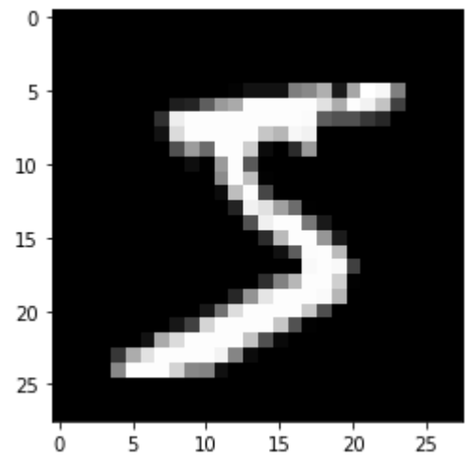
In [ ]:
```
import tensorflow.keras as keras
```

In [ ]:
```
from tensorflow.keras.datasets import mnist
from tensorflow.keras.layers import Dense, Input, Flatten,\
                                    Reshape, LeakyReLU as LR,\
                                    Activation, Dropout
from tensorflow.keras.models import Model, Sequential
from matplotlib import pyplot as plt
from IPython import display
import numpy as np
```

In [ ]:
```
(x_train, y_train), (x_test, y_test) = mnist.load_data()
x_train = x_train/255.0
x_test = x_test/255.0
```

In [ ]:
```
plt.imshow(x_train[0], cmap = "gray")
plt.show()
```



In [ ]:
```
LATENT_SIZE = 32
```

In [ ]:
```
encoder = Sequential([
    Flatten(input_shape = (28, 28)),
    Dense(512),
    LR(),
    Dropout(0.5),
    Dense(256),
    LR(),
    Dropout(0.5),
    Dense(128),
    LR(),
    Dropout(0.5),
    Dense(64),
    LR(),
    Dropout(0.5),
    Dense(LATENT_SIZE),
    LR()
])
```

In [ ]:
```
decoder = Sequential([
    Dense(64, input_shape = (LATENT_SIZE,)),
    LR(),
    Dropout(0.5),
    Dense(128),
    LR(),
    Dropout(0.5),
    Dense(256),
    LR(),
    Dropout(0.5),
    Dense(512),
    LR(),
    Dropout(0.5),
    Dense(784),
    Activation("sigmoid"),
    Reshape((28, 28))
])
```

In [ ]:
```
img = Input(shape = (28, 28))
```

In [ ]:
```
latent_vector = encoder(img)
#output = decoder(latent_vector)
print(latent_vector)
```

```
Tensor("sequential_2/leaky_re_lu_13/LeakyRelu_5:0", shape=(None, 32), dtype=float32)
```

In [ ]:
```
model = Model(inputs = img, outputs = output)
model.compile("nadam", loss = "binary_crossentropy")
```

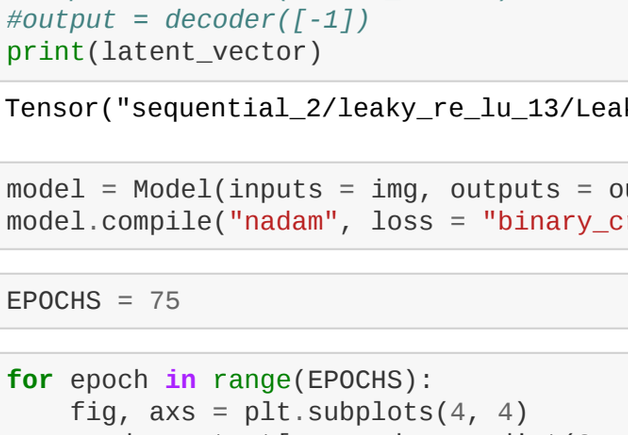
In [ ]:
```
EPOCHS = 75
```

In [ ]:
```
for epoch in range(EPOCHS):
    fig, axs = plt.subplots(4, 4)
    rand = x_test[np.random.randint(0, 10000, 16)].reshape((4, 4, 1, 28, 28))

    display.clear_output() # If you imported display from IPython

    for i in range(4):
        for j in range(4):
            axs[i, j].imshow(model.predict(rand[i, j])[0], cmap = "gray")
            axs[i, j].axis("off")

    plt.subplots_adjust(wspace = 0, hspace = 0)
    plt.show()
    print("-----------", "EPOCH", epoch, "-----------")
    model.fit(x_train, x_train)
```



```
----------- EPOCH 74 -----------
1875/1875 [==============================] - 9s 5ms/step - loss: 0.1892
```

In [ ]: