Assignment: Practice Exercise on Basic Programming

**Questions for this assignment**

1. Write a program for finding the difference of the square of the sum and the sum of square of the first N number (where N is a user defined input that you program will take). for instance, if the user enters the number of let say 5,  
   Then you should first compute the squae of sum = (1+2+3+4+5)^2  = 225

and next you will compute the sum of square as  = (1^2  + 2^2  + 3^2  + 4^2  + 5^2)  = (1 + 4+ 9 + 16 +25 ) = 55

and finally you will compute the difference = 225 - 55 = 170.

1. Find the sum of natural numbers below number N (where N is provide by user) that are multiples of either 3 or 5.  For example, if the user enters a number N = 20 then

multiples of 3 = 3,6,9,12,15,18

multiples of 5 = 5, 10, 15

Sum = 3 + 5 + 6 + 9 + 10 + 12 + **15** + 18   (Please note that value of 15 will be counted once since it is multiple of both 3 and 5)

1. This question is about writing some code to analyze the production of an assembly line in a car factory. The assembly line have different speeds which can range from 0 (off) to 10 (maximum).  At its lowest speed that is the 1, a total of 221 cars are produced each hour. The production increases linearly with the speed. This means that when the speed is set to 4, it should produce 4 \* 221 = 884 cars per hour. However, higher speeds increase the likelihood that faulty cars are produced, which then have to be discarded. The following table shows how speed influences the success rate:

1 to 4: 100% success rate.

5 to 8: 90% success rate.

9 and 10: 77% success rate.

You are requied to write two functions for the following two scenarios.

1. Write a function called total\_production() which will calculate the assembly line's total production in some specified time given in hours, taking into account its success rate. The input to the function will be the number of hours and speed while the output will be the number of cars successfully produced without the faults.

2. Write another function called Cars\_produced\_per\_minutes(). The input to the function will be the hours and speed while the output wil be the number of cars successfully produced per minutes.

1. Palindrome is a word, verse, or sentence (such as "Able was I ere I saw Elba") or a number (such as 1881) that reads the same backward or forward. Write a function called palindrome which will check if a given string is a palindrome or not. The input to the function will be String and the output will be a bool value.
2. A Pythagorean triple **consists of three positive integers a, b, and c, such that a\*a + b\*b = c\*c**. Such a triple is commonly written as (a, b, c), and a well-known example is (3, 4, 5). Write a program that will compute the Pythagorean triplet such that a < b < c and a+b+c = 1000.
3. Write a function that implements the logic, “You can see the movie if you are 17 or older, or you’re 13 or older and have a parent’s permission.”

Use the following skeleton of the function. Remove the return false statement once you write the code inside the function

fn can\_see\_movie(age: i32, permission: bool) -> bool {

return false

}