Name: Inchara Raveendra

SCU ID: 00001653600

1. Write a python function that takes a sequence of numbers and determines if all the numbers are distinct from each other or if there are any duplicates.

Solution 1

```
def test_distinct(data):
    return len(data) == len(set(data))

print(test_distinct([1,5,7,9]))
print(test_distinct([2,4,5,5,7,9]))
```

```
True
False
```

1. Write a python function to find indices of elements that are equal to zero in a numpy array.

Solution 1

```
import numpy as np

def zero_index(numpy_array):
    zero_indices = np.where(numpy_array == 0)
    return zero_indices[0]

zero_index(np.array([1,0,2,0,3,0,4,5,6,7,8]))
```

```
array([1, 3, 5])
```

1. Write a python function to find indices of elements that are equal to zero in a numpy array.

Solution 2

```
def zero_index(numpy_array):
    zero_indices = np.nonzero(numpy_array == 0)[0]
    return zero_indices

zero_index(np.array([1,0,2,0,3,0,4,5,6,7,8]))
```

```
array([1, 3, 5])
```

1. Write a python function to find indices of elements that are equal to zero in a numpy array.

Solution 3

```
def zero_index(numpy_array):
    zero_indices = np.argwhere(numpy_array == 0).flatten()
    return zero_indices

zero_index(np.array([1,0,2,0,3,0,4,5,6,7,8]))
```

```
array([1, 3, 5])
```

3). Write a program to compute and print the Mean Squared Error (MSE)..

$$MSE = \frac{1}{m}\sum_{i=1}^{m}(w_0 + w_1 x_i - y_i)^2$$

Where

$$\mathbf{w}^T = [w_0 \quad w_1] = [0.25 \quad 0.75]$$

$$\mathbf{x}^T = [x_1 \quad x_2 \quad x_3 \quad x_4 \quad x_5] = [100 \quad 200 \quad 300 \quad 400 \quad 500]$$

$$\mathbf{y}^T = [y_1 \quad y_2 \quad y_3 \quad y_4 \quad y_4] = [65 \quad 155 \quad 220 \quad 310 \quad 370]$$

```
w = np.array([0.25, 0.75])
x = np.array([100, 200, 300, 400, 500])
y = np.array([65, 155, 220, 310, 370])

m = len(y)
sum = 0
for i in range(0, m):
  sum = sum + (w[0] + w[1]*x[i] - y[i])**2
print ('MSE = ', sum/m)
```

```
MSE =  55.5625
```