In [3]:
```python
import tensorflow as tf
from tensorflow.keras import datasets, layers, models
import matplotlib.pyplot as plt
import numpy as np
```

In [5]:
```python
(x_train, y_train), (x_test,y_test) = datasets.cifar10.load_data()
y_train[0]
```

Out[5]:
```
array([6], dtype=uint8)
```

In [7]:
```python
x_test.shape
```

Out[7]:
```
(10000, 32, 32, 3)
```

In [9]:
```python
y_train.shape
```

Out[9]:
```
(50000, 1)
```

In [11]:
```python
y_train[:5]
```

Out[11]:
```
array([[6],
       [9],
       [9],
       [4],
       [1]], dtype=uint8)
```

In [13]:
```python
y_train = y_train.reshape(-1,)
y_train[:5]
```

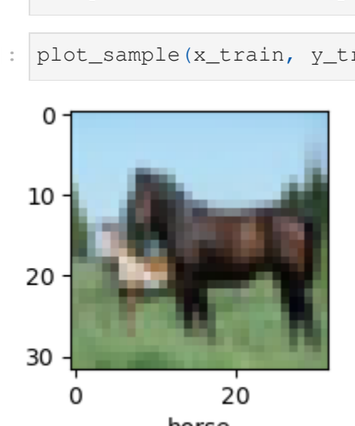
Out[13]:
```
array([6, 9, 9, 4, 1], dtype=uint8)
```

In [15]:
```python
y_test = y_test.reshape(-1,)
```

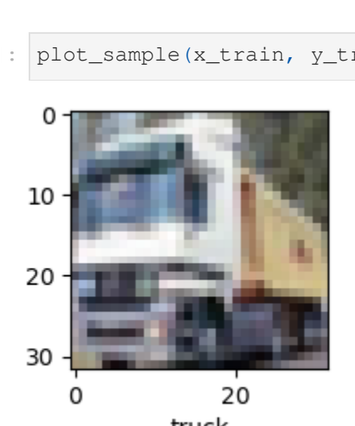
In [17]:
```python
classes = ["airplane","automobile","bird","cat","deer","dog","frog","horse","ship","truck"]
```

In [19]:
```python
def plot_sample(x, y, index):
    plt.figure(figsize = (15,2))
    plt.imshow(x[index])
    plt.xlabel(classes[y[index]])
```

In [21]:
```python
plot_sample(x_train, y_train,12)
```



In [23]:
```python
plot_sample(x_train, y_train, 1)
```



In [25]:
```python
#Normalizing the training data
x_train = x_train / 255.0
x_test = x_test / 255.0
```

In [35]:
```python
#Build simple artificial neural network for image classification
ann = models.Sequential([
    layers.Flatten(input_shape=(32,32,3)),
    layers.Dense(3000, activation='relu'),
    layers.Dense(1000, activation='relu'),
    layers.Dense(10,activation='softmax')
])
ann.compile(optimizer='SGD',
            loss='sparse_categorical_crossentropy',
            metrics=['accuracy'])
ann.fit(x_train, y_train, epochs=5)
```

```
Epoch 1/5
1563/1563 ━━━━━━━━━━━━━━━━━━━━ 86s 54ms/step - accuracy: 0.3033 - loss: 1.9297
Epoch 2/5
1563/1563 ━━━━━━━━━━━━━━━━━━━━ 87s 55ms/step - accuracy: 0.4206 - loss: 1.6438
Epoch 3/5
1563/1563 ━━━━━━━━━━━━━━━━━━━━ 155s 54ms/step - accuracy: 0.4530 - loss: 1.5530
Epoch 4/5
1563/1563 ━━━━━━━━━━━━━━━━━━━━ 89s 57ms/step - accuracy: 0.4757 - loss: 1.4840
Epoch 5/5
1563/1563 ━━━━━━━━━━━━━━━━━━━━ 91s 58ms/step - accuracy: 0.4859 - loss: 1.4458
```

