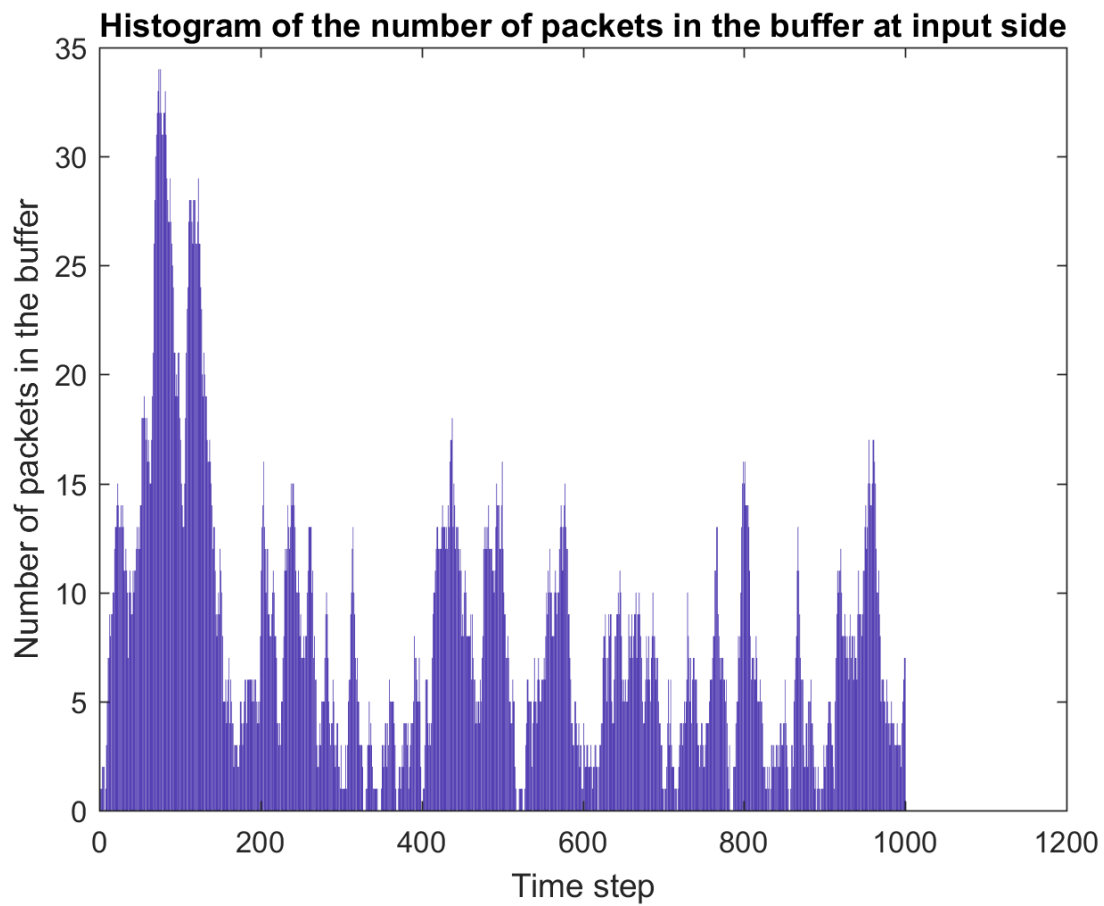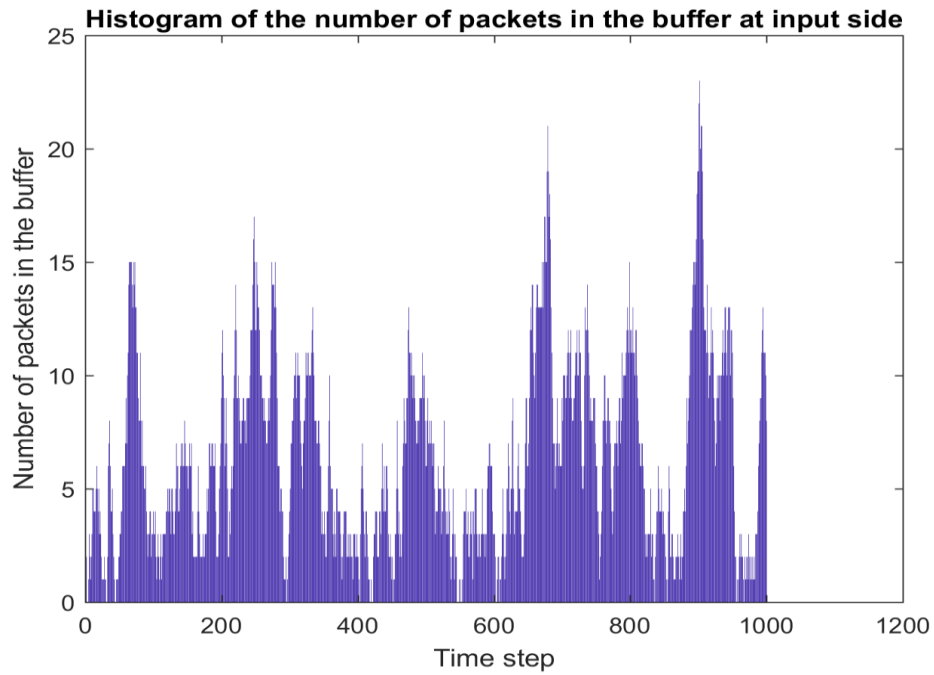This can be done for all the values of k, packet arrival probability and Buffer size.
