Worksheet 0

Output of every questions:

```
Unit Conversion Program:
1. Length (m <-> ft)
2. Weight (kg <-> lbs)
3. Volume (L <-> gal)
4. Exit
Choose a conversion type (1-4): 1
Enter the value to convert: 55
Enter the unit: ft
Converted value: 16.76 m

Unit Conversion Program:
1. Length (m <-> ft)
2. Weight (kg <-> lbs)
3. Volume (L <-> gal)
4. Exit
Choose a conversion type (1-4): 4
Exiting program. Goodbye!
```

```
 Mathemathical operations on a List of Numbers
1. sum
2. Average
3. Maximum
4. Minimum
5. Exit
Choose an operation (1-5): 4
Enter a list of numbers separated by spaces:5 2 10 5 6
Minimum: 2.0

 Mathemathical operations on a List of Numbers
1. sum
2. Average
3. Maximum
4. Minimum
5. Exit
Choose an operation (1-5): 5
Exiting program. Goodbye!
```

```
[1, 3, 5]
[3, 4, 5]
[5, 4, 3, 2, 1]
[1, 2, 3]
[1, 2, 3]
[4, 5]
[5, 3, 1]
[1, 2, 3, 4, 5]
6
21
6
3
[1, 2, 3, 4, 5, 6, 7, 8]
3.5
```

```
1. Empty Array:
 [[5.27986577e-316 0.00000000e+000]
 [5.73116149e-322 0.00000000e+000]]

2. Ones Array:
 [[1. 1.]
 [1. 1.]
 [1. 1.]
 [1. 1.]]

3. Full Array:
 [[7 7 7]
 [7 7 7]
 [7 7 7]]

4. Zeros Like Array:
 [[0 0]
 [0 0]]

5. Ones Like Array:
 [[1 1]
 [1 1]]

6. Numpy Array from List:
 [1 2 3 4]
```

```
1. [10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33
 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49]

2. [[0 1 2]
 [3 4 5]
 [6 7 8]]

3. [[1. 0. 0.]
 [0. 1. 0.]
 [0. 0. 1.]]

4. Mean: 0.5213346835047382

5. Min: 0.00939210677864899 Max: 0.9872088312443669

6. [0. 0. 0. 0. 1. 0. 0. 0. 0. 0.]

7. [0, 4, 0, 0, 2, 1]

8. [[1. 1. 1. 1. 1.]
 [1. 0. 0. 0. 1.]
 [1. 0. 0. 0. 1.]
 [1. 0. 0. 0. 1.]
 [1. 1. 1. 1. 1.]]

9. [[0 1 0 1 0 1 0 1]
 [1 0 1 0 1 0 1 0]
 [0 1 0 1 0 1 0 1]
 [1 0 1 0 1 0 1 0]
 [0 1 0 1 0 1 0 1]
 [1 0 1 0 1 0 1 0]
 [0 1 0 1 0 1 0 1]
 [1 0 1 0 1 0 1 0]]
```

```
1. Addition:
 [[ 6  8]
 [10 13]]

2. Subtraction:
 [[-4 -4]
 [-4 -3]]

3. Multiplication:
 [[ 3  6]
 [ 9 15]]

4. Square:
 [[ 1  4]
 [ 9 25]]

5. Dot Products: vw = 219 , xv = [29 77] , xy =
 [[19 22]
 [50 58]]

6. Concatenation: xy (row) =
 [[1 2]
 [3 5]
 [5 6]
 [7 8]] , vw (col) =
 [[ 9 10]
 [11 12]]

7. Concatenation (after reshape): xv =
 [[ 1  2]
 [ 3  5]
 [ 9 10]]
```

```
True
False
True
Solution using np.linalg.solve: [ 2.  1. -2.]
Solution using np.linalg.inv: [ 2.  1. -2.]
```

```
Time taken using Python lists: 0.0685 seconds
Time taken using NumPy arrays: 0.0045 seconds
```

```
Time taken using Python lists: 0.0667 seconds
Time taken using NumPy arrays: 0.0047 seconds
```

```
Time taken using Python lists: 0.1125 seconds
Time taken using NumPy arrays: 0.0017 seconds
```

```
Time taken using Python lists: 75.7446 seconds
Time taken using NumPy arrays: 0.1409 seconds
```