Out[35]:
```
<keras.src.callbacks.history.History at 0x15627899b20>
```

In [41]:
```python
from sklearn.metrics import confusion_matrix , classification_report
import numpy as np
y_pred = ann.predict(x_test)
y_pred_classes = [np.argmax(element) for element in y_pred]

print("Classification Report: \n", classification_report(y_test, y_pred_classes))
x_train
```

```
313/313 ━━━━━━━━━━━━━━━━━━━━ 3s 9ms/step
Classification Report:
               precision    recall  f1-score   support

           0       0.64      0.33      0.44      1000
           1       0.77      0.38      0.51      1000
           2       0.42      0.18      0.25      1000
           3       0.40      0.17      0.24      1000
           4       0.30      0.53      0.38      1000
           5       0.40      0.34      0.37      1000
           6       0.57      0.39      0.46      1000
           7       0.24      0.85      0.38      1000
           8       0.70      0.48      0.57      1000
           9       0.62      0.39      0.48      1000

    accuracy                           0.41     10000
   macro avg       0.51      0.41      0.41     10000
weighted avg       0.51      0.41      0.41     10000
```

Out[41]:
```
array([[[[0.23137255, 0.24313725, 0.24705882],
         [0.16862745, 0.18039216, 0.17647059],
         [0.19607843, 0.18823529, 0.16862745],
         ...,
         [0.61960784, 0.51764706, 0.42352941],
         [0.59607843, 0.49019608, 0.4       ],
         [0.58039216, 0.48627451, 0.40392157]],

        [[0.0627451 , 0.07843137, 0.07843137],
         [0.        , 0.        , 0.        ],
         [0.07058824, 0.03137255, 0.        ],
         ...,
         [0.48235294, 0.34509804, 0.21568627],
         [0.46666667, 0.3254902 , 0.19607843],
         [0.47843137, 0.34117647, 0.22352941]],

        [[0.09803922, 0.09411765, 0.08235294],
         [0.0627451 , 0.02745098, 0.        ],
         [0.19215686, 0.10588235, 0.03137255],
         ...,
         [0.4627451 , 0.32941176, 0.19607843],
         [0.47058824, 0.32941176, 0.19607843],
         [0.42745098, 0.28627451, 0.16470588]],

        ...,

        [[0.81568627, 0.66666667, 0.37647059],
         [0.78823529, 0.6       , 0.13333333],
         [0.77647059, 0.63137255, 0.10196078],
         ...,
         [0.62745098, 0.52156863, 0.2745098 ],
         [0.21960784, 0.12156863, 0.02745098],
         [0.20784314, 0.13333333, 0.07843137]],

        [[0.70588235, 0.54509804, 0.37647059],
         [0.67843137, 0.48235294, 0.16470588],
         [0.72941176, 0.56470588, 0.11764706],
         ...,
         [0.72156863, 0.58039216, 0.36862745],
         [0.38039216, 0.24313725, 0.13333333],
         [0.3254902 , 0.20784314, 0.13333333]],

        [[0.69411765, 0.56470588, 0.45490196],
         [0.65882353, 0.50588235, 0.36862745],
         [0.70196078, 0.55686275, 0.34117647],
         ...,
         [0.84705882, 0.72156863, 0.54901961],
         [0.59215686, 0.4627451 , 0.32941176],
         [0.48235294, 0.36078431, 0.28235294]]],


       [[[0.60392157, 0.69411765, 0.73333333],
         [0.49411765, 0.5372549 , 0.53333333],
         [0.41176471, 0.40784314, 0.37254902],
         ...,
         [0.35686275, 0.37254902, 0.27843137],
         [0.34117647, 0.35294118, 0.27843137],
         [0.30980392, 0.31764706, 0.2745098 ]],

        [[0.54901961, 0.62745098, 0.6627451 ],
         [0.56862745, 0.6       , 0.60392157],
         [0.49019608, 0.49019608, 0.4627451 ],
         ...,
         [0.37647059, 0.38823529, 0.30588235],
         [0.30196078, 0.31372549, 0.24313725],
         [0.27843137, 0.28627451, 0.23921569]],

        [[0.54901961, 0.60784314, 0.64313725],
         [0.54509804, 0.57254902, 0.58431373],
         [0.45098039, 0.45098039, 0.43921569],
         ...,
         [0.30980392, 0.32156863, 0.25098039],
         [0.26666667, 0.2745098 , 0.21568627],
         [0.2627451 , 0.27058824, 0.21568627]],

        ...,

        [[0.68627451, 0.65490196, 0.65098039],
         [0.61176471, 0.60392157, 0.62745098],