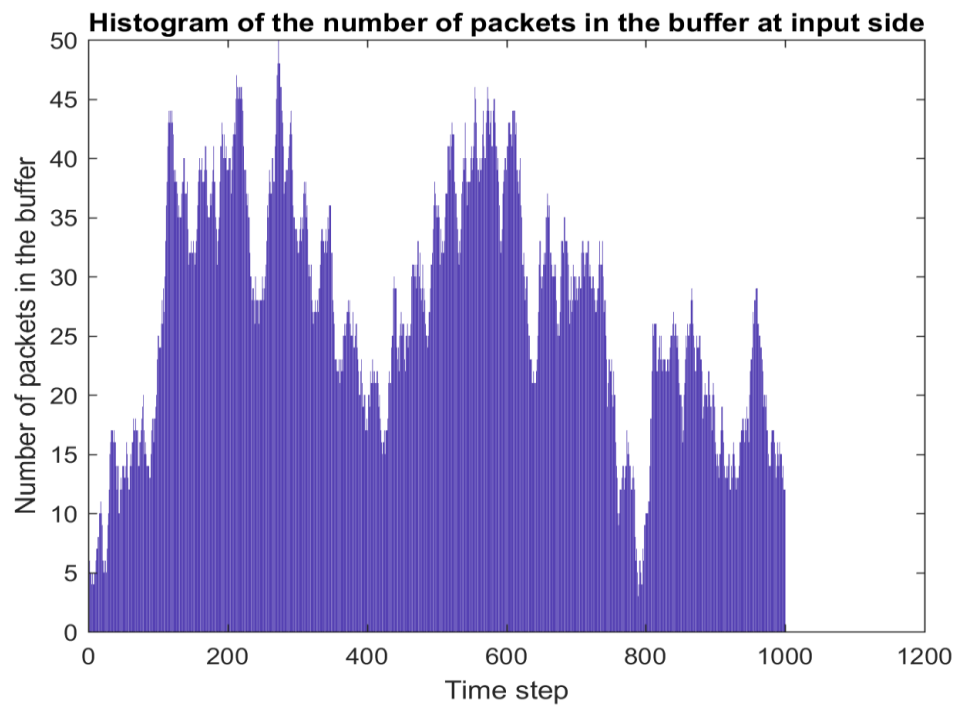
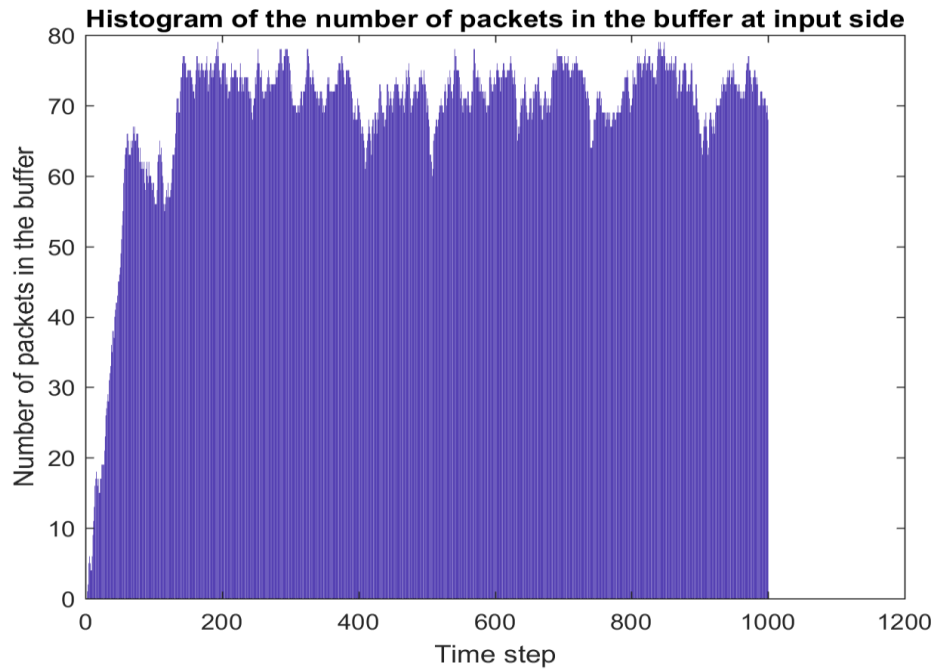Following are some of the histograms got from the simulation:

