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TE 01
31124

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Assignment 03

Problem statement:

Write a program for error detection or correction for 7/8 bit ASCII codes using Humming codes or CRC

Title: Humming method for error detection

Defination: To find single bit error in recieved data using humming method.

Requirement:

Operating system: windows 10 64 bit
language python 3+
IDE/editor: vscode

Theory:

When bits are transferred in computer networks, they sometimes get corrupted dut to interference and network problems.

Error correcting codes are sequence of code generated to detect erron in recieved string.

Methods for detecting error:

1. CRC
2. Humming.

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Humming method :

1. Encoding a message by humming code.

(a.) calculate no of redundent bits using $2^r \geq m+r+1$ where m → len of message r is no of redundant bits.

(b.) positioning the bits: The bits are positioned at 2^i position $i \rightarrow 0,1,\cdots r$

(c) calculating value of redundant bits: for each bit starting at that bit move left taking i leaving i elements. if parity is even put r as 1 else 0.

2. Decoding message

(a) calculating no. of redundant bits using same formula using used while encoding.

(b) positioning the bits from ~~left to~~ right to left.

(c) parity checking: similar to the encoding parity is checked for each redundant bit and then it is used to detect error.

(d) Error detection and correction: The bits are placed from left to right and if they form a binary number except, we have error at that position.

Humming method is used to detect as well as correct single bit error while CRC is used to detect error only.

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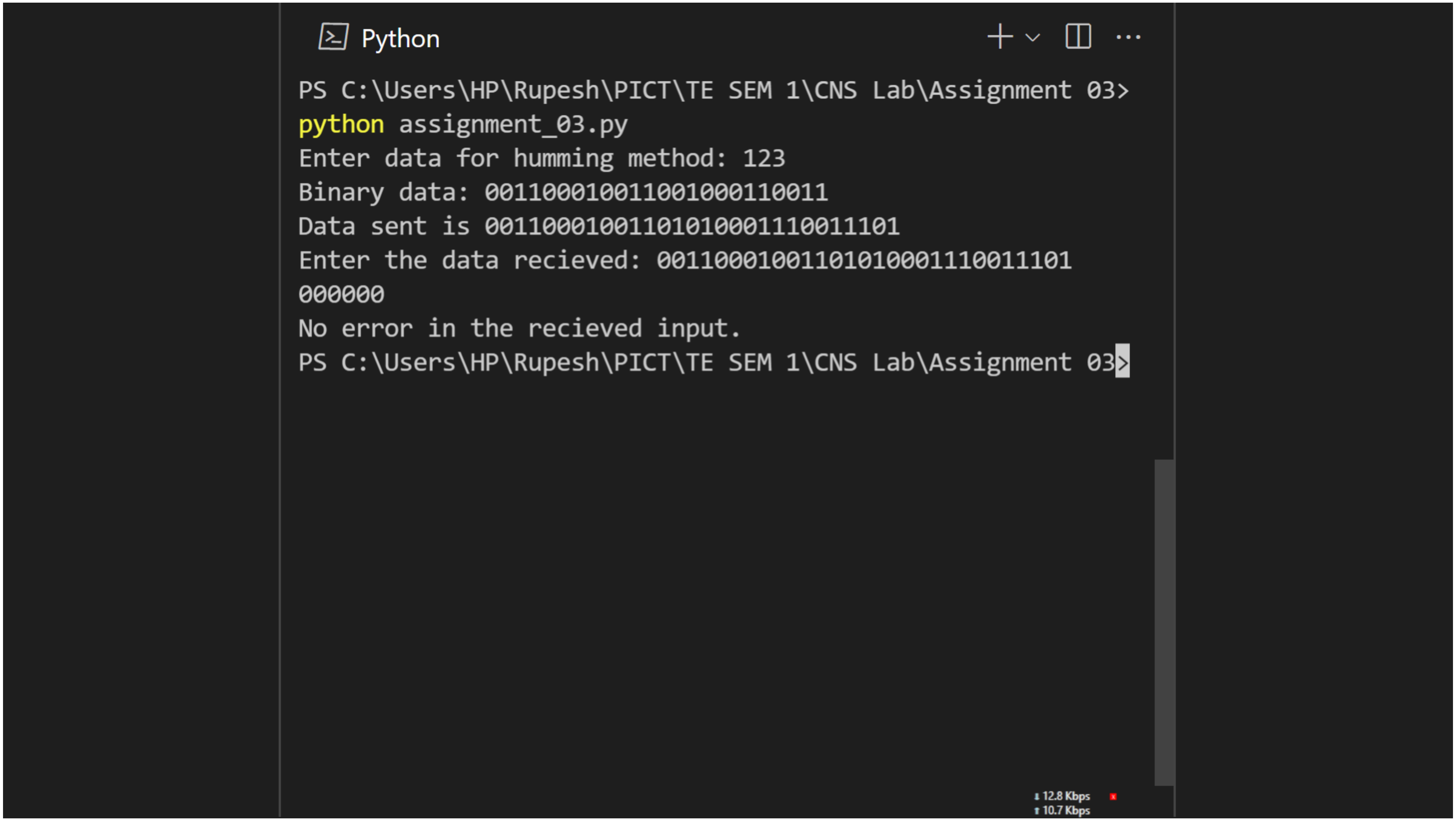
Test cases.