         [0.60392157, 0.62745098, 0.66666667],
         ...,
         [0.16470588, 0.13333333, 0.14117647],
         [0.23921569, 0.20784314, 0.22352941],
         [0.36470588, 0.3254902 , 0.35686275]],

        [[0.64705882, 0.60392157, 0.50196078],
         [0.61176471, 0.59607843, 0.50980392],
         [0.62352941, 0.63137255, 0.55686275],
         ...,
         [0.40392157, 0.36470588, 0.37647059],
         [0.48235294, 0.44705882, 0.47058824],
         [0.51372549, 0.4745098 , 0.51372549]],

        [[0.63921569, 0.58039216, 0.47058824],
         [0.61960784, 0.58039216, 0.47843137],
         [0.63921569, 0.61176471, 0.52156863],
         ...,
         [0.56078431, 0.52156863, 0.54509804],
         [0.56078431, 0.5254902 , 0.55686275],
         [0.56078431, 0.52156863, 0.56470588]]],


       [[[1.        , 1.        , 1.        ],
         [0.99215686, 0.99215686, 0.99215686],
         [0.99215686, 0.99215686, 0.99215686],
         ...,
         [0.99215686, 0.99215686, 0.99215686],
         [0.99215686, 0.99215686, 0.99215686],
         [0.99215686, 0.99215686, 0.99215686]],

        [[1.        , 1.        , 1.        ],
         [1.        , 1.        , 1.        ],
         [1.        , 1.        , 1.        ],
         ...,
         [1.        , 1.        , 1.        ],
         [1.        , 1.        , 1.        ],
         [1.        , 1.        , 1.        ]],

        [[1.        , 1.        , 1.        ],
         [0.99607843, 0.99607843, 0.99607843],
         [0.99607843, 0.99607843, 0.99607843],
         ...,
         [0.99607843, 0.99607843, 0.99607843],
         [0.99607843, 0.99607843, 0.99607843],
         [0.99607843, 0.99607843, 0.99607843]],

        ...,

        [[0.44313725, 0.47058824, 0.43921569],
         [0.43529412, 0.4627451 , 0.43529412],
         [0.41176471, 0.43921569, 0.41568627],
         ...,
         [0.28235294, 0.31764706, 0.31372549],
         [0.28235294, 0.31372549, 0.30980392],
         [0.28235294, 0.31372549, 0.30980392]],

        [[0.43529412, 0.4627451 , 0.43137255],
         [0.40784314, 0.43529412, 0.40784314],
         [0.38823529, 0.41568627, 0.38431373],
         ...,
         [0.26666667, 0.29411765, 0.28627451],
         [0.2745098 , 0.29803922, 0.29411765],
         [0.30588235, 0.32941176, 0.32156863]],

        [[0.41568627, 0.44313725, 0.41176471],
         [0.38823529, 0.41568627, 0.38431373],
         [0.37254902, 0.4       , 0.36862745],
         ...,
         [0.30588235, 0.33333333, 0.3254902 ],
         [0.30980392, 0.33333333, 0.3254902 ],
         [0.31372549, 0.3372549 , 0.32941176]]],


       ...,


       [[[0.1372549 , 0.69803922, 0.92156863],
         [0.15686275, 0.69019608, 0.9372549 ],
         [0.16470588, 0.69019608, 0.94509804],
         ...,
         [0.38823529, 0.69411765, 0.85882353],
         [0.30980392, 0.57647059, 0.77254902],
         [0.34901961, 0.58039216, 0.74117647]],

        [[0.22352941, 0.71372549, 0.91764706],
         [0.17254902, 0.72156863, 0.98039216],
         [0.19607843, 0.71764706, 0.94117647],
         ...,
         [0.61176471, 0.71372549, 0.78431373],
         [0.55294118, 0.69411765, 0.80784314],
         [0.45490196, 0.58431373, 0.68627451]],

        [[0.38431373, 0.77254902, 0.92941176],
         [0.25098039, 0.74117647, 0.98823529],
         [0.27058824, 0.75294118, 0.96078431],
         ...,
         [0.7372549 , 0.76470588, 0.80784314],
         [0.46666667, 0.52941176, 0.57647059],
         [0.23921569, 0.30980392, 0.35294118]],

        ...,

        [[0.28627451, 0.30980392, 0.30196078],
         [0.20784314, 0.24705882, 0.26666667],
         [0.21176471, 0.26666667, 0.31372549],
         ...,
         [0.06666667, 0.15686275, 0.25098039],
         [0.08235294, 0.14117647, 0.2       ],
         [0.12941176, 0.18823529, 0.19215686]],

        [[0.23921569, 0.26666667, 0.29411765],
         [0.21568627, 0.2745098 , 0.3372549 ],
         [0.22352941, 0.30980392, 0.40392157],
         ...,
         [0.09411765, 0.18823529, 0.28235294],
