

Exercise 2: Error Detection

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BTech IT 3rd Year, 5th Sem

1)

Problem: Write a program for detection of error using 2d parity.

Aim: To write a program for detection of error using 2d parity in python.

Program:

#2dsender

```
msge=input("Enter the message : ")
list_msge=list(msge)
rem=len(msge)%7
rem_digit=0
if rem!=0:
    rem_digit=7-rem
for i in range(0,rem_digit):
    list_msge.insert(0,'0')
print(list_msge)
temp=''
for i in list_msge:
    temp+=i
#print(temp)
l=[]
t=len(temp)
i=0
while i<t:
    a=temp[:7]
    a=list(a)
    temp=temp[7:]
    t=len(temp)
    l.append(a)
#print("Sender Message : ",end=' ')
#print(l,end='\n')
lis=[]
```

```

sum= ''
for i in range(0,7):
    for j in range(len(l)):
        sum+=l[j][i]
    setBits = [ones for ones in sum if ones=='1']
    s=len(setBits)
    if s%2==0:
        s='0'
    else:
        s='1'
    lis.append(s)
    sum= ''
#print("Column Parity : ",lis)
l.append(lis)
#print("Column Parity Appended To list: ",l)

for i in range(len(l)):
    setBits = [ones for ones in l[i] if ones=='1']
    #print(setBits)
    s=len(setBits)
    if s%2==0:
        s='0'
    else:
        s='1'
    s=list(s)
    #print(s)
    l[i]=l[i]+s
#print('Row Parity Added')
print("Intermediate Message: ",end=' ')
#print(l,end='\n')
for line in l:
    print("".join(line),end='')
file=open('intermediate_message.txt','w')
#file.write(str(l))
for line in l:
    file.write("".join(line))
file.close()

