ASSIGNMENT - 5

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PROGRAM   : MCA

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SUBJECT   : INTRODUCTION TO AI

Code :

```python
import numpy as np
import matplotlib.pyplot as plt
import tensorflow as tf
from tensorflow.keras.datasets import mnist
from tensorflow.keras.models import Sequential
from tensorflow.keras.layers import Dense, Flatten
from tensorflow.keras.utils import to_categorical

(x_train, y_train), (x_test, y_test) = mnist.load_data()
plt.figure(figsize=(6, 3))
for i in range(6):
    plt.subplot(2, 3, i+1)
    plt.imshow(x_train[i], cmap='gray')
    plt.title(f"Label: {y_train[i]}")
    plt.axis('off')
plt.tight_layout()
plt.show()

x_train = x_train / 255.0
x_test = x_test / 255.0

y_train_cat = to_categorical(y_train)
y_test_cat = to_categorical(y_test)

model = Sequential([
    Flatten(input_shape=(28, 28)),
    Dense(128, activation='relu'),
    Dense(10, activation='softmax')
])

model.compile(optimizer='adam', loss='categorical_crossentropy',
metrics=['accuracy'])

history = model.fit(x_train, y_train_cat, epochs=5, batch_size=32,
validation_split=0.1)

test_loss, test_acc = model.evaluate(x_test, y_test_cat)
print(f"Test accuracy: {test_acc}")


predictions = model.predict(x_test[:5])
for i in range(5):
  plt.imshow(x_test[i], cmap='gray')
  plt.title(f"Prediction: {np.argmax(predictions[i])}")
  plt.axis('off')
```
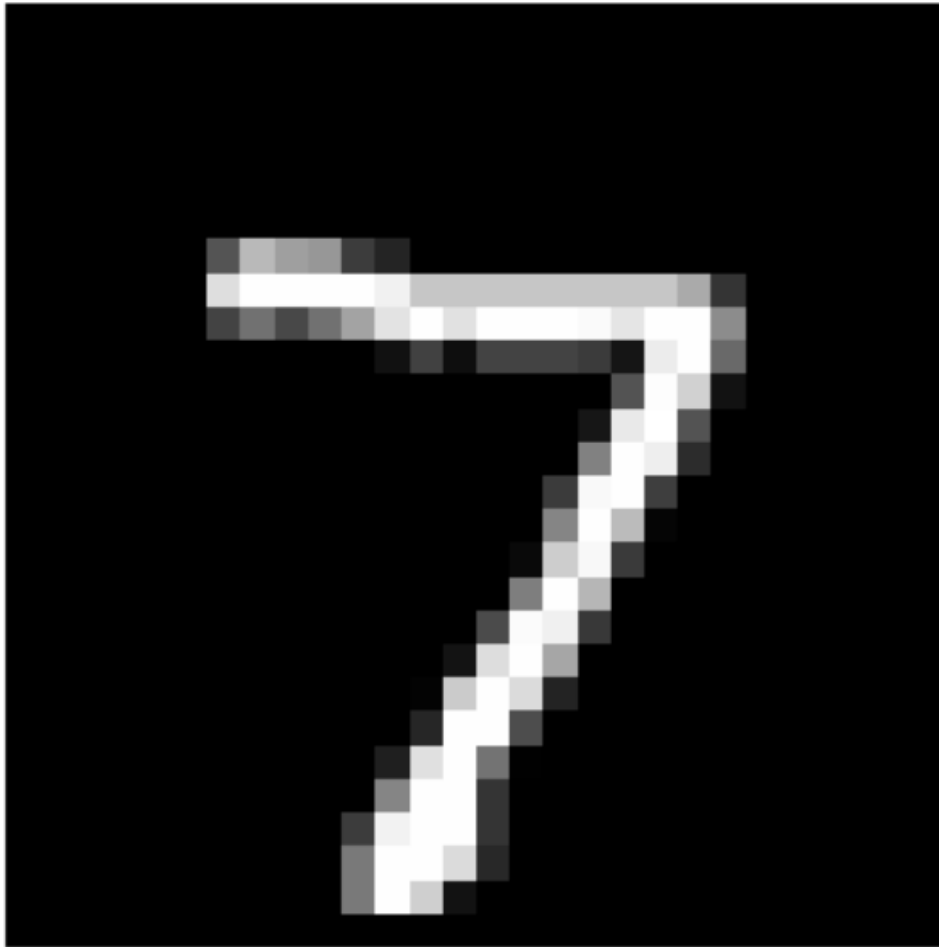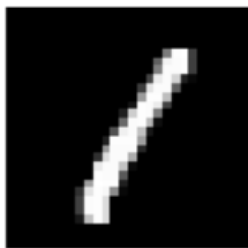
```
plt.show()
```

OUTPUT

Prediction: 7

Label: 5

Label: 0

Label: 4

Label: 1

Label: 9

Label: 2

Prediction: 1