

BÁO CÁO THỰC HÀNH LAB 5

Môn: Thực hành truyền thông số và dữ liệu

Họ và tên: Lê Hoàng Nam – MSSV: 21207246

Câu 1&2:

```
m=10; % The number of frames
n=7; % The frame length
div=[1 0 0 1];
msg=randi([0,1],m,n);
sn=1;
while(sn<=m)
    pac(sn,:)=MakeFrame(msg(sn,:),div);
    sn=sn+1;
end
```

Dữ liệu ban đầu:

	1	2	3	4	5	6	7	8
1	1	1	0	1	1	0	0	1
2	1	1	1	0	0	0	1	0
3	0	1	1	1	0	1	1	1
4	1	0	1	1	0	1	0	1
5	1	1	1	1	0	0	0	1
6	0	0	1	1	1	0	0	1
7	0	0	1	1	0	1	1	1
8	1	1	0	0	1	0	0	0
9	1	1	1	1	1	1	1	0
10	1	1	1	0	0	1	0	0

Dữ liệu sau mã hóa CRC:

	1	2	3	4	5	6	7	8	9	10	11	12
1	0	1	1	1	1	1	1	0	1	1	0	1
2	0	1	1	1	1	1	1	0	1	1	0	0
3	0	1	1	1	1	1	1	0	0	1	1	0
4	0	1	1	1	1	1	1	0	1	0	1	0
5	0	1	1	1	1	1	1	0	1	1	1	0
6	0	1	1	1	1	1	1	0	0	0	1	1
7	0	1	1	1	1	1	1	0	0	0	1	1
8	0	1	1	1	1	1	1	0	1	1	0	0
9	0	1	1	1	1	1	1	0	1	1	1	1
10	0	1	1	1	1	1	1	0	1	1	0	0

Câu 3:

```
clear;clc
m=10; % The number of frames
n=7; % The frame length
div=[1 0 0 1];
msg=randi([0,1],m,n);
sn=1;
tx=[];
pac=[];
msgrx=[];
px=0.1;
while(sn<=m)
    pac(sn,:)=MakeFrame(msg(sn,:),div);
    tx(sn,:) = pac(sn,:);
    cn=sn;
    sn=sn+1;
    msgrx(cn,:)=bsc(tx(cn,:),px);
end
```

Dữ liệu thu được sau khi qua kênh truyền nhị phân:

	1	2	3	4	5	6	7	8	9	10	11	12
1	0	1	1	1	1	1	0	1	0	1	0	1
2	0	1	1	1	1	1	0	0	0	1	0	0
3	0	1	1	1	1	1	1	0	1	1	1	0
4	0	1	1	1	1	1	1	0	0	1	1	1
5	0	1	1	1	1	1	1	0	1	1	1	0
6	0	1	1	1	1	1	1	0	0	0	1	1
7	0	1	1	1	1	1	1	0	0	1	1	0
8	0	1	1	1	1	1	1	0	0	1	0	1
9	0	1	1	1	1	1	1	0	1	1	0	1
10	1	0	1	0	1	1	1	0	0	1	0	1

Câu 4&5:

```
clear;clc
%stop n wait protocol
```

```

pass=0; % The total number of transmitted frames
m=10; % The number of frames
n=7; % The frame length
tx=zeros(m,m);
RequestToSend = true;
Arrivaltx = false;
arivalrx=false;
canSend = true;
sn=1;
rn = 1;

div=[1 0 0 1];
msg=randi([0,1],m,n);
pac=[];
msgrx=[];
tx = [];
px=1;
%timer = 0.002; %timeout
while(sn<=m)
    pass=pass+1;
    %=====Transmitter
    if (RequestToSend&&canSend)
        pac(sn,:)=MakeFrame(msg(sn,:),div);
        tx(sn,:)= pac(sn,:);
        fprintf('Tx - Truyen frame thu %d \n',sn); %tic
        cn = sn;
        sn =sn+1;
        canSend = false;
        arivalrx=true;
    end

    %=====Channel
    msgrx(cn,:)=bsc(tx(cn,:),px);

    %=====Receiver
    if (arivalrx)
        if (msgrx(cn,1:8)==[0 1 1 1 1 1 1 0])
            fprintf('Rx - Nhan duoc frame %d \n',rn);
            [q2,r2]=deconv(msgrx(cn,:),div);
            r2(1,:)=mod(r2(1,:),2);
            arivalrx=false;
            canSend = true;
            if r2==0
                rn=rn+1;
                fprintf('Rx - San sang nhan frame thu %d \n',rn);
            else
                rn=rn+1;
                fprintf('Rx - Sai khong truyen lai %d\n',rn);
            end
        else
            fprintf('Rx - Khong nhan duoc frame %d \n',rn);
        end
    end
end
end