```

#2d receiver

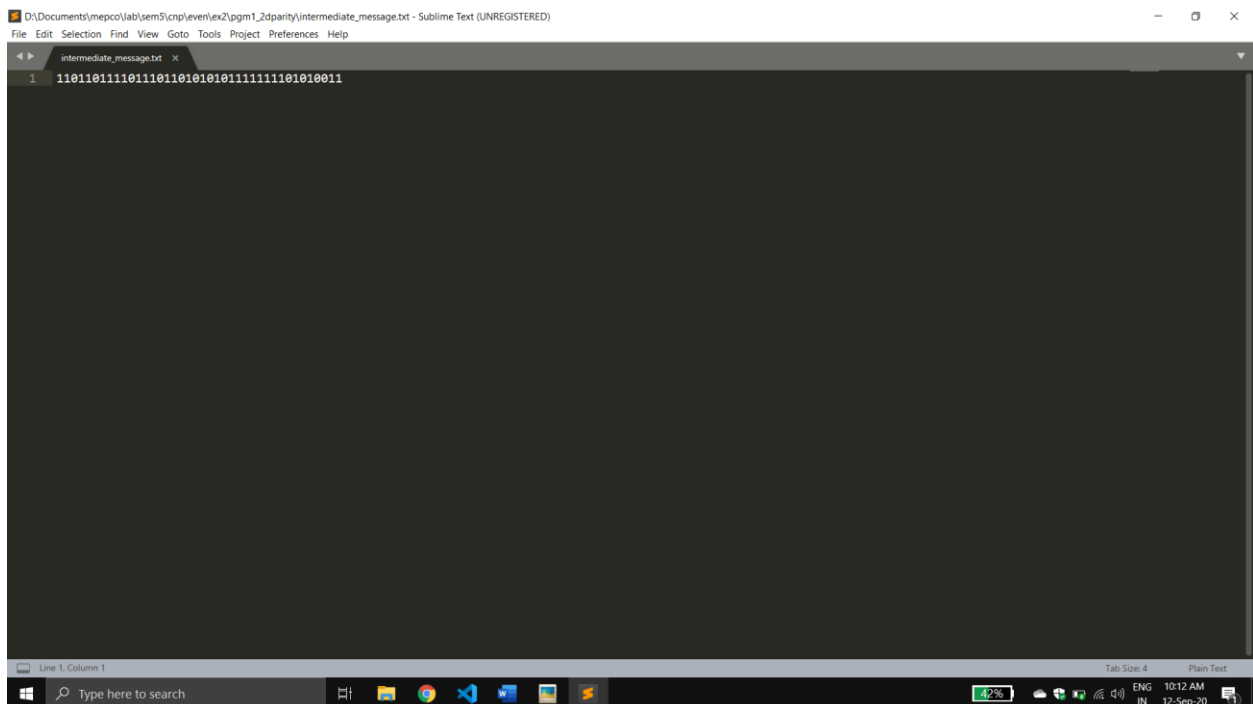
```
File=open('intermediate_message.txt','r')
temp=File.read()
File.close()
#print(len(temp))
rem=len(temp)%8
flag=0
if rem==0:
    flag=1
if flag==1:
    #print("No error in nos of bits")
    l=[]
    t=len(temp)
    i=0
    while i<t:
        a=temp[:8]
        a=list(a)
        temp=temp[8:]
        t=len(temp)
        l.append(a)
    #print("Sender Message : ",end=' ')
    #print(l,end='\n')
    lis=[]
    sum=''
    col_parity=''
    for i in range(0,8):
        for j in range(len(l)):
            sum+=l[j][i]
        setBits = [ones for ones in sum if ones=='1']
        s=len(setBits)
        if s%2==0:
            s='0'
        else:
            s='1'
        #lis.append(s)
        col_parity+=s
        sum=''
    print("Column Parity : ",col_parity)
    #for i in lis:
    #    col_parity+=i
    #print(col_parity)
    #l.append(lis)
    #print("Column Parity Appended To list: ",end=' ')
```

```

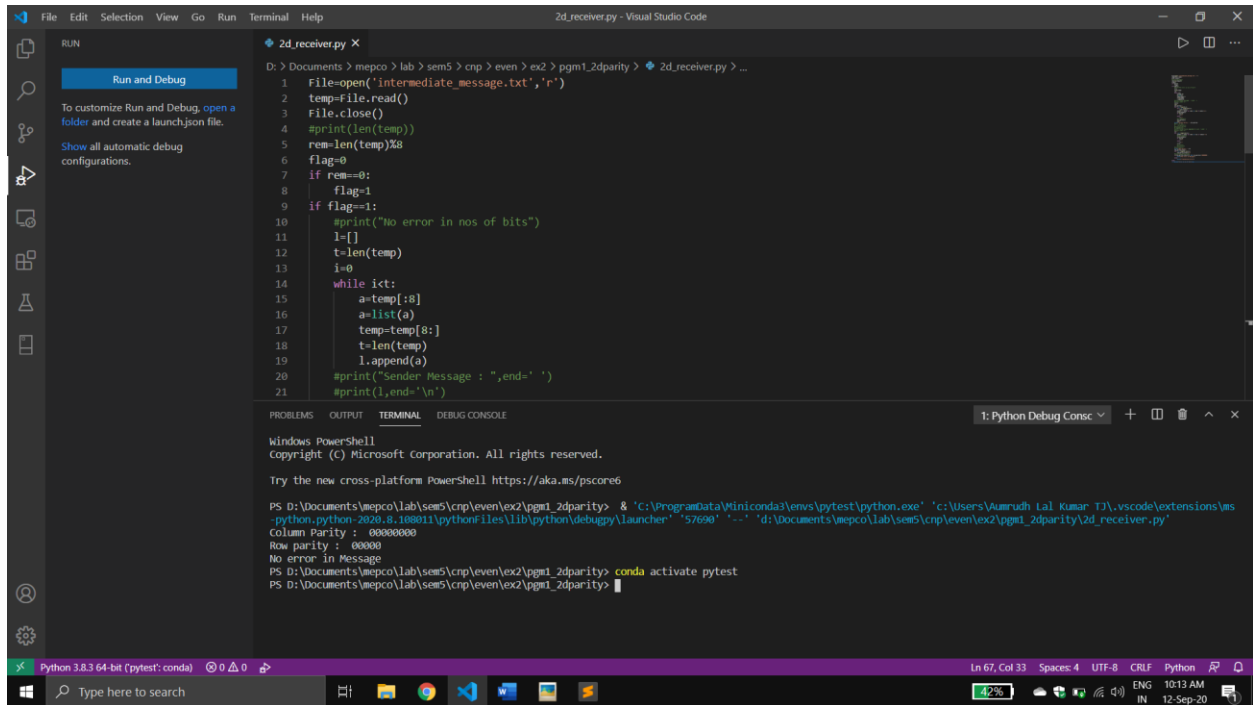
#print(l,end='\n')
rl=''
for i in range(len(l)):
    setBits = [ones for ones in l[i] if ones=='1']
    #print(setBits)
    s=len(setBits)
    if s%2==0:
        s='0'
    else:
        s='1'
    rl+=s
    #s=list(s)
    #l[i]=l[i]+s
#print(len(l))
print("Row parity : ",rl)
row_parity_final=''
for i in range(0,len(l)):
    row_parity_final+='0'
#print(row_parity_final)
if(row_parity_final==rl) and col_parity=='00000000':
    print("No error in Message")
else:
    print("Transmission Error")
else:
    print("Error in no of bits")

