```python
#Matematyka Konkretna
#Laboratorium 9
#Setla Joanna https://github.com/ASetla/MK
#Wariant 1

import tensorflow as tf
import numpy as np

def generate_data(num_samples=1000, num_bits=16):
    X = np.random.randint(0, 2, size=(num_samples, 16, 2))
    Y = np.abs(X[:, :, 0] - X[:, :, 1])

    X = X[:, :num_bits, :]
    Y = np.abs(X[:, :, 0] - X[:, :, 1])

    return X, Y

model = tf.keras.Sequential([
    tf.keras.layers.SimpleRNN(8, input_shape=(16, 2),
activation='relu', return_sequences=True),
    tf.keras.layers.SimpleRNN(8, activation='relu'),
    tf.keras.layers.Dense(16, activation='sigmoid')
])

model.compile(optimizer='adam', loss='mean_squared_error',
metrics=['mae'])

X_train, Y_train = generate_data()

model.fit(X_train, Y_train, epochs=10, batch_size=32)

X_test, Y_test = generate_data(10)
predictions = model.predict(X_test)

for i in range(10):
    input_data = X_test[i]
    true_output = Y_test[i]
    predicted_output = predictions[i].round()

    print(f"Wejscie: {input_data}")
    print(f"Prawdziwa roznica: {true_output}")
    print(f"Przewidziana roznica: {predicted_output}")
    print()
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Epoch 1/10
32/32 [==============================] - 1s 4ms/step - loss: 0.2504 -
mae: 0.5000
Epoch 2/10
32/32 [==============================] - 0s 4ms/step - loss: 0.2499 -
mae: 0.4996
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Epoch 3/10
32/32 [==============================] - 0s 4ms/step - loss: 0.2497 -
mae: 0.4995
Epoch 4/10
32/32 [==============================] - 0s 4ms/step - loss: 0.2495 -
mae: 0.4993
Epoch 5/10
32/32 [==============================] - 0s 4ms/step - loss: 0.2493 -
mae: 0.4990
Epoch 6/10
32/32 [==============================] - 0s 3ms/step - loss: 0.2491 -
mae: 0.4987
Epoch 7/10
32/32 [==============================] - 0s 3ms/step - loss: 0.2487 -
mae: 0.4983
Epoch 8/10
32/32 [==============================] - 0s 3ms/step - loss: 0.2481 -
mae: 0.4975
Epoch 9/10
32/32 [==============================] - 0s 3ms/step - loss: 0.2475 -
mae: 0.4967
Epoch 10/10
32/32 [==============================] - 0s 3ms/step - loss: 0.2469 -
mae: 0.4959
1/1 [==============================] - 0s 207ms/step
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