**01\_EXPRESSIONS**

**07 Projects**

**Project 01:**

Simulate rolling two dice, three times, print the result of each dice role, this program shows how variable scope works.

**For this program we have to import random module. Random module work for generating random numbers.**

**Projects 02:**

Create a program which is continually read in mass from the user then output the equivalent energy using Einstein’s mass-energy equivalence formula (E stands for Energy, m stands for Mass and C is the speed of light.

E = mc\*\*2.

Almost 100 years ago, Albert Einstein famously discovered that mass and energy are interchangeable and are related by the above equation. You should ask the input of mass(m) in kilograms and use a constant value for the speed of light –C=299792458 m/s.

Here’s a sample run of the program (User input is in bold and italic):

Enter kilos of mass: 100

E=mc\*\*2.

M = 100 kg.

C = 299792458 m/s.

8.987551787368176e+18 joules of energy!

**Project 03:**

Convert feet to inches. Feet are an American unit of measurement. There are 12 inches per foot. Foot is the singular and feet are the plural.

**Project 04:**

Write a program to as the length of two perpendicular sides of a right triangle and outputs the length of the third side (the hypotenuse) using the Pythagorean Theorem.

The Pythagorean Theorem, named after the ancient Greek thinker, Pythagoras, is a fundamental relation in Geometry. It states that in a right triangle, the square of the hypotenuse is equal to the sum of square of the other two sides.

For instance, let’s consider a right triangle ABC, with the right angle located C. According to the Pythagorean Theorem:

BC\*\*2 = AB\*\*2 + AC\*\*2.

Your code should read in the lengths of the sides AB and AC, and that outputs the length of the hypotenuse (BC). You will probably find math.sqrt () to be useful.

Take the user input and user input must be in bold and italic.

import math # Import the math library so we can use the sqrt function

Enter the length of AB: 3

Enter the length of AC: 4

The length of BC (the hypotenuse) is: 5.0.

**Project 05:**

Ask the user for two numbers, one at a time, and then print the result of dividing the first number by the second and also the remainder of the division.

Here's a sample run of the program (user input is in bold italics):

Please enter an integer to be divided: 5

Please enter an integer to divide by: 3

The result of this division is 1 with a remainder of 2

**Project 06:**

Simulate rolling two dice, and prints results of each roll as well as the total.

# Import the random library which lets us simulate random things like dice!

import random

# Number of sides on each die to roll

NUM\_SIDES: int = 6