```

Sender Side



Receiver side:



```
File Edit Selection View Go Run Terminal Help
2d_receiver.py - Visual Studio Code

RUN
Run and Debug
To customize Run and Debug, open a folder and create a launch.json file.
Show all automatic debug configurations.

2d_receiver.py X
D:\Documents\mepco\lab\sem5\cnp\even\ex2\pgm1_2dparity> 2d_receiver.py > ...
1 file=open('intermediate_message.txt','r')
2 temp=file.read()
3 file.close()
4 #print(len(temp))
5 rem=len(temp)%8
6 flag=0
7 if rem==0:
8     flag=1
9 if flag==1:
10     #print("No error in nos of bits")
11     l=[]
12     t=len(temp)
13     i=0
14     while i<t:
15         a=temp[i:]
16         a=list(a)
17         temp=temp[8:]
18         t=len(temp)
19         l.append(a)
20     #print("Sender Message : ",end=' ')
21     #print(l,end='\n')
```

PROBLEMS OUTPUT TERMINAL DEBUG CONSOLE

1: Python Debug Consc

Windows PowerShell
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Try the new cross-platform PowerShell <https://aka.ms/pscore6>

PS D:\Documents\mepco\lab\sem5\cnp\even\ex2\pgm1_2dparity> & 'C:\ProgramData\Miniconda3\envs\pytest\python.exe' 'c:\Users\Aamrudh Lal Kumar\TJ\.vscode\extensions\ms-python.python-2020.8.108011\pythonFiles\lib\python\debugpy\launcher' '57690' '-' 'd:\Documents\mepco\lab\sem5\cnp\even\ex2\pgm1_2dparity\2d_receiver.py'

Column Parity : 00000000
Row parity : 000000
No error in Message
PS D:\Documents\mepco\lab\sem5\cnp\even\ex2\pgm1_2dparity> conda activate pytest
PS D:\Documents\mepco\lab\sem5\cnp\even\ex2\pgm1_2dparity> |

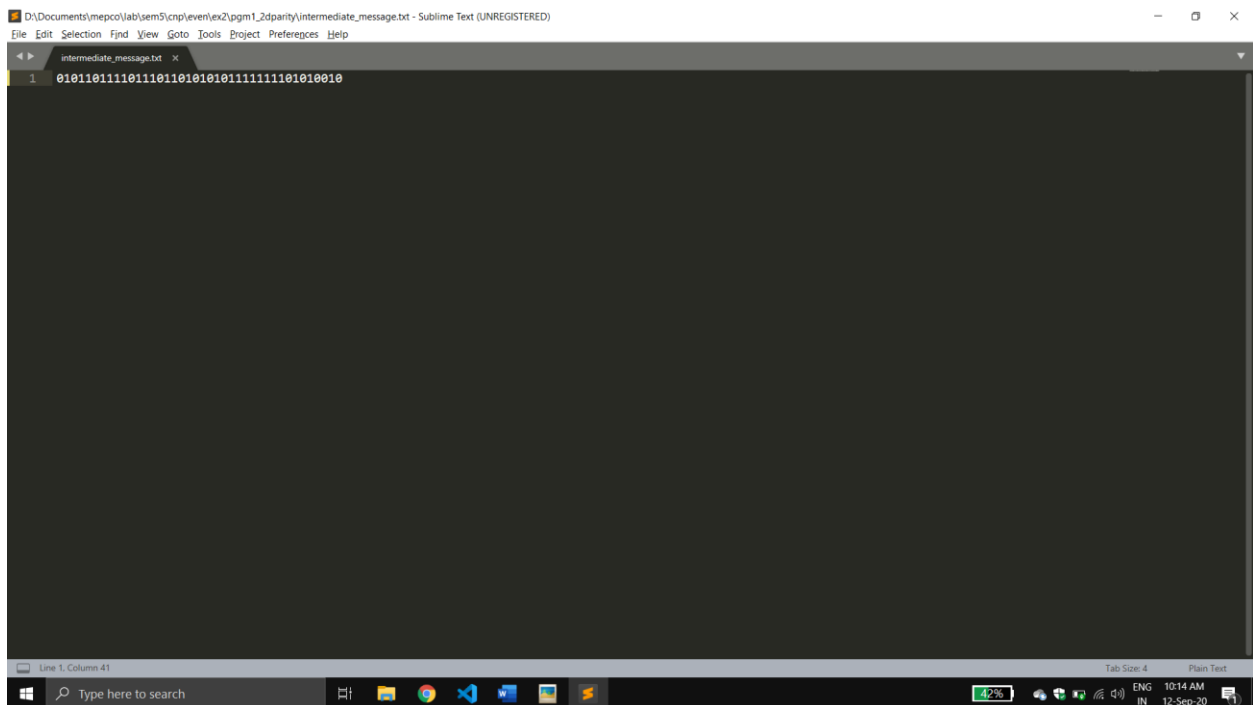
Python 3.8.3 64-bit (pytest: conda) 0 0 0

Type here to search

Ln 67, Col 33 Spaces: 4 UTF-8 CRLF Python

ENG 10:13 AM
IN 12-Sep-20

With Error: First and last bit are changed



```
D:\Documents\mepco\lab\sem5\cnp\even\ex2\pgm1_2dparity\intermediate_message.txt - Sublime Text (UNREGISTERED)
File Edit Selection Find View Goto Tools Project Preferences Help

intermediate_message.txt X
1 010110111101110110101010111111101010010
```

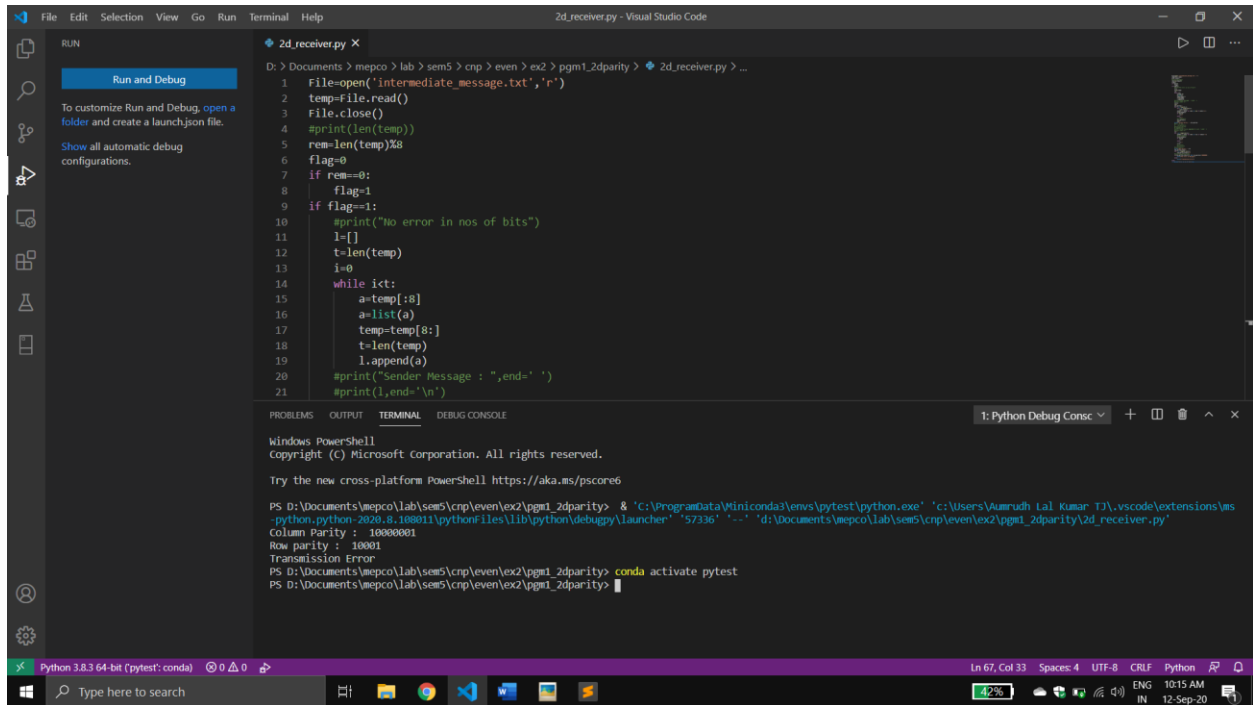
Line 1, Column 41

Tab Size: 4 Plain Text

Type here to search

ENG 10:14 AM
IN 12-Sep-20

Receiver (error)



The screenshot shows the Visual Studio Code interface with a Python file named `2d_receiver.py` open. The code implements a 2D parity error detection algorithm. It reads a file `intermediate_message.txt`, calculates the row and column parities, and prints the sender message and the calculated parities. The terminal output shows the execution of the script, which successfully detects the error.

```
1 file=open('intermediate_message.txt','r')
2 temp=file.read()
3 file.close()
4 #print(len(temp))
5 rem=len(temp)%8
6 flag=0
7 if rem==0:
8     flag=1
9 if flag==1:
10     #print("No error in nos of bits")
11     l=[]
12     t=len(temp)
13     i=0
14     while i<t:
15         a=temp[i:8]
16         a=list(a)
17         temp=temp[8:]
18         t=len(temp)
19         l.append(a)
20     #print("Sender Message : ",end=' ')
21     #print(l,end='\n')
```

Windows PowerShell
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Try the new cross-platform PowerShell <https://aka.ms/pscore6>
PS D:\Documents\mepco\lab\sem5\cnp\even\ex2\pgm1_2dparity> & 'C:\ProgramData\Miniconda3\envs\pytest\python.exe' 'c:\Users\Aamrudh Lal Kumar\TJ\.vscode\extensions\ms-python.python-2020.8.108011\pythonFiles\lib\python\debugpy\launcher' '57336' '-' 'd:\Documents\mepco\lab\sem5\cnp\even\ex2\pgm1_2dparity\2d_receiver.py'
Column Parity : 10000001
Row parity : 10001
Transmission Error
PS D:\Documents\mepco\lab\sem5\cnp\even\ex2\pgm1_2dparity> conda activate pytest
PS D:\Documents\mepco\lab\sem5\cnp\even\ex2\pgm1_2dparity>

Result:

The error detection using 2d parity was executed successfully using python. If any bit is modified the row and column parity is modified (i.e.) both values are not zeros.

2)

Problem: Write a program for detection of error using cyclic redundancy check (crc).

Aim: To write a program for detection of error using cyclic redundancy check in python.

Program:

#crcsender

```
msge=input("Enter your message : ")
key=input("Enter the key value : ")
divident=msge+'0'*(len(key)-1)
flag=len(key)
divisor=key
temp=divident[:flag]
while flag<len(divident):
    if(temp[0]=='0'):
        temp_divisor='0'*flag
        temp_divident=temp
        l=[]
        for i in range(1,len(temp_divident)):
            if(temp_divisor[i]==temp_divident[i]):
                l.append('0')
            else:
                l.append('1')
        rem=''.join(l)
        temp=rem+divident[flag]
    else:
        temp_divisor=divisor
        temp_divident=temp
        l=[]
        for i in range(1,len(temp_divident)):
            if(temp_divisor[i]==temp_divident[i]):
                l.append('0')
            else:
                l.append('1')
        rem=''.join(l)
        temp=rem+divident[flag]
    flag+=1
if(temp[0] == '0'):
```



```
temp_divisor='0'*flag
temp_divident=temp
l=[]
for i in range(1,len(temp_divident)):
    if(temp_divisor[i]==temp_divident[i]):
        l.append('0')
    else:
        l.append('1')
rem=''.join(l)
else:
    temp_divisor=divisor
    temp_divident=temp
    l=[]
    for i in range(1,len(temp_divident)):
        if(temp_divisor[i]==temp_divident[i]):
            l.append('0')
        else:
            l.append('1')
    rem=''.join(l)
msge=msge+rem+'k'+key
print("Intermediate message : ",msge)
file=open('intermediate_message.txt','w')
file.write(msge)
file.close()
```

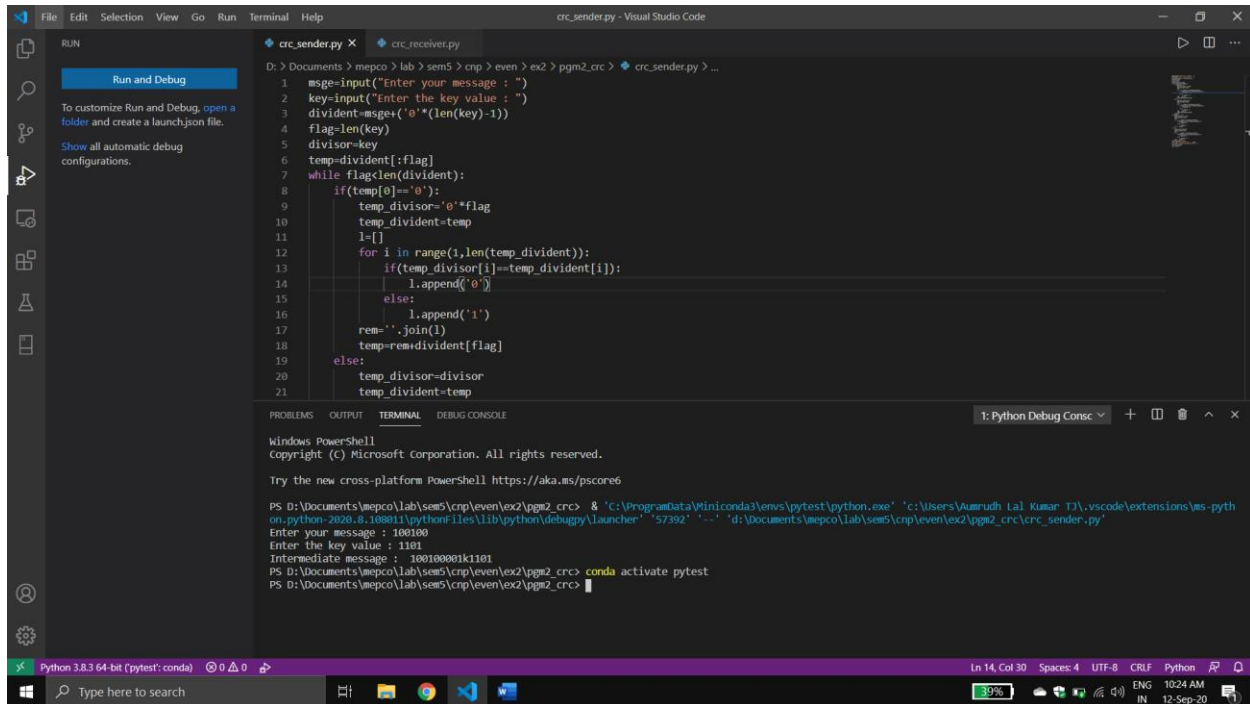
#crcreceiver

```
File=open('intermediate_message.txt','r')
temp=File.read()
File.close()
i=0
while i<len(temp):
    if temp[i].isalpha():
        dividend=temp[:i]
        key=temp[i+1:]
        i+=1
#print(temp1)
#print(key)
flag=len(key)
divisor=key
temp=divident[:flag]
while flag<len(divident):
    if(temp[0]=='0'):
        temp_divisor='0'*flag
        temp_divident=temp
        l=[]
        for i in range(1,len(temp_divident)):
            if(temp_divisor[i]==temp_divident[i]):
                l.append('0')
            else:
                l.append('1')
        rem=''.join(l)
        temp=rem+divident[flag]
    else:
        temp_divisor=divisor
        temp_divident=temp
        l=[]
        for i in range(1,len(temp_divident)):
            if(temp_divisor[i]==temp_divident[i]):
                l.append('0')
            else:
                l.append('1')
        rem=''.join(l)
        temp=rem+divident[flag]
    flag+=1
if(temp[0] == '0'):
    temp_divisor='0'*flag
    temp_divident=temp
    l=[]
```

```
    for i in range(1,len(temp_divident)):
        if(temp_divisor[i]==temp_divident[i]):
            l.append('0')
        else:
            l.append('1')
    rem=''.join(l)
else:
    temp_divisor=divisor
    temp_divident=temp
    l=[]
    for i in range(1,len(temp_divident)):
        if(temp_divisor[i]==temp_divident[i]):
            l.append('0')
        else:
            l.append('1')
    rem=''.join(l)
print("rem",rem)
if(rem=='000'):
    print("No Error")
else:
    print("Error")
```

