Appendix B:
This code illustrates the simulation of AVQ using different values of Bandwidth and fixed number of packets.

\%? is the arrival rate at the link
\%C is virtual queue whose capacity
\% ? > 0 is the smoothing parameter
\%B = buffer size
\% s = arrival time of previous packet
\%t = Current time
\%b = number of bytes in current packet
\%VQ = No of bytes currently in virtual queue  \%virtual queue capacity C =?(?C ? ?)
\%? Desired utilization <1

clc, close all, clear all;
prompt =('Please Enter Number of Total Packets\n');%set total packet number
number_packets = input(prompt); % wait for user entry

prompt = ('Please Enter arrival rate at the link\n'); % set arrival rate
arrival_rate = input(prompt); % wait for user entry

\%B=1000;
x=0;

for B=100:100:5000
    x=x+1;
    b = randi(1000,1,number_packets); % generate random size of each packet
    random_packet_size
    time=0:number_packets-1; % set over all time of simulation accourding to the processing items
    s=randi(440,1,number_packets); %s  packet_arrive_time
t=time;
figure(1) % view the bytes of each packet during time
plot(time,b,'color','r','marker','.','Linewidth',0.5);
title('Bytes in each packet');
xlabel('Packets');
ylabel('Packets in Bytes');
legend('Bytes');

figure(2) % view the number of packets during
bar(1:1:number_packets);
title('Number of packets');
xlabel('Time in seconds');
ylabel('No. of Packet');
legend('Number of Packets');

alpha=0.8;
gamma=4;

C=20;
C = alpha*(0.98*C - gamma);

VQ=b;
drop=0;

for i=1:number_packets
    VQ(i)=VQ(i)-gamma*b(i);
    VQ(i)=VQ(i)-1;
    VQ_max=max(VQ(i),0);
    if (VQ_max+b(i)>B)
        drop=drop+1;
    else
        VQ(i)=VQ_max+b(i);
end

\[ C = \max(\min(C + 0.98 * 0.8 * 100 * (t - s), C) - \alpha * b, 0) \];

end
drops(x)=drop;
end

%AVQ_Comp(C);
BS=100:100:5000;

figure (3)
plot (BS,drops,'color','r','marker','.','Linewidth',0.5);
title('Packet Drop with Different Bandwidth Configuration');
xlabel('Bandwidth');
ylabel('No. of Packet Dropped');

legend('AVQ Packet Dropped');