         [0.06666667, 0.1372549 , 0.20784314],
         [0.02745098, 0.09019608, 0.1254902 ]],

        [[0.17254902, 0.21960784, 0.28627451],
         [0.18039216, 0.25882353, 0.34509804],
         [0.19215686, 0.30196078, 0.41176471],
         ...,
         [0.10588235, 0.20392157, 0.30196078],
         [0.08235294, 0.16862745, 0.25882353],
         [0.04705882, 0.12156863, 0.19607843]]],


       [[[0.74117647, 0.82745098, 0.94117647],
         [0.72941176, 0.81568627, 0.9254902 ],
         [0.7254902 , 0.81176471, 0.92156863],
         ...,
         [0.68627451, 0.76470588, 0.87843137],
         [0.6745098 , 0.76078431, 0.87058824],
         [0.6627451 , 0.76078431, 0.8627451 ]],

        [[0.76078431, 0.82352941, 0.9372549 ],
         [0.74901961, 0.81176471, 0.9254902 ],
         [0.74509804, 0.80784314, 0.92156863],
         ...,
         [0.67843137, 0.75294118, 0.8627451 ],
         [0.67058824, 0.74901961, 0.85490196],
         [0.65490196, 0.74509804, 0.84705882]],

        [[0.81568627, 0.85882353, 0.95686275],
         [0.80392157, 0.84705882, 0.94117647],
         [0.8       , 0.84313725, 0.9372549 ],
         ...,
         [0.68627451, 0.74901961, 0.85098039],
         [0.6745098 , 0.74509804, 0.84705882],
         [0.6627451 , 0.74901961, 0.84313725]],

        ...,

        [[0.81176471, 0.78039216, 0.70980392],
         [0.79607843, 0.76470588, 0.68627451],
         [0.79607843, 0.76862745, 0.67843137],
         ...,
         [0.52941176, 0.51764706, 0.49803922],
         [0.63529412, 0.61960784, 0.58823529],
         [0.65882353, 0.63921569, 0.59215686]],

        [[0.77647059, 0.74509804, 0.66666667],
         [0.74117647, 0.70980392, 0.62352941],
         [0.70588235, 0.6745098 , 0.57647059],
         ...,
         [0.69803922, 0.67058824, 0.62745098],
         [0.68627451, 0.6627451 , 0.61176471],
         [0.68627451, 0.6627451 , 0.60392157]],

        [[0.77647059, 0.74117647, 0.67843137],
         [0.74117647, 0.70980392, 0.63529412],
         [0.69803922, 0.66666667, 0.58431373],
         ...,
         [0.76470588, 0.72156863, 0.6627451 ],
         [0.76862745, 0.74117647, 0.67058824],
         [0.76470588, 0.74509804, 0.67058824]]],


       [[[0.89803922, 0.89803922, 0.9372549 ],
         [0.9254902 , 0.92941176, 0.96862745],
         [0.91764706, 0.9254902 , 0.96862745],
         ...,
         [0.85098039, 0.85882353, 0.91372549],
         [0.86666667, 0.8745098 , 0.91764706],
         [0.87058824, 0.8745098 , 0.91372549]],

        [[0.87058824, 0.86666667, 0.89803922],
         [0.9372549 , 0.9372549 , 0.97647059],
         [0.91372549, 0.91764706, 0.96470588],
         ...,
         [0.8745098 , 0.8745098 , 0.9254902 ],
         [0.89019608, 0.89411765, 0.93333333],
         [0.82352941, 0.82745098, 0.8627451 ]],

        [[0.83529412, 0.80784314, 0.82745098],
         [0.91764706, 0.90980392, 0.9372549 ],
         [0.90588235, 0.91372549, 0.95686275],
         ...,
         [0.8627451 , 0.8627451 , 0.90980392],
         [0.8627451 , 0.85882353, 0.90980392],
         [0.79215686, 0.79607843, 0.84313725]],

        ...,

        [[0.58823529, 0.56078431, 0.52941176],
         [0.54901961, 0.52941176, 0.49803922],
         [0.51764706, 0.49803922, 0.47058824],
         ...,
         [0.87843137, 0.87058824, 0.85490196],
         [0.90196078, 0.89411765, 0.88235294],
         [0.94509804, 0.94509804, 0.93333333]],

        [[0.5372549 , 0.51764706, 0.49411765],
         [0.50980392, 0.49803922, 0.47058824],
         [0.49019608, 0.4745098 , 0.45098039],
         ...,
         [0.70980392, 0.70588235, 0.69803922],
         [0.79215686, 0.78823529, 0.77647059],
         [0.83137255, 0.82745098, 0.81176471]],

        [[0.47843137, 0.46666667, 0.44705882],
         [0.4627451 , 0.45490196, 0.43137255],
         [0.47058824, 0.45490196, 0.43529412],
         ...,
         [0.70196078, 0.69411765, 0.67843137],
         [0.64313725, 0.64313725, 0.63529412],
         [0.63921569, 0.63921569, 0.63137255]]]])
```