Output:

Sender



```
File Edit Selection View Go Run Terminal Help
crc_sender.py - Visual Studio Code

RUN
Run and Debug
To customize Run and Debug, open a folder and create a launch.json file.
Show all automatic debug configurations.

D:\> Documents\mepco\lab\sem5\cnp\even\ex2\pgm2_crc> crc_sender.py ...
1 msg=input("Enter your message : ")
2 key=input("Enter the key value : ")
3 dividend=msg+'0'*(len(key)-1)
4 flag=len(key)
5 divisor=key
6 temp=divident[:flag]
7 while flag<len(divident):
8     if(temp[0]=='0'):
9         temp_divisor='0'*flag
10        temp_divident=temp
11        l=[]
12        for i in range(1,len(temp_divident)):
13            if(temp_divisor[i]==temp_divident[i]):
14                l.append('0')
15            else:
16                l.append('1')
17        rem=''.join(l)
18        temp=rem+divident[flag]
19    else:
20        temp_divisor=divisor
21        temp_divident=temp

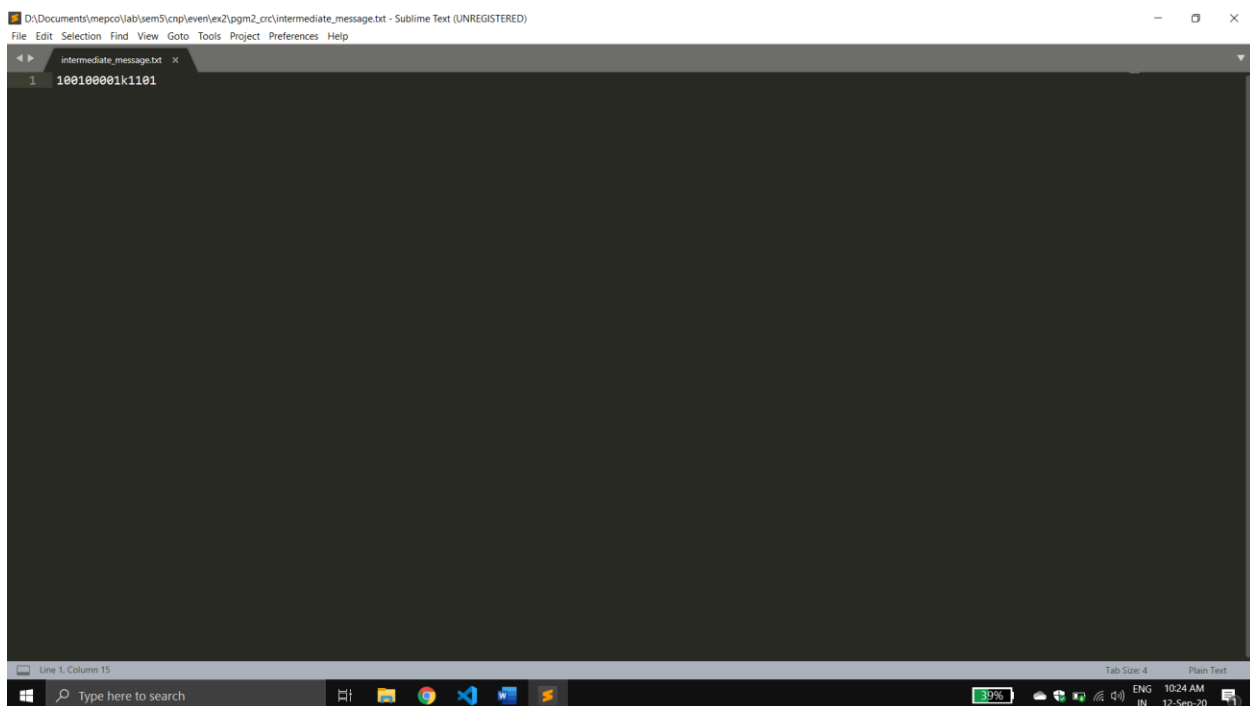
PROBLEMS OUTPUT TERMINAL DEBUG CONSOLE
1: Python Debug Consc...

Windows PowerShell
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Try the new cross-platform PowerShell https://aka.ms/pscore6

PS D:\Documents\mepco\lab\sem5\cnp\even\ex2\pgm2_crc> & 'C:\ProgramData\Winiconda3\envs\pytest\python.exe' 'c:\Users\Aamrudh Lal Kumar TJ\.vscode\extensions\ms-python.python-2020.8.100811\python-l1es\lib\python\debugpy\launcher' '57392' '--' 'd:\Documents\mepco\lab\sem5\cnp\even\ex2\pgm2_crc\crc_sender.py'
Enter your message : 100100
Intermediate message : 100100001k1101
PS D:\Documents\mepco\lab\sem5\cnp\even\ex2\pgm2_crc> conda activate pytest
PS D:\Documents\mepco\lab\sem5\cnp\even\ex2\pgm2_crc>
```