```

Câu 6:

```
clear;clc
%stop n wait protocol
pass=0; % The total number of transmitted frames
m=10; % The number of frames
n=7; % The frame length
tx=zeros(m,m);
RequestToSend = true;
Arrivaltx = false;
arivalrx=false;
canSend = true;
sn=1;
rn = 1;

div=[1 0 0 1];
msg=randi([0,1],m,n);
pac=[];
msgrx=[];
tx = [];
px=1;
timer = 0.002; %timeout
while(sn<=m)
    pass=pass+1;
    %=====Transmitter
    if (RequestToSend&&canSend)
        pac(sn,:)=MakeFrame(msg(sn,:),div);
        tx(sn,:)= pac(sn,:);
        fprintf('Tx - Truyen frame thu %d \n',sn); tic
        cn = sn;
        sn =sn+1;
        canSend = false;
        arivalrx=true;
    end

    %=====Channel
    msgrx(cn,:)=bsc(tx(cn,:),px);

    %=====Set timeout
    if (toc > timer)
        canSend = true;
        px=0;
        sn = sn-1;
    end

    %=====Receiver
    if (arivalrx)
        if (msgrx(cn,1:8)==[0 1 1 1 1 1 0])
            fprintf('Rx - Nhan duoc frame %d \n',rn);
            [q2,r2]=deconv(msgrx(cn,:),div);
            r2(1,:)=mod(r2(1,:),2);
            arivalrx=false;
            canSend = true;
            if r2==0
```

```

                rn=rn+1;
                fprintf('Rx - San sang nhan frame thu %d \n',rn);
            else
                rn=rn+1;
                fprintf('Rx - Sai khong truyen lai %d\n',rn);
            end
        else
            fprintf('Rx - Khong nhan duoc frame %d \n',rn);
        end
    end
end
end

```

Câu 7:

```

clear;clc
%stop n wait protocol
pass=0; % The total number of transmitted frames
m=10; % The number of frames
n=7; % The frame length
tx=zeros(m,m);
RequestToSend = true;
Arrivaltx = false;
arivalrx=false;
canSend = true;
sn=1;
rn = 1;

div=[1 0 0 1];
msg=randi([0,1],m,n);
pac=[];
msgrx=[];
tx = [];
px = 0;
prx = 1;
timer = 0.002; %timeout
while(sn<=m)
    pass=pass+1;
    %=====Transmitter
    if (RequestToSend&&canSend)
        pac(sn,:)=MakeFrame(msg(sn,:),div);
        tx(sn,:)= [pac(sn,1:8) mod(sn,2) pac(sn,9:18)]; % Add 1 bit
        fprintf('Tx - Truyen frame thu %d \n',sn); tic
        cn = sn;
        sn =sn+1;
        canSend = false;
        arivalrx=true;
    end

    %=====Channel
    msgrx(cn,:)=bsc(tx(cn,:),px);

    %=====Set timeout
    if (toc > timer)
        canSend = true;
    end
end

```

```

        px=0;
        sn = sn-1;
    end
    %=====Receiver
    if (arivalrx)
        if (msgrx(cn,1:8)==[0 1 1 1 1 1 1 0])
            if (msgrx(cn,9)==mod(rn,2)) % Check ACK
                fprintf('Rx - Nhan duoc frame %d \n',rn);
                %====CRC
                [q2,r2]=deconv(msgrx(cn,10:19),div);
                r2(1,:)=mod(r2(1,:),2);
                arivalrx=false;
                canSend = true;
                canSend = bsc(canSend,prx); % ACK loss
                prx = 0;
                if r2==0
                    rn=rn+1;
                    fprintf('Rx - San sang nhan frame thu %d \n',rn);
                else
                    rn=rn+1;
                    fprintf('Rx - Sai khong truyen lai %d\n',rn);
                end
            else
                fprintf('Rx - Trung bo frame thu %d \n',cn);
                canSend = true;
            end
        else
            fprintf('Rx - Khong nhan duoc frame %d \n',rn);
        end
    end
end
end

```

Câu 8:

