

NUMPY

PROBLEM 1:

The screenshot shows the Spyder Python IDE with a script named `div_by_3.py` open. The script generates a 1D array of 10 random values and normalizes them by dividing by 5. The console output shows the resulting array.

```
import numpy as np
X = np.random.random([1,5])
S = X*5
H = X.mean()
Z = (X - H)/5
print("The value of the normalized X: ")
print(Z)
```

Python console output:

```
In [26]: runFile('C:/Users/Krystyn Searson/Desktop/Numpy/X_normalized.py', uidir='C:/Users/Krystyn Searson/Desktop/Numpy')
The value of the normalized X:
[[ -1.45799249 -1.52735962  0.08179798  0.55538912  1.3819537 ]
 [ 1.36973815 -0.64134653  1.28819882  0.79047896 -0.54987993]
 [-0.14108656 -1.48752899  1.38894349  0.38153725  1.44779817]
 [-0.36137981  1.01649861 -0.08286293  0.77355864 -1.37689668]
 [-0.33878694 -1.14322867 -0.98725787 -1.83856   -0.16235786]]

In [27]:
```

Variable explorer shows the following variables:

| Name | Type | Size | Value |
|------|---------|----------|---------|
| A | int32 | (10, 10) | [[...]] |
| B | int32 | (10, 10) | [[...]] |
| C | int32 | (10, 10) | [[...]] |
| D | int32 | (33,) | [[...]] |
| E | float64 | (10,) | [[...]] |
| F | float64 | (10,) | [[...]] |
| G | float64 | (10,) | [[...]] |
| H | float64 | (10,) | [[...]] |
| I | float64 | (10,) | [[...]] |

PROBLEM 2:

The screenshot shows the Spyder Python IDE with a script named `div_by_3.py` open. The script generates a 10x10 array of random values and filters out elements that are not divisible by 3. The console output shows the resulting array.

```
import numpy as np
A = np.arange(1,101).reshape(10,10)
B = A**2
C = B % 3
D = B[C == 0]
print(B)
print("The elements that are divisible by 3: ")
print(D)
```

Python console output:

```
In [26]:
[[ 1  4  9 16 25 36 49 64 81 100]
 [121 144 169 196 225 256 289 324 361 400]
 [441 484 529 576 625 676 729 784 841 900]
 [961 1024 1089 1156 1225 1296 1369 1444 1521 1600]
 [1681 1764 1849 1936 2025 2116 2209 2304 2401 2500]
 [2881 2984 3089 3196 3305 3416 3529 3644 3761 3880]
 [3721 3844 3969 4096 4225 4356 4489 4624 4761 4900]
 [4941 5184 5329 5476 5625 5776 5929 6084 6241 6400]
 [6561 6724 6889 7056 7225 7396 7569 7744 7921 8100]
 [8281 8464 8649 8836 9025 9216 9409 9604 9801 10000]]

The elements that are divisible by 3:
[[ 9 36 81 144 225 324 441 576 729 900 1089 1296 1521 1764]
 [2025 2304 2681 3056 3439 3820 4209 4596 4981 5364 5744 6121 6504]
 [6881]]

In [26]:
```

Variable explorer shows the following variables:

| Name | Type | Size | Value |
|------|---------|----------|---------|
| A | int32 | (10, 10) | [[...]] |
| B | int32 | (10, 10) | [[...]] |
| C | int32 | (10, 10) | [[...]] |
| D | int32 | (33,) | [[...]] |
| E | float64 | (10,) | [[...]] |
| F | float64 | (10,) | [[...]] |
| G | float64 | (10,) | [[...]] |
| H | float64 | (10,) | [[...]] |
| I | float64 | (10,) | [[...]] |