Vidyavardhini's College of Engineering and Technology

Department of Artificial Intelligence & Data Science

AY: 2025-26

Class:	TE-AIDS	**Semester:**	V
Course Code:	CSC501	**Course Name:**	CN

Name of Student:	Divya Davane
Roll No. :	13
Assignment No.:	2
Title of Assignment:	Communication Mechanism like services
Date of Submission:	~~29/7/25~~ 5/8/25
Date of Correction:	

Evaluation

Performance Indicator	Max. Marks	Marks Obtained
Completeness	5	04
Demonstrated Knowledge	3	03
Legibility	2	02
Total	10	09

Performance Indicator	Exceed Expectations (EE)	Meet Expectations (ME)	Below Expectations (BE)
Completeness	5	3-4	1-2
Demonstrated Knowledge Legibility	3	2	1
Legibility	2	1	0

Checked by

Name of Faculty :

Signature :

Date : 28/09

CN Assignment - 2

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Q:1 A pure ALOHA network transmits 200 bits frames on a shared channel of 200 kbps. Find the throughput of the system (all station together) produces
a) 1000 frames all per second?
b) 500 frames per second?
c) 250 frames per second?

→ Frames transmission time is t is 200 bits / 200 kbps or 1ms

- The vulnerable time is $2t = 2 \times 1ms = 2ms$
- This means no station should send 1m/s before or after this station starts transmission.
- The throughput for pure ALOHA is $S = Ge^{-2G}$ — (1)

a) If the stations produces 1000 frames per second, ie 1 frames per millisecond.
The load is 1. put $G = 1$ in eq^n (1) $S = Ge^{-2G}$ or $S = 0.135$ (13.5%)
∴ The throughput is $1000 \times 0.135 = 135$ frames.
Only 135 frames out of 1000 would be probably transmitted successfully (survive)

b) If the stations produces 500 frames per second, this is (1/2) frame per millisecond:
The load is (1/2). put $G = 1/2$ in eqn (1)
$S = Ge^{-2G}$ or $S = 0.184$ (18.4%)
Therefore, the throughput is $500 \times 0.184 = 92$ frames
Only 92 frames out of 500 would be probably transmitted successfully (survive)
∴ Throughput $500 \times 0.184 = 92$ and only 92 frames out of 500 will probably survive.

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c) If the stations produces 250 per second, ie 1 frames per millisecond
The load is (1/4) put $G = 1/4$ in eqn (1)
The thoroughput is $250 \times 0.152 = 38$ frame
Only 38 frames out of 250 would be probably transmitted successfully (survive)

Q.2 A bit stream 1001101 is transmitted using the standard CRC method. The generator polynomial is $x^3 + 1$
i) what is actual bit string transmitted?
ii) Suppose the third bit from the left is inverted during transmitted, How will receiver detect the error
iii) Suppose the third bit from the left is inverted during transmission, how will receiver detect the error

An The generator polynomial $G(x) = x^3 + 1$ is encoded as 1001

- Clearly the generator polynomial consist of 4 bits
- So a string of 3 zeros is appended to the bit stream to be transmitted

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```
      10001100
1001 ) 10011101000
     ⊕ 1001↓||||||
     ⊕  0001 |||||
        0000↓||||
         0011 ||||
     ⊕   0000↓|||
          0110 |||
     ⊕    0000↓||
           1101 ||
     ⊕     1001↓|
            1000 |
     ⊕      1001↓
             0010
     ⊕       0000↓
              0100
     ⊕        0000
               100 → CRC remainder
```

a) Now the binary division is performed as from here, CRC = 100
Thus, the code word transmitted to the receiver = 10111011100

b) Receiver receives the bit stream = 10111011100

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The remainder obtained on division is a non-zero value. This indicate to the receiver that an error occured in the data during the transmission. Therefore, receiver rejects the data & asks the sender for transmission.