Balanced Traffic with probability of arrival of packets = 0.5 and Buffer Size = 10

Balanced Traffic with probability of arrival of packets = 0.5 and Buffer Size = 20

Balanced Traffic with probability of arrival of packets = 0.6 and Buffer Size = 10

Balanced Traffic with k = 2, probability of arrival of packets = 0.5 and Buffer Size = 10
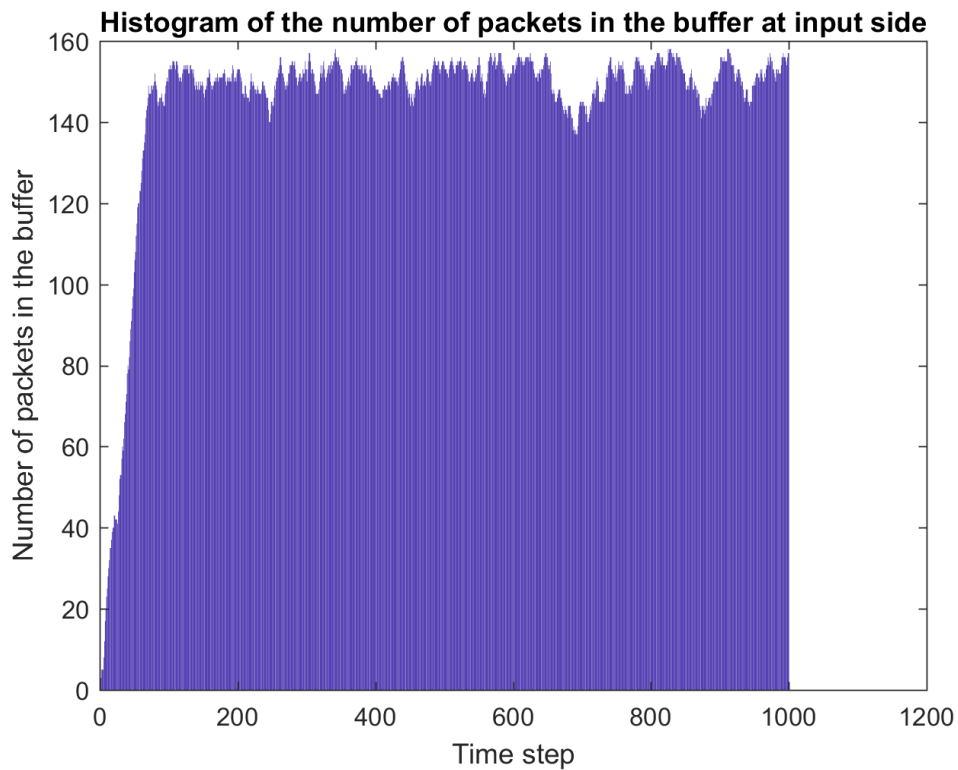