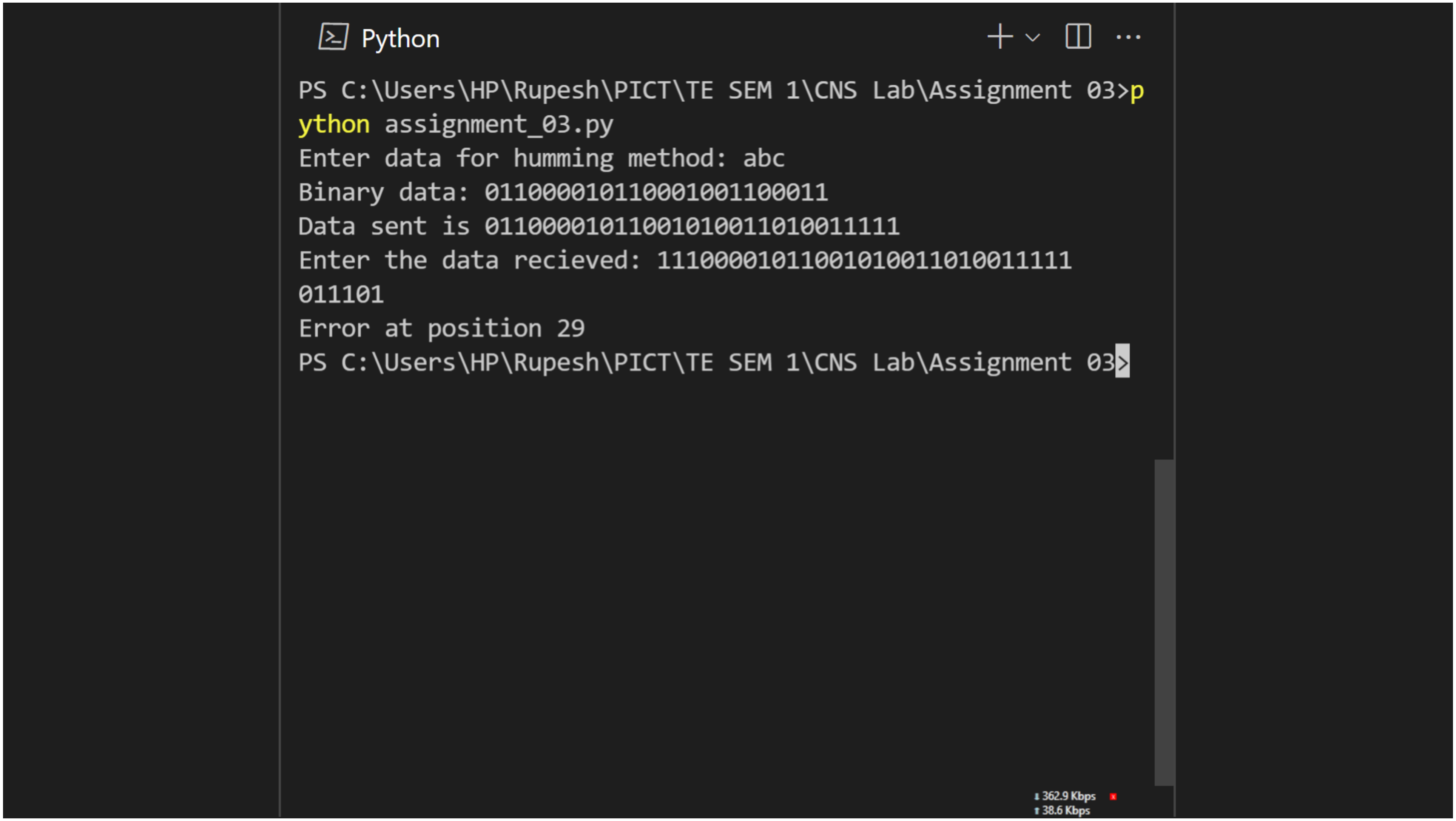
case	Input	Exp o/p	actual o/p	Result
(1)	'a' recv: 011000$\overset{0}{0}$10	sent: 011000$\overset{0}{0}$10 No error detected	same as expected	pass
(2)	'b' recv: 0110001010	sent: 01100010 Error at position 2	same as expected	pass
(c)	'c' recv: 1110000 11111	sent: 01100001111 Error at position 12	same as expected	pass

Conclusion:

Humming and CRC error detection methods were understood and Humming method was implemented successfully using python.



```
PS C:\Users\HP\Rupesh\PICT\TE SEM 1\CNS Lab\Assignment 03>
python assignment_03.py
Enter data for humming method: 123
Binary data: 001100010011001000110011
Data sent is 00110001001101010001110011101
Enter the data recieved: 00110001001101010001110011101
000000
No error in the recieved input.
PS C:\Users\HP\Rupesh\PICT\TE SEM 1\CNS Lab\Assignment 03>
```



```
PS C:\Users\HP\Rupesh\PICT\TE SEM 1\CNS Lab\Assignment 03>p
ython assignment_03.py
Enter data for humming method: abc
Binary data: 011000010110001001100011
Data sent is 01100001011001010011010011111
Enter the data recieved: 11100001011001010011010011111
011101
Error at position 29
PS C:\Users\HP\Rupesh\PICT\TE SEM 1\CNS Lab\Assignment 03>
```