import numpy as np import base64

def encode\_3d(message): try:

# Generate a random 3D NumPy array arr = np.random.rand(20, 10, 20)

# Encode the message as base64 bytes

encoded = base64.b64encode(message.encode())

# Store the encoded message in the first 100 elements of the first slice of the array arr[0, :, :][:len(encoded)] = encoded

return arr

except Exception as e:

print("Error encoding 3D array:", str(e)) return None

def decode\_3d(arr): try:

# Extract the encoded message from the first 100 elements of the first slice of the array encoded = arr[0, :, :][:100]

# Decode the base64 bytes to a string

message = base64.b64decode(encoded).decode() return message

except Exception as e:

print("Error decoding 3D array:", str(e)) return None

# Example usage

message = "Hello, 3D world!" encoded\_arr = encode\_3d(message)

decoded\_message = decode\_3d(encoded\_arr)

if decoded\_message:

print("Original message: ", message) print("Decoded message: ", decoded\_message)

else:

print("Decoding failed.")