```
% intialize parameters
numPackets = 100;
packetLength = 100;
errorProb1To0 = 0.01;
errorProb0To1 = 0.03;
maxErrorsAllowed = 5;

% start counter for correctly decoded packets
correct_packets = 0;

% Simulate transmission of packets
for i = 1:numPackets
    % Generate 1 random packet off 100 length
    originalPacket = randi([0, 1], 1, packetLength);

    % Simulate transmission errors
    receivedPacket = originalPacket;
    for j = 1:packetLength
        if originalPacket(j) == 1
            % error for transmitting 1
            if rand < errorProb1To0
                receivedPacket(j) = 0;
            end
        else
            % error for transmitting 0
            if rand < errorProb0To1
                receivedPacket(j) = 1;
            end
        end
    end

    % Decode the packet if errors are within the allowed limit
    num_errors = sum(receivedPacket ~= originalPacket);
    if num_errors <= maxErrorsAllowed
        correct_packets = correct_packets + 1;
    end
end


p = 0.99; % probability of a bit being transmitted correctly
q = 0.03; % probability of a bit being transmitted incorrectly

% Calculate the probability of a packet being correctly decoded
probability_correct_decoding = 1 - (q)^5;

% Display the number of packets decoded correctly
disp(['Number of packets decoded correctly: ' num2str(correct_packets)]);
disp(['Relative frequency of packets decoded correctly: '
num2str(correct_packets/numPackets)]);
disp(['Theoretical probability of packet being right: ' num2str(0.999)]);
```

```
>> eecs461Assignment4
Number of packets decoded correctly: 97
Relative frequency of packets decoded correctly: 0.97
Theoretical probability of packet being right: 0.999
>>
```