Intermediate text file

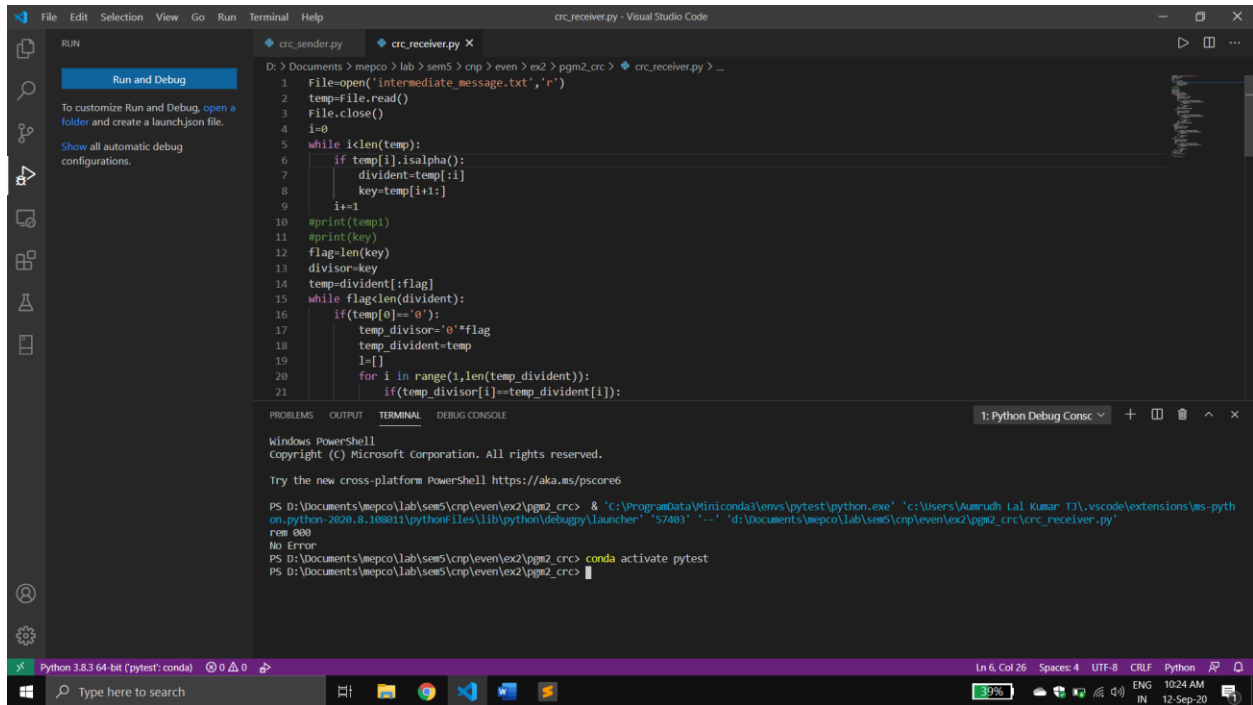


```
D:\Documents\mepco\lab\sem5\cnp\even\ex2\pgm2_crc\intermediate_message.txt - Sublime Text (UNREGISTERED)
File Edit Selection Find View Goto Tools Project Preferences Help

intermediate_message.txt x
1 100100001k1101

Line 1, Column 15
Tab Size: 4
Plain Text
```