Balanced Traffic with k = 2, probability of arrival of packets = 0.5 and Buffer Size = 20
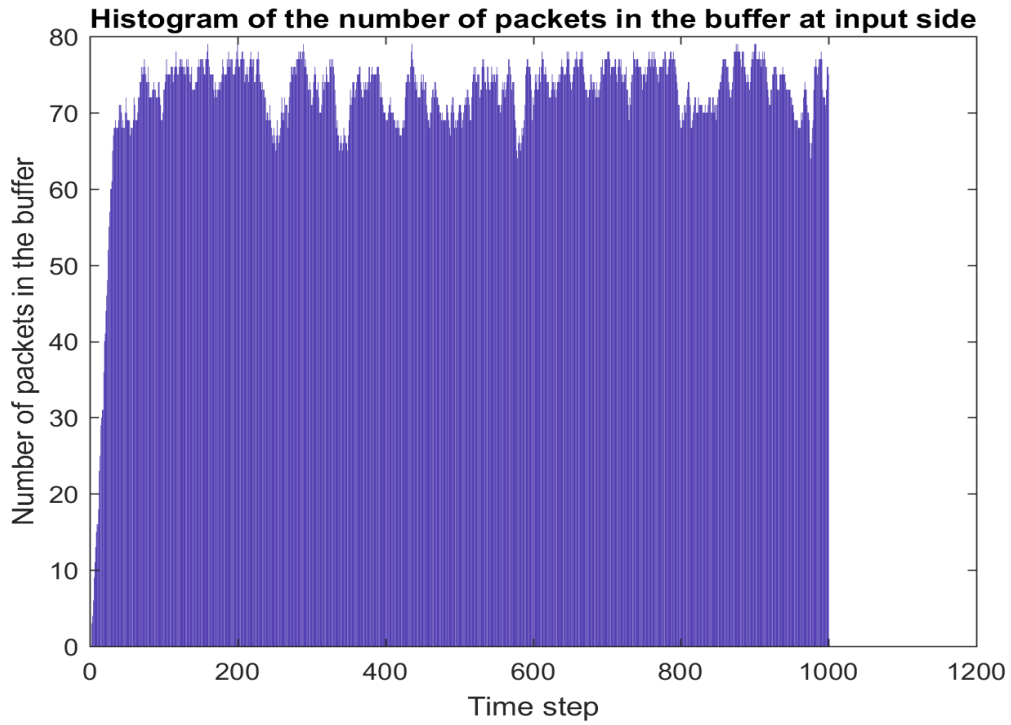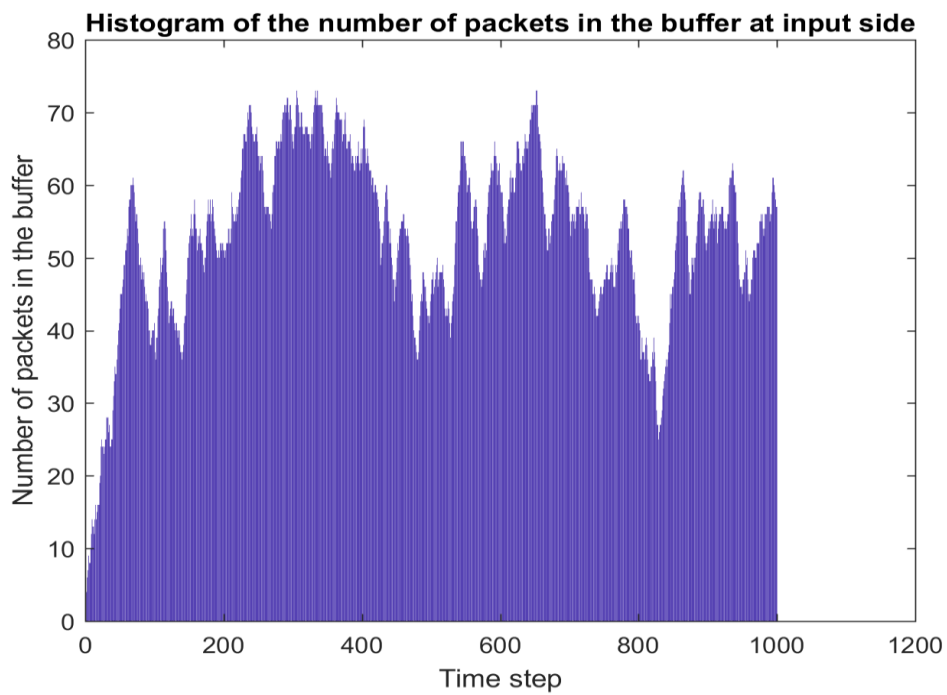
Balanced Traffic with k = 2, probability of arrival of packets = 0.6 and Buffer Size = 10

