

MIS200 Assessment 1 Case Study

Q1. Write the code for these two equations. Let $R = 10000$, $C = 1e - 6$, $V_s = 10$

$$T = RC$$

$$V_c = V_s(1 - 10^{-\frac{t}{T}})$$

The builder will enter t.

```
In [ ]: def equation_1(t: float, R = 10000, C = 1e-6, V_s = 10) -> float:
    T = R * C
    V_c = V_s * (1 - 10**(-t / T))
    return T, V_c

t = int(input("Enter the value of t: "))
T, V_c = equation_1(t)
print("For the value of t =", t, "\nthe value of T is", T, "\nthe value of V_c is", V_c)
```

For the value of t = 10
the value of T is 0.01
the value of V_c is 10.0

Q2. Write the code to implement the equation below (ignore the units). Let $G = 6.67 \times 10^{-11}m^3kg^{-1}s^{-2}$, $r = 384e6m$

$$F_g = G. \frac{m_1.m_2}{r^2}$$

The user will enter m1 and m2.

```
In [ ]: def equation_2(m_1: float, m_2: float) -> float:
    G = 6.67e-11
    r = 384e6
    F_g = G * m_1 * m_2 / r**2
    return F_g

m_1, m_2 = float(input("Enter the value of m_1: ")), float(input("Enter the value of m_2: "))
print("For the value of m_1 =", m_1, "and the value of m_2 =", m_2, "\nthe value of F_g is", equation_2(m_1, m_2))
```

For the value of m_1 = 5.97e+24 and the value of m_2 = 7.34e+22
the value of F_g is 1.982137491861979e+20

Q3. Code the equation:

$$\left(\frac{6^{(2+a)}}{4+b}\right) + (c + 180) \times \left(\frac{b}{a}\right) \times \frac{6 + \frac{2.8}{3} - 3^{2.5}}{\frac{4}{3} \times \frac{7}{3 \times 24}}$$

The builder will enter all the parameters.

```
In [ ]: def equation_3(a: float, b: float, c: float) -> float:
    term1 = 6**(2+a)/(4+b)
    term2 = (c+180)*(b/a)*((6+(2.8/3)-3**2.5)/(4/3)*(7/(3*24)))
    return term1 + term2

a, b, c = float(input("Enter the value of a: ")), float(input("Enter the value of b: ")), float(input("Enter the value of c: "))

print("For the value of a =", a, ", b =", b, "and c =", c, "\nthe value of equation_3 is", equation_3(a, b, c))
```

For the value of a = 1.0 , b = 2.0 and c = 3.0
the value of equation_3 is -194.9836200096164

Q4. Programs to covert the following units (the builder will enter the first unit in each case):

- centimetre to millimetre
- feet to meter
- kilometres to meter
- pound to kilogram
- yard to inch

```
In [ ]: def convert(n: float, type: int) -> float:
    """_summary_
    Converts the input number to the desired type.
    type = 1: centimetre to millimetre
    type = 2: feet to meter
    type = 3: kilometres to meter
    type = 4: pound to kilogram
    type = 5: yard to inch

    Args:
        n (float): Number to convert
```

type (int): Type of conversion desired as per given values

Returns:

float: Number converted to the desired type

"""

```
if type == 1:
    return n * 10
elif type == 2:
    return n * 0.3048
elif type == 3:
    return n * 1000
elif type == 4:
    return n * 0.453592
elif type == 5:
    return n * 36
else:
    return "Invalid type"
```

```
print("Refer the following table for the conversion of the number to the desired type:")
```

```
"\n1. Centimetre to millimetre"
```

```
"\n2. Feet to meter"
```

```
"\n3. Kilometres to meter"
```

```
"\n4. Pound to kilogram"
```

```
"\n5. Yard to inch")
```

```
n, type = float(input("Enter the value of n: ")), int(input("Enter the value of type: "))
```

```
print("For the value of n =", n, "and type =", type, " conversion\nthe value of the converted number is", convert(n, type))
```

Refer the following table for the conversion of the number to the desired type:

1. Centimetre to millimetre

2. Feet to meter

3. Kilometres to meter

4. Pound to kilogram

5. Yard to inch

For the value of n = 10.0 and type = 1 conversion

the value of the converted number is 100.0

In []: