DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
SUBJECT CODE: 19CS2109
COMPUTER NETWORKS AND SECURITY

ERROR DETECTION#2

Date of the Session: ___/___/___ **Time of the Session: _____to_____**

Learning outcomes:

- General idea of what Error Control is. [stanford.edu]
- Understand the Error Detection methods like CRC and parity.

IN-TUTORIAL:

1. The message 110010011 is to be transmitted using the generator polynomial x^3+1 to protect it from errors. Find the final data to be transmitted after performing CRC.Also check for errors on the received data using CRC.

Solution:

CNS Tutorial-2 190031187 Radhakrishna

In-Tutorial

1. Data = 110010011

Generator polynomial = x^3+1

$= 1\cdot x^3 + 0\cdot x^2 + 0\cdot x^1 + 1\cdot x^0$

Generator(Binary): 1001

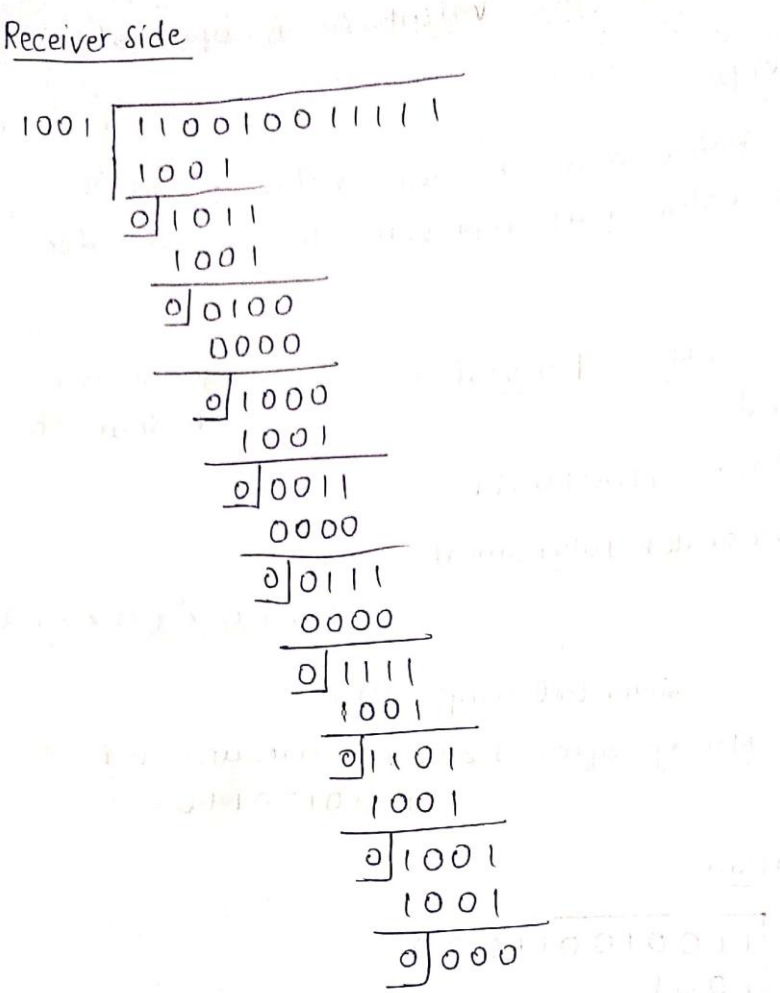
Message after 3 zero bits are appended

110010011000

calculation

```
1001 | 110010011000
       1001
       ----
       0011
       0000
       ----
       0110
       0000
       ----
       1100
       1001
       ----
       1010
       1001
       ----
       0110
       0000
       ----
       1100
       1001
       ----
       1010
       1001
       ----
       0111   Remainder
```

∴ Sender data/ Transmitted data = 110010011111



2. A bitstream 10011101 is transmitted using the standard CRC method. The generator polynomial is x^3+1
   a. What is actual bit string transmitted?
   b. Suppose the third bit from the left is inverted during transmission. How will receiver detect the error?

Solution:

2. Bit stream - 10011101

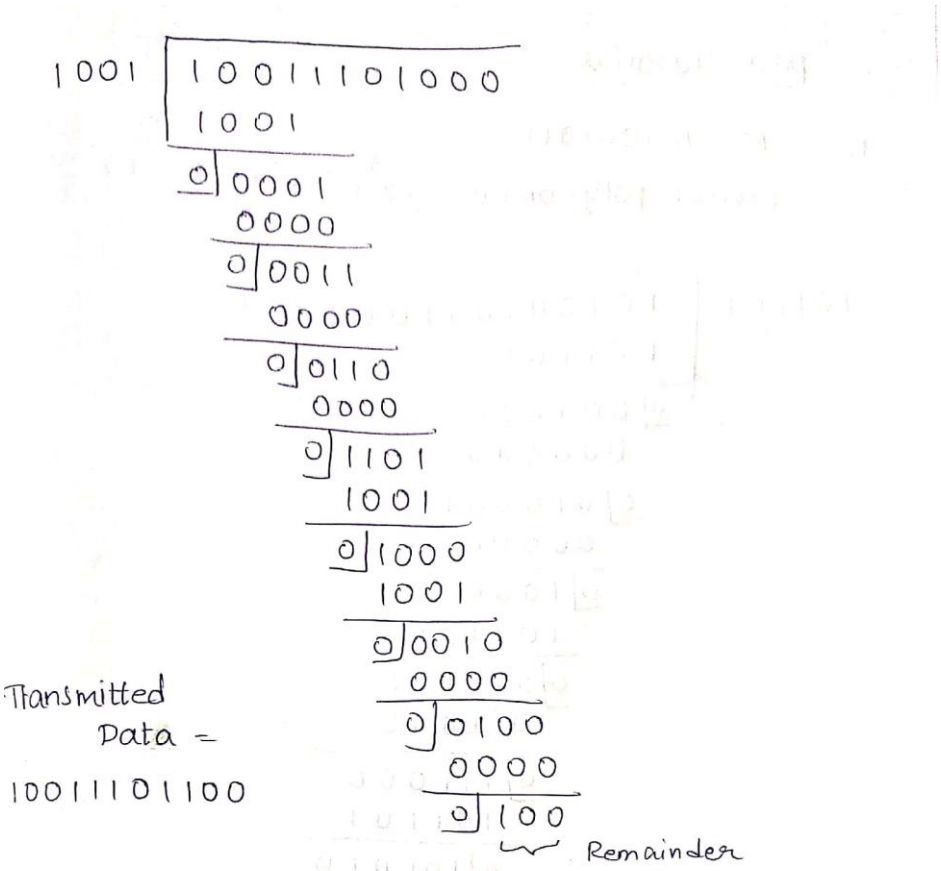
Generator polynomial $= x^3+1$

$= 1.x^3+0.x^2+0.x^1+1.x^0$

Generator - 1001

Message after adding 3 zero bits

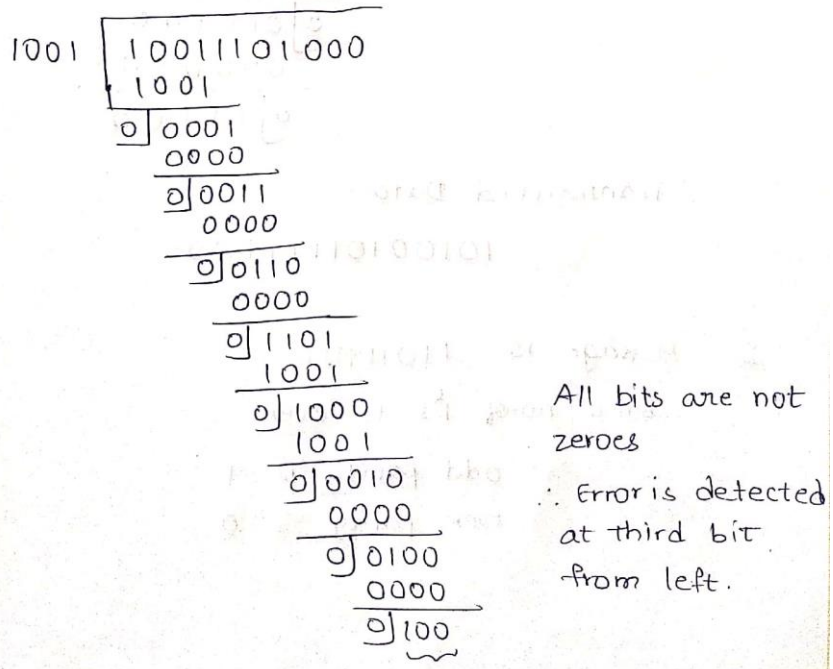
10011101000



Transmitted Data = 10011101100

a) Actual bit string transmitted - 10011101100

b) Inverted third bit from left - 10011101000



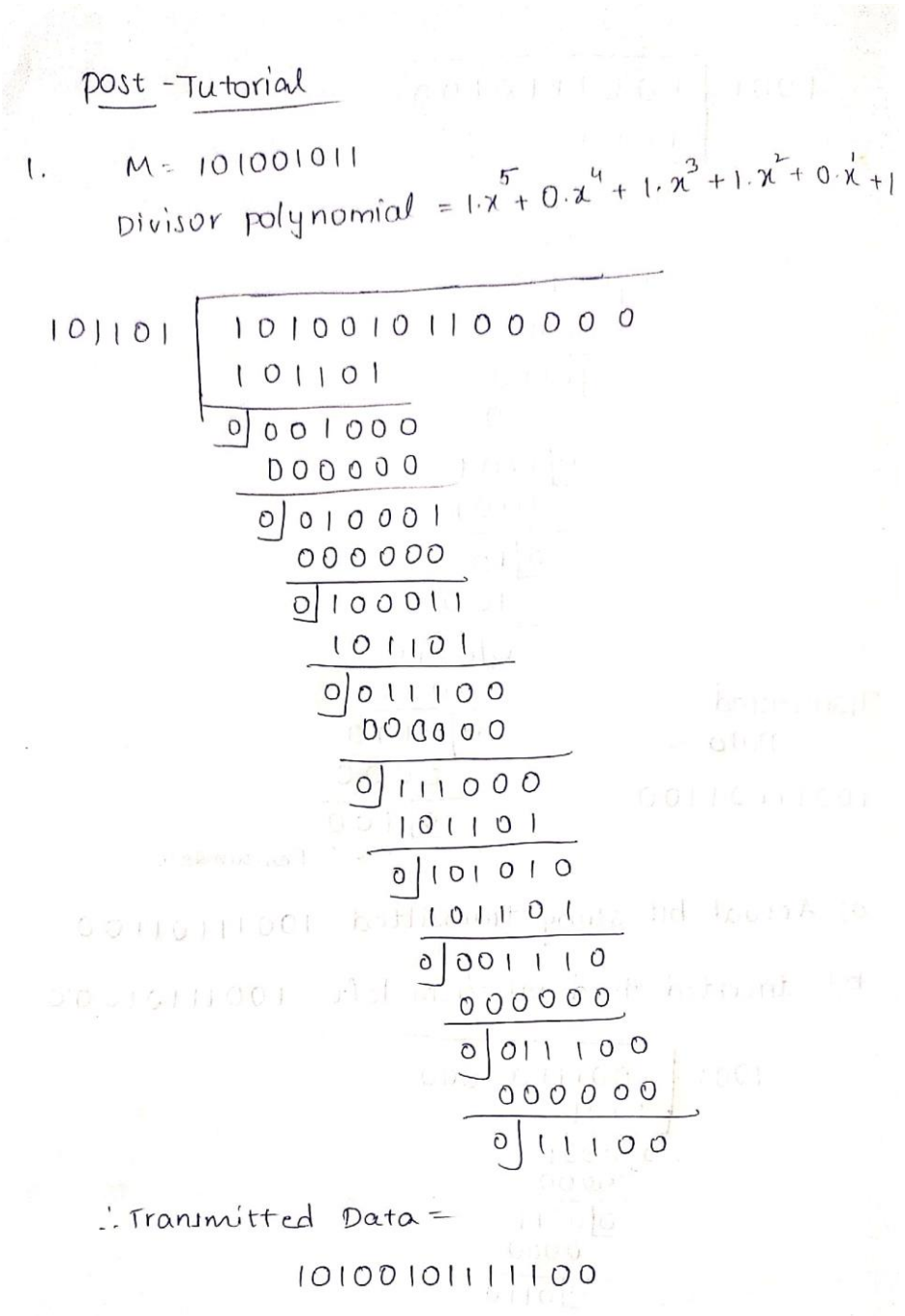
All bits are not zeroes

∴ Error is detected at third bit from left.

POST-TUTORIAL:

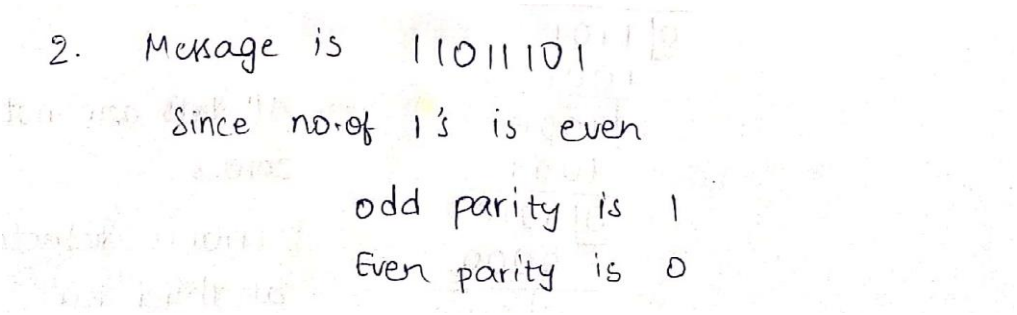
1. Consider the message M=101001011 and do the Cyclic Redundancy check for the above message using the following divisor polynomial $x^5 + x^3 + x^2 + 1$.

Solution:



2. For the given message 11011101, find the even and odd parity and then write a python code.

Solution:



(For Evaluator's use only)

Comment of the Evaluator (if Any)	Evaluator's Observation Marks Secured: _____ out of _____ Full Name of the Evaluator: Signature of the Evaluator Date of Evaluation:

NAME: NERELLA VENKATA RADHAKRISHNA

ID: 190031187

TUTORIAL-2

In [2]:

```
bit = input("Enter bit stream:")
l = list(bit)
e = 1
for i in range(len(bit)):
    l[i] = int(l[i])
    if(l[i]!=1 and l[i]!=0):
        print("Incorrect bit stream (it should contain only 0 and 1)")
        e=0
        break
if e!=0:
    s = sum(l)
    if s%2==0:
        print("Odd parity = 1")
        print("Even parity = 0")
    else:
        print("Odd parity = 0")
        print("Even parity = 1")
```

```
Enter bit stream:1011101
Odd parity = 0
Even parity = 1
```