United International University (UIU)

Dept. of Computer Science & Engineering (CSE)

CSE 1110: Introduction to Computer Systems

Final Exam, Time: 45 Minutes Marks: 25

Name:
Id:

Note: Answer all the questions.

1.	Einstein's equation for the theory of relativity is as follows: $E = mc^2$ where ***E*** = energy, ***m*** = mass, ***c*** = Speed of light Write a C program that will take 2 floats (Energy and mass) as input, and print the Speed of Light as output to 3 decimal places. **Sample Input** | **Sample Output** 134.5 150.2 | 0.946 84.9 12.6 | 2.596	[5]
2.	Write a C program that can calculate the area and perimeter of a rectangle. The system first takes input of a character that can be 'A' or 'P'. If **A** is entered, the program will compute area, and if P is entered, the program will compute perimeter. To compute, the program needs to take two floating point numbers, length and width first. **Formulas:** ● *Area of a rectangle: length * width* ● *Perimeter of the rectangle: 2* (length + width)* **Sample Input** | **Sample Output** A 5.0 4.0 | The area of a rectangle is: 20.000000 P 3.0 2.0 | The perimeter of the rectangle is: 10.000000	[5]
3.	Take three **integers** as input and find the maximum value. If the maximum number is divisible by 2 print "Red Number", or if it is divisible by 3, print "Blue number", or if divisible by both 2 and 3 print, "Purple number" or if it is divisible by neither print "White number". **Sample Input** | **Sample Output** 34 45 40 | Blue Number	[5]

10 9 7	Red Number

4.	Write a C program that will take three integer numbers as input, and calculate *the maximum value* after using exactly *one addition* and exactly *one multiplication* operation among those numbers. [***Hints****:* Compute values for all three possible combinations (a+ b*c), (b+a*c), and (c+a*b) and find the maximum value.]	[5]

Sample Input	Sample Output
1 4 7	Maximum value: 29
-5 0 3	Maximum value: 3
-3 -2 -9	Maximum value: 25

5.	Write a program that will take **a positive integer** as input, find the last digit, and print all the digits from the last digit to digit 9. You must use **switch case statements** and the last digit as its input**.**	[5]

Sample Input	Sample Output
54	456789
90	0123456789
9	9
16	6789

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1. [5]

The volume of a Sphere is given by the formula: $V = \frac{4}{3}\pi r^3$ and the surface area of a Sphere is given by the formula: $A = 4\pi r^2$, where ***r*** = Radius of Sphere. **Write a program** that will take the radius of a sphere as input, and compute and print the volume and surface area of the sphere. ($\pi = 3.1416$).

Sample Input	**Sample Output**
10.5	Volume = 4849.06 , Area = 1385.45
12.9	Volume = 8992.05 , Area = 2091.17

2. [5]

A function ***f(x,y)*** can be defined as follows:

$$f(x,y) = \begin{cases} x^3 + 5xy & ; x, y < 0 \\ 4y & ; x < 0 \text{ and } y > 0 \\ \frac{1}{(x+y)} & ; x \geq 0 \end{cases}$$

Write a C program to evaluate f(x,y) following above definition. For values that are not in the mentioned range your program should output "Undefined".

Sample Input	**Sample Output**
-3.8 -2.2	-13.072
-0.6 0	Undefined
5 2	0.143

3. [5]

Take three **integers** as input and find the minimum among them. If the minimum number is odd, print "Red Number", otherwise print "Blue number".

Sample Input	**Sample Output**
34 45 40	Even, Blue Number
11 15 17	Odd, Red Number

4.	Write a C program that asks the user to input three numbers representing the lengths of the sides of a *triangle*. **Using if/else statements**, determine and print whether the triangle is valid or not. If the triangle is valid, then print "Valid Triangle.". If the triangle is invalid, print "Invalid Triangle." [***Hints**:* A triangle is valid if the sum of its two sides is greater than the third side.] **Sample Input** | **Sample Output** 2 9 10 | Valid Triangle. 1 2 3 | Invalid Triangle.	[5]
5.	Write a program that will take the last 4 digits of your student id and an operator as input. The program will determine the **last digit of your student id** and perform an operation on that digit three times, using the **switch case statements.** **Sample Input** | **Sample Output** 1145 * | 5 * 5 * 5 = 125 1123 + | 3 + 3 + 3 = 9 1128 - | 8 - 8 – 8 = - 8 1122 ? | The input is invalid	[5]