In [55]:
```python
cnn =  models.Sequential([
    layers.Conv2D(filters=32, kernel_size=(3, 3), activation='relu', input_shape=(32, 32, 3)),
    layers.MaxPooling2D((2, 2)),

    layers.Conv2D(filters=64, kernel_size=(3, 3), activation='relu'),
    layers.MaxPooling2D((2, 2)),

    layers.Flatten(),
    layers.Dense(64, activation='relu'),
    layers.Dense(10, activation='softmax')
])
```

```
C:\Users\thanu\anaconda3\Lib\site-packages\keras\src\layers\convolutional\base_conv.py:107: UserWarning: Do not pass an
as the first layer in the model instead.
  super().__init__(activity_regularizer=activity_regularizer, **kwargs)
```

In [61]:
```python
cnn.compile(optimizer='adam',
            loss='sparse_categorical_crossentropy',
            metrics=['accuracy'])
```

In [63]:
```python
cnn.fit(x_train, y_train, epochs=10)
```

```
Epoch 1/10
1563/1563 ━━━━━━━━━━━━━━━━━━━━ 55s 34ms/step - accuracy: 0.3623 - loss: 1.7363
Epoch 2/10
1563/1563 ━━━━━━━━━━━━━━━━━━━━ 52s 34ms/step - accuracy: 0.5852 - loss: 1.1699
Epoch 3/10
1563/1563 ━━━━━━━━━━━━━━━━━━━━ 53s 34ms/step - accuracy: 0.6394 - loss: 1.0301
Epoch 4/10
1563/1563 ━━━━━━━━━━━━━━━━━━━━ 72s 46ms/step - accuracy: 0.6756 - loss: 0.9248
Epoch 5/10
1563/1563 ━━━━━━━━━━━━━━━━━━━━ 42s 27ms/step - accuracy: 0.6959 - loss: 0.8627
Epoch 6/10
1563/1563 ━━━━━━━━━━━━━━━━━━━━ 88s 31ms/step - accuracy: 0.7251 - loss: 0.7933
Epoch 7/10
1563/1563 ━━━━━━━━━━━━━━━━━━━━ 80s 29ms/step - accuracy: 0.7392 - loss: 0.7391
Epoch 8/10
1563/1563 ━━━━━━━━━━━━━━━━━━━━ 53s 34ms/step - accuracy: 0.7568 - loss: 0.6983
Epoch 9/10
1563/1563 ━━━━━━━━━━━━━━━━━━━━ 76s 30ms/step - accuracy: 0.7706 - loss: 0.6603
Epoch 10/10
1563/1563 ━━━━━━━━━━━━━━━━━━━━ 52s 33ms/step - accuracy: 0.7825 - loss: 0.6264
```

Out[63]:
```
<keras.src.callbacks.history.History at 0x1563020bec0>
```

In [65]:
```python
from sklearn.metrics import confusion_matrix , classification_report
import numpy as np
y_pred = cnn.predict(x_test)
y_pred_classes = [np.argmax(element) for element in y_pred]

print("Classification Report: \n", classification_report(y_test, y_pred_classes))
x_train
```

```
313/313 ━━━━━━━━━━━━━━━━━━━━ 2s 6ms/step
Classification Report:
               precision    recall  f1-score   support

           0       0.75      0.75      0.75      1000
           1       0.80      0.84      0.82      1000
           2       0.63      0.56      0.59      1000
           3       0.50      0.48      0.49      1000
           4       0.53      0.76      0.63      1000
           5       0.59      0.64      0.62      1000
           6       0.80      0.74      0.77      1000
           7       0.74      0.73      0.73      1000
           8       0.88      0.74      0.80      1000
           9       0.84      0.70      0.76      1000

    accuracy                           0.69     10000
   macro avg       0.71      0.69      0.70     10000
weighted avg       0.71      0.69      0.70     10000
```