Tx - Truyen frame thu 1 Rx - Nhan duoc frame 1 Rx - San sang nhan frame thu 2 Tx - Truyen frame thu 1 Rx - Trung bo frame thu 1 Tx - Truyen frame thu 2 Rx - Nhan duoc frame 2 Rx - San sang nhan frame thu 3	Frame thứ 1 bị trùng
--	----------------------

Câu 9:

```

clear;clc
%stop n wait protocol
pass=0; % The total number of transmitted frames
m=10; % The number of frames
n=7; % The frame length
tx=zeros(m,m);

```

```

RequestToSend = true;
Arrivaltx = false;
arivalrx=false;
canSend = true;
sn=1;
rn = 1;

div=[1 0 0 1];
msg=randi([0,1],m,n);
pac=[];
msgrx=[];
tx = [];
px = 0;
prx = 0.5;
timer = 0.002; %timeout
while(sn<=m)
    pass=pass+1;
    %=====Transmitter
    if (RequestToSend&&canSend)
        pac(sn,:)=MakeFrame(msg(sn,:),div);
        tx(sn,:)= [pac(sn,1:8) mod(sn,2) pac(sn,9:18)]; % Add 1 bit
        fprintf('Tx - Truyen frame thu %d \n',sn); tic
        cn = sn;
        sn =sn+1;
        canSend = false;
        arivalrx=true;
    end

    %=====Channel
    msgrx(cn,:)=bsc(tx(cn,:),px);

    %=====Set timeout
    if (toc > timer)
        canSend = true;
        px=0;
        sn = sn-1;
    end

    %=====Receiver
    if (arivalrx)
        if (msgrx(cn,1:8)==[0 1 1 1 1 1 1 0])
            if (msgrx(cn,9)==mod(rn,2)) % Check ACK
                fprintf('Rx - Nhan duoc frame %d \n',rn);
                %====CRC
                [q2,r2]=deconv(msgrx(cn,10:19),div);
                r2(1,:)=mod(r2(1,:),2);
                arivalrx=false;
                canSend = true;
                canSend = bsc(canSend,prx); % ACK loss

                if r2==0
                    rn=rn+1;
                    fprintf('Rx - San sang nhan frame thu %d \n',rn);
                else
                    rn=rn+1;
                    fprintf('Rx - Sai khong truyen lai %d\n',rn);
                end
            end
        end
    end
end

```

<pre> end else fprintf('Rx - Trung bo frame thu %d \n',cn); canSend = true; end else fprintf('Rx - Khong nhan duoc frame %d \n',rn); end end end end </pre>	
<p> Tx - Truyen frame thu 1 Rx - Nhan duoc frame 1 Rx - San sang nhan frame thu 2 Tx - Truyen frame thu 1 Rx - Trung bo frame thu 1 Tx - Truyen frame thu 2 Rx - Nhan duoc frame 2 Rx - San sang nhan frame thu 3 Tx - Truyen frame thu 2 Rx - Trung bo frame thu 2 Tx - Truyen frame thu 3 Rx - Nhan duoc frame 3 Rx - San sang nhan frame thu 4 Tx - Truyen frame thu 4 Rx - Nhan duoc frame 4 Rx - San sang nhan frame thu 5 Tx - Truyen frame thu 4 Rx - Trung bo frame thu 4 Tx - Truyen frame thu 5 Rx - Nhan duoc frame 5 Rx - San sang nhan frame thu 6 Tx - Truyen frame thu 6 Rx - Nhan duoc frame 6 Rx - San sang nhan frame thu 7 Tx - Truyen frame thu 6 Rx - Trung bo frame thu 6 Tx - Truyen frame thu 7 Rx - Nhan duoc frame 7 Rx - San sang nhan frame thu 8 Tx - Truyen frame thu 8 Rx - Nhan duoc frame 8 Rx - San sang nhan frame thu 9 Tx - Truyen frame thu 8 Rx - Trung bo frame thu 8 Tx - Truyen frame thu 9 Rx - Nhan duoc frame 9 Rx - San sang nhan frame thu 10 </p>	<p> Thay đổi xác suất lỗi của gói ACK là 0.5. Xác suất các gói ACK bị mất (phía phát gửi trùng gói tin, không đưa giá trị prx về 0) cao hơn so với câu 7 (đưa prx về 0 sau lần trùng đầu tiên). Các gói tin bị trùng: 1, 2, 4, 6, 8 </p>

Tx - Truyen frame thu 9 Rx - Trung bo frame thu 9 Tx - Truyen frame thu 10 Rx - Nhan duoc frame 10 Rx - San sang nhan frame thu 11	
--	--