Presidential Initiative for Artificial Intelligence and Computing (PIAIC)

Batch 2 IoT (Session 09:00 - 12:00)

Internet of Things (IoT) Specialist Program

Quarter I: Rust Programming

RUST CHALLENGE

1. Calculate Area of a Circle

Write a Rust program, which accepts the radius of a circle from the user and computes the area.

Program Console Sample Output 1:
Input Radius: 0.5
Area of Circle with radius 0.5 is 0.7853981634

References: https://www.mathsisfun.com/geometry/circle-area.html

2. Check Number either positive, negative or zero

Write a Rust program to check if a number is positive, negative or zero

Program Console Sample Output 1:
Enter Number: -1
Negative Number Entered

Program Console Sample Output 2:
Integer: 3
Positive Number Entered

Program Console Sample Output 3:
Integer: 0
Zero Entered

3. Divisibility Check of two numbers

Write a Rust program to check whether a number is divisible by another number. Accept two integer values form the user

Program Console Sample Output 1:
Enter numerator: 4

Enter Denominator: 2
Number 4 is Completely divisible by 2

Program Console Sample Output 2:
Enter numerator: 7
Enter Denominator: 4
Number 7 is not Completely divisible by 4

4. Calculate Volume of a sphere

Write a Rust program to get the volume of a sphere, please take the radius as input from user

Program Console Output:
Enter Radius of Sphere: 1
Volume of the Sphere with Radius 1 is 4.18

Reference:
https://keisan.casio.com/exec/system/1223372883

5. Copy string n times

Write a Rust program to get a string which is n (non-negative integer) copies of a given string.

Program Console Output:
Enter String: Hi
How many copies of String you need: 4
4 Copies of Hi are HiHiHiHi

6. Check if number is Even or Odd

Write a Rust program to find whether a given number (accept from the user) is even or odd, print out an appropriate message to the user

Program Console Output 1:
Enter Number: 4
4 is Even

Program Console Output 2:
Enter Number: 9
9 is Odd

7. Vowel Tester

Write a Rust program to test whether a passed letter is a vowel or not

Program Console Output 1:
Enter a character: A
Letter A is Vowel

Program Console Output 2:
Enter a character: e
Letter e is Vowel

Program Console Output 3:
Enter a character: N
Letter N is not Vowel

8. Triangle area

Write a Rust program that will accept the base and height of a triangle and compute the area

Program Console Sample 1:
Enter magnitude of Triangle base: 4
Enter Magnitude of Triangle Height: 4
Area of a Triangle with Height 4 and Base 4 is 8

Reference: https://www.mathgoodies.com/lessons/vol1/area_triangle

9. Calculate Interest

Write a Rust program to compute the future value of a specified principal amount, rate of interest, and a number of years

Program Console Sample 1:
Please enter principal amount: 10000
Please Enter Rate of interest in %: 0.1
Enter number of years for investment: 5
After 5 years your principal amount 10000 over an interest rate of 0.1 % will be 16105.1

10. Euclidean distance

Write a Rust program to compute the distance between the points (x1, y1) and (x2, y2).

Program Console Sample 1:
Enter Coordinate for x1: 2
Enter Coordinate for x2: 4
Enter Coordinate for y1: 4
Enter Coordinate for y2: 4
Distance between points (2, 4) and (4, 4) is 2

Reference: https://en.wikipedia.org/wiki/Euclidean_distance

11. Feet to Centimeter Converter

Write a Rust program to convert height in feet to centimetres.

Program Console Sample 1:
Enter Height in Feet: 5
There are 152.4 Cm in 5 ft

Reference: https://www.rapidtables.com/convert/length/feet-to-cm.html

12. BMI Calculator

Write a Rust program to calculate body mass index

Program Console Sample 1:
Enter Height in Cm: 180
Enter Weight in Kg: 75
Your BMI is 23.15

Reference: https://www.thecalculatorsite.com/articles/health/bmi-formula-for-bmi-calculations.php

13. Sum of n Positive Integers

Write a Rust program to sum of the first n positive integers

Program Console Sample 1:
Enter value of n: 5
Sum of n Positive integers till 5 is 15

14. Digits Sum of a Number

Write a Rust program to calculate the sum of the digits in an integer

Program Console Sample 1:
Enter a number: 15
Sum of 1 + 5 is 6

Program Console Sample 2:
Enter a number: 1234
Sum of 1 + 2 + 3 + 4 is 10

15. Decimal to Binary Converter

Write a Rust program to convert a decimal integer to binary

Program Console Sample 1:
Enter a decimal number: 5
Binary Representation of 5 is 101

Program Console Sample 2:
Enter a decimal number: 32
Binary Representation of 32 is 100000

Reference: https://www.rapidtables.com/convert/number/decimal-to-binary.html

16. Binary to Decimal Converter

Write a program to convert binary number to Decimal number

Program Console Sample 1:
Enter a Binary number: 1101
Decimal Representation of 1101 is 13

Program Console Sample 2:
Enter a Binary number: 1001
Decimal Representation of 1001 is 9

Reference: https://www.rapidtables.com/convert/number/binary-to-decimal.html

17. Vowel and Consonants Counter

Input a text and count the occurrences of vowels and consonant

Program Console Sample 1:
Enter text: QuickBrownFoxJumpsovertheDog
Vowels: 9
Consonants: 19

18. Palindrome tester

Write a program to check whether the given input is a palindrome or not

Program Console Sample 1:
Enter text: AHA Text AHA is Palindrome

Program Console Sample 2:
Enter text: Hello Text Hello is not a Palindrome

19. Count Alphabets, Numbers and Special Characters

Write a Rust program that accepts a string and calculate the number of digits and letters

Program Console Sample 1:
Enter text: Rust 3.2
Numbers = 2
Alphabets = 6
Special Characters = 1
Spaces = 1

20. Project Calculator (!important)

Write a calculator program. A minimal calculator will support the following functions:

• numbers with decimals (not just integers)
• addition (1 + 2 is 3)
• subtraction (12 - 4 is 8)
• multiplication (33 * 2 is 66)
• division (3 / 8 is 0.375)
• exponents (2 ^ 3 is 8)
• error messages when you do something wrong

Your calculator should keep on running until explicitly told to quit. I suggest typing a zero as the first operand to cause it to quit, i.e.

Program Console Sample:
>2 + 3
5
>4 * 9
36
>0 + 2
Bye, now.

Hint:
Well, if you read in everything as a String, then you can convert to other things.

What to avoid:
Any program, which presents me with a screen like the following, will not receive a very good score.

Program Console Sample:
Enter the function you wish to perform.
1) addition
2) subtraction
3) multiplication

4) division
5) quit
Your choice:

Also, the same fate applies to any program that ever presents me with the following message:
Would you like to calculate again? (y/n)

Finally, you may use the built-in function in order to compute powers, but those that write their own will receive a much higher score.