```
import numpy as np

image = np.array([
    [[100, 50, 200], [120, 60, 210], [130, 70, 220]],
    [[140, 80, 230], [150, 90, 240], [160, 100, 250]],
    [[170, 110, 180], [180, 120, 190], [190, 130, 200]]
])

print("Original 3D RGB Image Matrix:\n", image)
```

```
Original 3D RGB Image Matrix:
 [[[100  50 200]
  [120  60 210]
  [130  70 220]]

 [[140  80 230]
  [150  90 240]
  [160 100 250]]

 [[170 110 180]
  [180 120 190]
  [190 130 200]]]
```

```
red_channel = image[:, :, 0]
green_channel = image[:, :, 1]
blue_channel = image[:, :, 2]

print("\nRed Channel:\n", red_channel)
print("\nGreen Channel:\n", green_channel)
print("\nBlue Channel:\n", blue_channel)
```

```
Red Channel:
 [[100 120 130]
 [140 150 160]
 [170 180 190]]

Green Channel:
 [[ 50  60  70]
 [ 80  90 100]
 [110 120 130]]

Blue Channel:
 [[200 210 220]
 [230 240 250]
 [180 190 200]]
```

```
avg_red = np.mean(red_channel)
avg_green = np.mean(green_channel)
avg_blue = np.mean(blue_channel)

print("\nAverage Intensities -> Red:", avg_red, " Green:", avg_green, " Blue:", avg_blue)
```

```
Average Intensities -> Red: 148.88888888888889  Green: 90.0  Blue: 213.33333333333334
```

```
bright_image = np.clip(image + 50, 0, 255)
print("\nBrightened Image:\n", bright_image)
```

```
Brightened Image:
```

```
[[[150 100 250]
  [170 110 255]
  [180 120 255]]

 [[190 130 255]
  [200 140 255]
  [210 150 255]]

 [[220 160 230]
  [230 170 240]
  [240 180 250]]]
```

```
A = np.array([[1, 2, 3],
              [4, 5, 6]])
B = np.array([10, 20, 30])

print("\n2D Array A:\n", A)
print("1D Array B:", B)
print("A + B (Broadcasted):\n", A + B)
print("\nShape of A:", A.shape)
print("Shape of B:", B.shape)
```

```
2D Array A:
 [[1 2 3]
 [4 5 6]]
1D Array B: [10 20 30]
A + B (Broadcasted):
 [[11 22 33]
 [14 25 36]]

Shape of A: (2, 3)
Shape of B: (3,)
```

```
C = np.ones((2,3,4)) * 5
print("\n3D Array C shape:", C.shape)
print("C + 10 (Scalar broadcasting):\n", C + 10)
```

```
3D Array C shape: (2, 3, 4)
C + 10 (Scalar broadcasting):
 [[[15. 15. 15. 15.]
  [15. 15. 15. 15.]
  [15. 15. 15. 15.]]

 [[15. 15. 15. 15.]
  [15. 15. 15. 15.]
  [15. 15. 15. 15.]]]
```