Out[65]:
```
array([[[[0.23137255, 0.24313725, 0.24705882],
         [0.16862745, 0.18039216, 0.17647059],
         [0.19607843, 0.18823529, 0.16862745],
         ...,
         [0.61960784, 0.51764706, 0.42352941],
         [0.59607843, 0.49019608, 0.4       ],
         [0.58039216, 0.48627451, 0.40392157]],

        [[0.0627451 , 0.07843137, 0.07843137],
         [0.        , 0.        , 0.        ],
         [0.07058824, 0.03137255, 0.        ],
         ...,
         [0.48235294, 0.34509804, 0.21568627],
         [0.46666667, 0.3254902 , 0.19607843],
         [0.47843137, 0.34117647, 0.22352941]],

        [[0.09803922, 0.09411765, 0.08235294],
         [0.0627451 , 0.02745098, 0.        ],
         [0.19215686, 0.10588235, 0.03137255],
         ...,
         [0.4627451 , 0.32941176, 0.19607843],
         [0.47058824, 0.32941176, 0.19607843],
         [0.42745098, 0.28627451, 0.16470588]],

        ...,

        [[0.81568627, 0.66666667, 0.37647059],
         [0.78823529, 0.6       , 0.13333333],
         [0.77647059, 0.63137255, 0.10196078],
         ...,
         [0.62745098, 0.52156863, 0.2745098 ],
         [0.21960784, 0.12156863, 0.02745098],
         [0.20784314, 0.13333333, 0.07843137]],

        [[0.70588235, 0.54509804, 0.37647059],
         [0.67843137, 0.48235294, 0.16470588],
         [0.72941176, 0.56470588, 0.11764706],
         ...,
         [0.72156863, 0.58039216, 0.36862745],
         [0.38039216, 0.24313725, 0.13333333],
         [0.3254902 , 0.20784314, 0.13333333]],

        [[0.69411765, 0.56470588, 0.45490196],
         [0.65882353, 0.50588235, 0.36862745],
         [0.70196078, 0.55686275, 0.34117647],
         ...,
         [0.84705882, 0.72156863, 0.54901961],
         [0.59215686, 0.4627451 , 0.32941176],
         [0.48235294, 0.36078431, 0.28235294]]],


       [[[0.60392157, 0.69411765, 0.73333333],
         [0.49411765, 0.5372549 , 0.53333333],
         [0.41176471, 0.40784314, 0.37254902],
         ...,
         [0.35686275, 0.37254902, 0.27843137],
         [0.34117647, 0.35294118, 0.27843137],
         [0.30980392, 0.31764706, 0.2745098 ]],

        [[0.54901961, 0.62745098, 0.6627451 ],
         [0.56862745, 0.6       , 0.60392157],
         [0.49019608, 0.49019608, 0.4627451 ],
         ...,
         [0.37647059, 0.38823529, 0.30588235],
         [0.30196078, 0.31372549, 0.24313725],
         [0.27843137, 0.28627451, 0.23921569]],

        [[0.54901961, 0.60784314, 0.64313725],
         [0.54509804, 0.57254902, 0.58431373],
         [0.45098039, 0.45098039, 0.43921569],
         ...,
         [0.30980392, 0.32156863, 0.25098039],
         [0.26666667, 0.2745098 , 0.21568627],
         [0.2627451 , 0.27058824, 0.21568627]],

        ...,

        [[0.68627451, 0.65490196, 0.65098039],
         [0.61176471, 0.60392157, 0.62745098],
         [0.60392157, 0.62745098, 0.66666667],
         ...,
         [0.16470588, 0.13333333, 0.14117647],
         [0.23921569, 0.20784314, 0.22352941],
         [0.36470588, 0.3254902 , 0.35686275]],

        [[0.64705882, 0.60392157, 0.50196078],
         [0.61176471, 0.59607843, 0.50980392],
         [0.62352941, 0.63137255, 0.55686275],
         ...,
         [0.40392157, 0.36470588, 0.37647059],
         [0.48235294, 0.44705882, 0.47058824],
         [0.51372549, 0.4745098 , 0.51372549]],

        [[0.63921569, 0.58039216, 0.47058824],
         [0.61960784, 0.58039216, 0.47843137],
         [0.63921569, 0.61176471, 0.52156863],
         ...,
         [0.56078431, 0.52156863, 0.54509804],
         [0.56078431, 0.5254902 , 0.55686275],