Balanced Traffic with k = 3, probability of arrival of packets = 0.5 and Buffer Size = 10

5. CODE

For Balanced Traffic,

```
close all;
clear;
clc;

prompt = 'What is the size of the switch?';
N = input(prompt)

prompt = 'What is the size of the buffer?';
B = input(prompt)

prompt = 'What is the arrival probability of a packet?';
Pa = input(prompt)

Buffer = zeros(N,B);
total = 0;
dropped = 0;
steps = 1000;
Ip = zeros(steps,1);
sum = 0;

for j = 1:steps

    Hash = zeros(N,1);

    for m = 1:N

        x = rand;
        if x < Pa
            z = find( Buffer(m,:) == 0)
            Z = isempty(z)
            if Z == 0
                Buffer(m,z(1)) = randi([1,N],1,1)
            else
                dropped = dropped + 1;
            end
        end
    end

    for m = 1:N
        if Buffer(m,1) == 0
            continue;
        end
        Hash( Buffer(m,1)) = Hash(Buffer(m,1)) + 1;
    end

    for m = 1:N
        if Hash(m,1) == 0
            continue;
        end
        Hash1(m,1) = randi([1,Hash(m,1)],1,1);
    end

    for m = 1:N
```

```matlab
            if (Buffer(m,1) == 0)
                continue;
            end
            if (Hash1(Buffer(m,1)) == 0)
                continue;
            elseif (Hash1(Buffer(m,1)) == 1)
                Hash1(Buffer(m,1)) = 0;
                Buffer(m,:) = [Buffer(m,2:end),0]
                total = total + 1;
            else
                Hash1(Buffer(m,1)) = Hash1(Buffer(m,1)) - 1;
            end
        end

    Num = nnz(Buffer);
    Ip(j,1) = Num;
    sum = sum + Num;

end

figure;
bar(Ip);
title('Histogram of the number of packets in the buffer at input side');
xlabel('Time step');
ylabel('Number of packets in the buffer');
```

For Hot Spot Traffic,

```matlab
close all;
clear;
clc;

prompt = 'What is the size of the switch?';
N = input(prompt)

prompt = 'What is the size of the buffer?';
B = input(prompt)

prompt = 'What is the arrival probability of a packet?';
Pa = input(prompt)

prompt = 'Enter value of k';
k = input(prompt)

Buffer = zeros(N,B);
total = 0;
dropped = 0;
steps = 1000;
Ip = zeros(steps,1);
sum = 0;

for j = 1:steps

    Hash = zeros(N,1);

    for m = 1:N
```

```matlab
            x = rand;
            if x < Pa
                z = find( Buffer(m,:) == 0)
                Z = isempty(z)
                if Z == 0
                    y = rand;
                    if y < 1/k
                        Buffer(m,z(1)) = 1;
                    else
                        Buffer(m,z(1)) = randi([2,N],1,1);
                    end
                else
                    dropped = dropped + 1;
                end
            end
        end

        for m = 1:N
            if Buffer(m,1) == 0
                continue;
            end
            Hash( Buffer(m,1)) = Hash(Buffer(m,1)) + 1;
        end

        for m = 1:N
            if Hash(m,1) == 0
                continue;
            end
            Hash1(m,1) = randi([1,Hash(m,1)],1,1);
        end

        for m = 1:N
            if (Buffer(m,1) == 0)
                continue;
            end
            if (Hash1(Buffer(m,1)) == 0)
                continue;
            elseif (Hash1(Buffer(m,1)) == 1)
                Hash1(Buffer(m,1)) = 0;
                Buffer(m,:) = [Buffer(m,2:end),0]
                total = total + 1;
            else
                Hash1(Buffer(m,1)) = Hash1(Buffer(m,1)) - 1;
            end
        end

        Num = nnz(Buffer);
        Ip(j,1) = Num;
        sum = sum + Num;

    end

figure;
bar(Ip);
title('Histogram of the number of packets in the buffer at input side');
xlabel('Time step');
ylabel('Number of packets in the buffer');
```