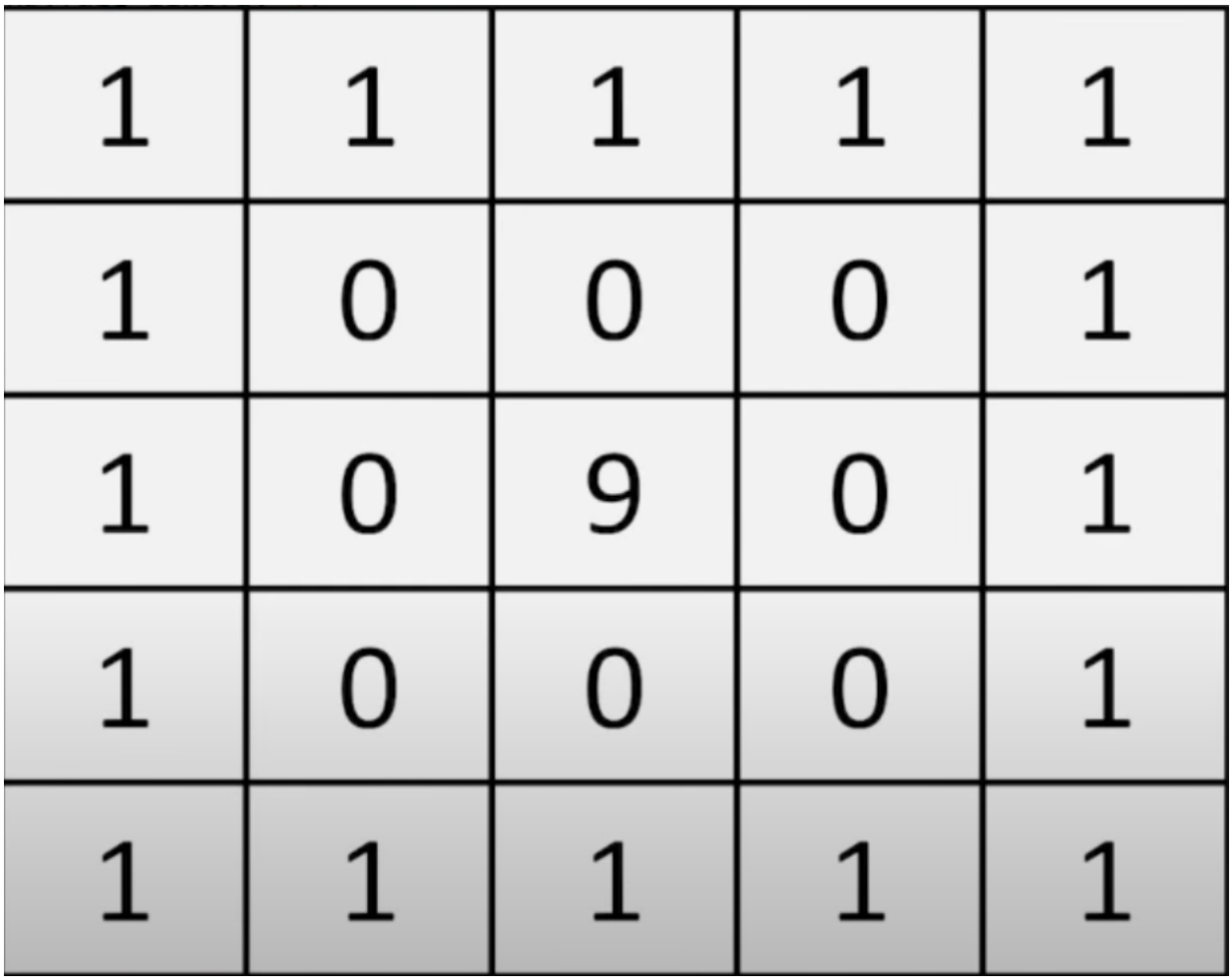
In [22]:
```
import numpy as np
```



1. Create the array above!

In [53]:
```
output = np.ones((5,5))

z = np.zeros((3,3))
z[1,1] = 9


output[1:4,1:4] = z
print(output)
```

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

2. Create 3 arrays for each color and their respective numbers!

In [43]:
```
a = np.arange(1,31).reshape(6, 5)
a
```

Out[43]:
```
array([[ 1,  2,  3,  4,  5],
       [ 6,  7,  8,  9, 10],
       [11, 12, 13, 14, 15],
       [16, 17, 18, 19, 20],
       [21, 22, 23, 24, 25],
       [26, 27, 28, 29, 30]])
```

In [45]:
```
a[2:4,0:2]
```

Out[45]:
```
array([[11, 12],
       [16, 17]])
```

In [46]:
```
a[[0,1,2,3],[1,2,3,4]]
```

Out[46]:
```
array([ 2,  8, 14, 20])
```

In [48]:
```
a[[0,4,5],3:]
```

Out[48]:
```
array([[ 4,  5],
       [24, 25],
       [29, 30]])
```

3. Write a NumPy program to create a 3x3 identity matrix and stack it vertically and horizontally.

In [55]:
```
# creating a 3x3 identity matrix
b = np.identity(3)
print("3x3 identity matrix:")
print(b)
# stacking the matrix vertically
vert_stack = np.vstack((b, b, b))
# stacking the matrix horizontally
horz_stack = np.hstack((b, b, b))
print("Vertical Stack:\n", vert_stack)
print("Horizontal Stack:\n", horz_stack)
```

```
3x3 identity matrix:
[[1. 0. 0.]
 [0. 1. 0.]
 [0. 0. 1.]]
Vertical Stack:
 [[1. 0. 0.]
 [0. 1. 0.]
 [0. 0. 1.]
 [1. 0. 0.]
 [0. 1. 0.]
 [0. 0. 1.]
 [1. 0. 0.]
 [0. 1. 0.]
 [0. 0. 1.]]
Horizontal Stack:
 [[1. 0. 0. 1. 0. 0. 1. 0. 0.]
 [0. 1. 0. 0. 1. 0. 0. 1. 0.]
 [0. 0. 1. 0. 0. 1. 0. 0. 1.]]
```

4, Write a NumPy program to create a 4x4 array with random values and find the sum of each row.

In [57]:
```
import numpy as np
# create a 4x4 array with random values
c = np.random.rand(4, 4)
# find the sum of each row
row_sum = np.sum(arr, axis=1)
print("Original array:")
print(c)
print("\nSum of each row:")
print(row_sum)
```

```
Original array:
[[0.84607826 0.08443543 0.9965225  0.25606294]
 [0.71807069 0.2129553  0.91553813 0.77575012]
 [0.0968757  0.44475889 0.40483623 0.66475117]
 [0.87162029 0.44762322 0.85286575 0.22122101]]

Sum of each row:
[1.6984634  2.22555904 1.95474151 1.46711196]
```

5. Write a NumPy program to repeat all the elements three times of a given array of string.

In [62]:
```
import numpy as np
d = np.array(['Python', 'PHP', 'Java', 'C++'])
print("Original Array:")
print(d)
new_array = np.char.multiply(d, 3)
print("New array:")
print(new_array)
```

```
Original Array:
['Python' 'PHP' 'Java' 'C++']
New array:
['PythonPythonPython' 'PHPPHPPHP' 'JavaJavaJava' 'C++C++C++']
```