         [0.56078431, 0.52156863, 0.56470588]]],


       [[[1.        , 1.        , 1.        ],
         [0.99215686, 0.99215686, 0.99215686],
         [0.99215686, 0.99215686, 0.99215686],
         ...,
         [0.99215686, 0.99215686, 0.99215686],
         [0.99215686, 0.99215686, 0.99215686],
         [0.99215686, 0.99215686, 0.99215686]],

        [[1.        , 1.        , 1.        ],
         [1.        , 1.        , 1.        ],
         [1.        , 1.        , 1.        ],
         ...,
         [1.        , 1.        , 1.        ],
         [1.        , 1.        , 1.        ],
         [1.        , 1.        , 1.        ]],

        [[1.        , 1.        , 1.        ],
         [0.99607843, 0.99607843, 0.99607843],
         [0.99607843, 0.99607843, 0.99607843],
         ...,
         [0.99607843, 0.99607843, 0.99607843],
         [0.99607843, 0.99607843, 0.99607843],
         [0.99607843, 0.99607843, 0.99607843]],

        ...,

        [[0.44313725, 0.47058824, 0.43921569],
         [0.43529412, 0.4627451 , 0.43529412],
         [0.41176471, 0.43921569, 0.41568627],
         ...,
         [0.28235294, 0.31764706, 0.31372549],
         [0.28235294, 0.31372549, 0.30980392],
         [0.28235294, 0.31372549, 0.30980392]],

        [[0.43529412, 0.4627451 , 0.43137255],
         [0.40784314, 0.43529412, 0.40784314],
         [0.38823529, 0.41568627, 0.38431373],
         ...,
         [0.26666667, 0.29411765, 0.28627451],
         [0.2745098 , 0.29803922, 0.29411765],
         [0.30588235, 0.32941176, 0.32156863]],

        [[0.41568627, 0.44313725, 0.41176471],
         [0.38823529, 0.41568627, 0.38431373],
         [0.37254902, 0.4       , 0.36862745],
         ...,
         [0.30588235, 0.33333333, 0.3254902 ],
         [0.30980392, 0.33333333, 0.3254902 ],
         [0.31372549, 0.3372549 , 0.32941176]]],


       ...,


       [[[0.1372549 , 0.69803922, 0.92156863],
         [0.15686275, 0.69019608, 0.9372549 ],
         [0.16470588, 0.69019608, 0.94509804],
         ...,
         [0.38823529, 0.69411765, 0.85882353],
         [0.30980392, 0.57647059, 0.77254902],
         [0.34901961, 0.58039216, 0.74117647]],

        [[0.22352941, 0.71372549, 0.91764706],
         [0.17254902, 0.72156863, 0.98039216],
         [0.19607843, 0.71764706, 0.94117647],
         ...,
         [0.61176471, 0.71372549, 0.78431373],
         [0.55294118, 0.69411765, 0.80784314],
         [0.45490196, 0.58431373, 0.68627451]],

        [[0.38431373, 0.77254902, 0.92941176],
         [0.25098039, 0.74117647, 0.98823529],
         [0.27058824, 0.75294118, 0.96078431],
         ...,
         [0.7372549 , 0.76470588, 0.80784314],
         [0.46666667, 0.52941176, 0.57647059],
         [0.23921569, 0.30980392, 0.35294118]],

        ...,

        [[0.28627451, 0.30980392, 0.30196078],
         [0.20784314, 0.24705882, 0.26666667],
         [0.21176471, 0.26666667, 0.31372549],
         ...,
         [0.06666667, 0.15686275, 0.25098039],
         [0.08235294, 0.14117647, 0.2       ],
         [0.12941176, 0.18823529, 0.19215686]],

        [[0.23921569, 0.26666667, 0.29411765],
         [0.21568627, 0.2745098 , 0.3372549 ],
         [0.22352941, 0.30980392, 0.40392157],
         ...,
         [0.09411765, 0.18823529, 0.28235294],
         [0.06666667, 0.1372549 , 0.20784314],
         [0.02745098, 0.09019608, 0.1254902 ]],

        [[0.17254902, 0.21960784, 0.28627451],
         [0.18039216, 0.25882353, 0.34509804],
         [0.19215686, 0.30196078, 0.41176471],
         ...,
         [0.10588235, 0.20392157, 0.30196078],
         [0.08235294, 0.16862745, 0.25882353],
