 – 2.3 / 3.5 = 23.842857

6. Write a C program which will calculate the area of a circle, given its radius. (Assume that pi = 3.14159)

Sample input	Sample output
5	Area = 78.53975

7. Write a C program which will calculate the terminal velocity of a moving body by using the following equation:

$$v = u + at$$

You have to take as input u, a and t in order. Can you figure out the data types for all the variables?

Sample input	Sample output
5 6 12	v = 77

8. Write a C program which will calculate the displacement of a moving body by using the following equation:

$$s = ut + \frac{1}{2}at^2$$

You have to take as input u, a and t in order. Have you faced any problem regarding the output?

Sample input	Sample output
5 6 12	s = 492

9. Write a C program which will take as input the height of an object in centimeters, and represent it in meter-centimeter format.

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Sample input	Sample output
157	1 meter 57 centimeter
2309	23 meter 9 centimeter

10. Write a C program which will take as input the height of an object in inches, and represent it in feet-inch format.

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Sample input	Sample output
57	4 feet 9 inch
79	6 feet 7 inch

11. Write a C program which will take as input a time interval in seconds, and represent it in hour-minute-second format.

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Sample input	Sample output
3824	1 hour 3 minute 44 second
525	0 hour 8 minute 45 second

12. Suppose that in a country, there are notes of 1, 5, 10, 50, 100 and 500 units of currencies. Write a C program which will take as input the amount of money to give, and find out the number of each note to provide this amount of money so that a minimal number of notes are given in total.

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Sample input	Sample output
1627	3 note(s) of 500 1 note(s) of 100 0 note(s) of 50 2 note(s) of 10 1 note(s) of 5 2 note(s) of 1
789	1 note(s) of 500 2 note(s) of 100 1 note(s) of 50 3 note(s) of 10 1 note(s) of 5 4 note(s) of 1

The math.h header

1. Write a C program that will take as input a floating-point number, and print the floor and the ceiling of that number.

Sample input	**Sample output**
5.7	Floor = 5 Ceiling = 6
-5.7	Floor = -6 Ceiling = -5

2. Write a C program that will take as input two floating point numbers a and b, and print the value of a^b.

Sample input	**Sample output**
3 4	81.00
5.2 1.5	11.85

3. Write a C program that will take as input an angle in radian, and calculate the sine, the cosine and the tangent of the angle.

Sample input	**Sample output**
1	Sine = 0.84 Cosine = 0.54 Tangent = 1.55
0.524	Sine = 0.50 Cosine = 0.86 Tangent = 0.57

4. Write a C program that will calculate the terminal velocity of a moving body by using the following equation:

$$v^2 = u^2 + 2as$$

You have to take as input the values of u, a and s in order, and output the value of v (not v^2).

Sample input	**Sample output**
5 6 20	v = 16.27

5. Write a C program that will solve the following quadratic equation:

$$ax^2 + bx + c = 0$$

You have to take as input the values of a, b and c in order. The solutions can be calculated by the following equation:

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Sample input	**Sample output**
1 5 6	x1 = -3.00 x2 = -2.00
1 -4 4	x1 = 2.00 x2 = 2.00