Golomb Encoding and Decoding

```
clc;
clear;

% Define the input data and Golomb parameter
data = [10, 5, 7, 9, 6, 9, 40];
m = 4;

% Calculate the original size in bits
max_data_value = max(data);
original_size = length(data) * ceil(log2(max_data_value + 1));  % Bits required for the origina

% Encode the data
encoded_data = golomb_encode(data, m);
disp('Encoded Data:');
```

```
Encoded Data:
```

```
disp(encoded_data);
```

```
  Columns 1 through 20

     1     1     0     1     0     1     0     0     1     1     0     1     1     1     1     0     0     1     1

  Columns 21 through 40

     1     0     1     1     0     0     1     1     1     1     1     1     1     1     1     1     1     0     0
```

```

% Calculate the compressed size in bits
compressed_size = length(encoded_data);  % Bits required for the encoded data

% Calculate the compression ratio
compression_ratio = original_size / compressed_size;
disp(['Compression Ratio: ', num2str(compression_ratio)]);
```

```
Compression Ratio: 1.05
```

```

% Decode the data
decoded_data = golomb_decode(encoded_data, m);
disp('Decoded Data:');
```

```
Decoded Data:
```

```
disp(decoded_data);
```

```
    10     5     7     9     6     9    40
```

```
disp('Input Data:');
```

```
Input Data:
```

```
disp(data);
```

```
    10     5     7     9     6     9    40
```

```
% Check if the decoded data matches the original data
if isequal(decoded_data, data)
    disp('Success: Decoded data matches the original data.');
else
    disp('Error: Decoded data does not match the original data.');
end
```

```
Success: Decoded data matches the original data.
```