         [0.04705882, 0.12156863, 0.19607843]]],


       [[[0.74117647, 0.82745098, 0.94117647],
         [0.72941176, 0.81568627, 0.9254902 ],
         [0.7254902 , 0.81176471, 0.92156863],
         ...,
         [0.68627451, 0.76470588, 0.87843137],
         [0.6745098 , 0.76078431, 0.87058824],
         [0.6627451 , 0.76078431, 0.8627451 ]],

        [[0.76078431, 0.82352941, 0.9372549 ],
         [0.74901961, 0.81176471, 0.9254902 ],
         [0.74509804, 0.80784314, 0.92156863],
         ...,
         [0.67843137, 0.75294118, 0.8627451 ],
         [0.67058824, 0.74901961, 0.85490196],
         [0.65490196, 0.74509804, 0.84705882]],

        [[0.81568627, 0.85882353, 0.95686275],
         [0.80392157, 0.84705882, 0.94117647],
         [0.8       , 0.84313725, 0.9372549 ],
         ...,
         [0.68627451, 0.74901961, 0.85098039],
         [0.6745098 , 0.74509804, 0.84705882],
         [0.6627451 , 0.74901961, 0.84313725]],

        ...,

        [[0.81176471, 0.78039216, 0.70980392],
         [0.79607843, 0.76470588, 0.68627451],
         [0.79607843, 0.76862745, 0.67843137],
         ...,
         [0.52941176, 0.51764706, 0.49803922],
         [0.63529412, 0.61960784, 0.58823529],
         [0.65882353, 0.63921569, 0.59215686]],

        [[0.77647059, 0.74509804, 0.66666667],
         [0.74117647, 0.70980392, 0.62352941],
         [0.70588235, 0.6745098 , 0.57647059],
         ...,
         [0.69803922, 0.67058824, 0.62745098],
         [0.68627451, 0.6627451 , 0.61176471],
         [0.68627451, 0.6627451 , 0.60392157]],

        [[0.77647059, 0.74117647, 0.67843137],
         [0.74117647, 0.70980392, 0.63529412],
         [0.69803922, 0.66666667, 0.58431373],
         ...,
         [0.76470588, 0.72156863, 0.6627451 ],
         [0.76862745, 0.74117647, 0.67058824],
         [0.76470588, 0.74509804, 0.67058824]]],


       [[[0.89803922, 0.89803922, 0.9372549 ],
         [0.9254902 , 0.92941176, 0.96862745],
         [0.91764706, 0.9254902 , 0.96862745],
         ...,
         [0.85098039, 0.85882353, 0.91372549],
         [0.86666667, 0.8745098 , 0.91764706],
         [0.87058824, 0.8745098 , 0.91372549]],

        [[0.87058824, 0.86666667, 0.89803922],
         [0.9372549 , 0.9372549 , 0.97647059],
         [0.91372549, 0.91764706, 0.96470588],
         ...,
         [0.8745098 , 0.8745098 , 0.9254902 ],
         [0.89019608, 0.89411765, 0.93333333],
         [0.82352941, 0.82745098, 0.8627451 ]],

        [[0.83529412, 0.80784314, 0.82745098],
         [0.91764706, 0.90980392, 0.9372549 ],
         [0.90588235, 0.91372549, 0.95686275],
         ...,
         [0.8627451 , 0.8627451 , 0.90980392],
         [0.8627451 , 0.85882353, 0.90980392],
         [0.79215686, 0.79607843, 0.84313725]],

        ...,

        [[0.58823529, 0.56078431, 0.52941176],
         [0.54901961, 0.52941176, 0.49803922],
         [0.51764706, 0.49803922, 0.47058824],
         ...,
         [0.87843137, 0.87058824, 0.85490196],
         [0.90196078, 0.89411765, 0.88235294],
         [0.94509804, 0.94509804, 0.93333333]],

        [[0.5372549 , 0.51764706, 0.49411765],
         [0.50980392, 0.49803922, 0.47058824],
         [0.49019608, 0.4745098 , 0.45098039],
         ...,
         [0.70980392, 0.70588235, 0.69803922],
         [0.79215686, 0.78823529, 0.77647059],
         [0.83137255, 0.82745098, 0.81176471]],

        [[0.47843137, 0.46666667, 0.44705882],
         [0.4627451 , 0.45490196, 0.43137255],
         [0.47058824, 0.45490196, 0.43529412],
         ...,
         [0.70196078, 0.69411765, 0.67843137],
```