Receiver



The screenshot shows the Visual Studio Code interface with the file `crc_receiver.py` open. The code is a Python script that reads a file named `intermediate_message.txt` and processes its contents. The code is as follows:

```
1 File=open('intermediate_message.txt','r')
2 temp=file.read()
3 File.close()
4 i=0
5 while i<len(temp):
6     if temp[i].isalpha():
7         dividend=temp[i:]
8         key=temp[i+1:]
9         i+=1
10    #print(temp1)
11    #print(key)
12    flag=len(key)
13    divisor=key
14    temp=divident[:flag]
15    while flag<len(divident):
16        if(temp[0]!='0'):
17            temp_divisor='0'*flag
18            temp_divident=temp
19            l=[]
20            for i in range(1,len(temp_divident)):
21                if(temp_divisor[i]==temp_divident[i]):
```

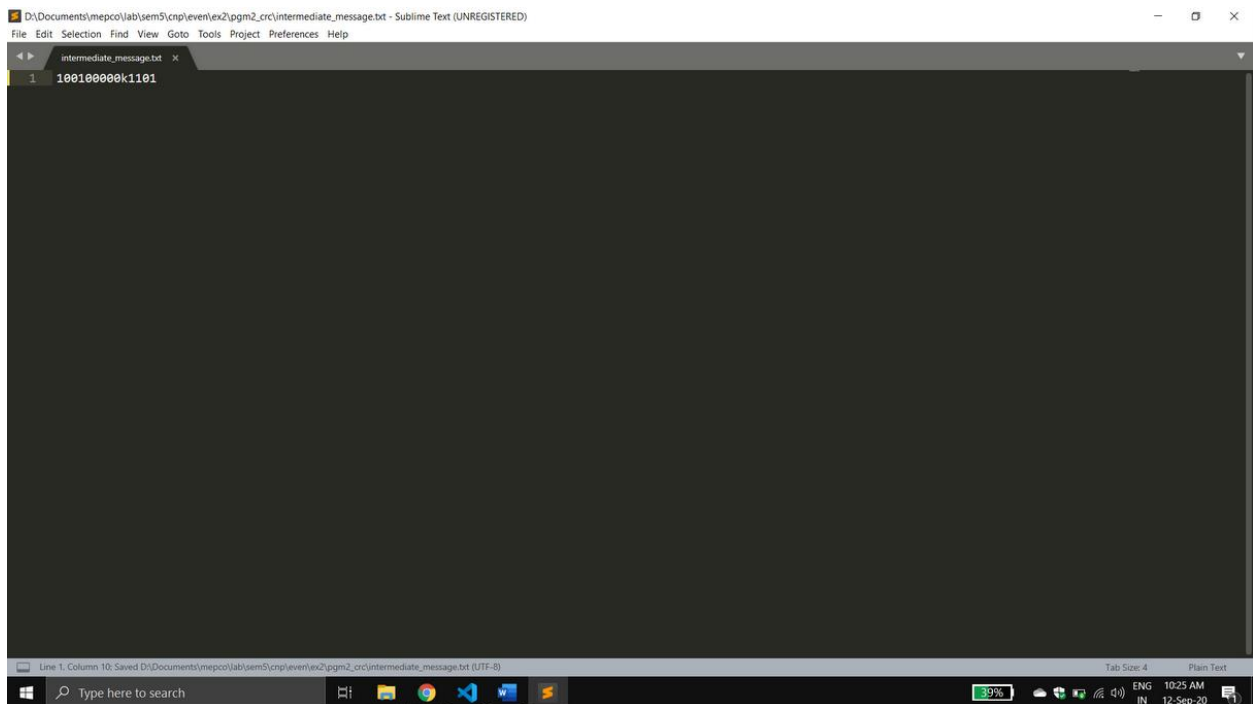
The terminal window shows the following output:

```
Windows PowerShell
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PS D:\Documents\mepco\lab\sem5\crp\even\ex2\pgm2_crc> & 'C:\ProgramData\Miniconda3\envs\pytest\python.exe' 'c:\Users\Aamruth Lal Kumar TJ\.vscode\extensions\ms-python.python-2020.8.108011\pythonFiles\lib\python\debugpy\launcher' '57403' '-.' 'd:\Documents\mepco\lab\sem5\crp\even\ex2\pgm2_crc\crc_receiver.py'
rem 000
No Error
PS D:\Documents\mepco\lab\sem5\crp\even\ex2\pgm2_crc> conda activate pytest
PS D:\Documents\mepco\lab\sem5\crp\even\ex2\pgm2_crc> 
```

With Error: Last bit is changed in message

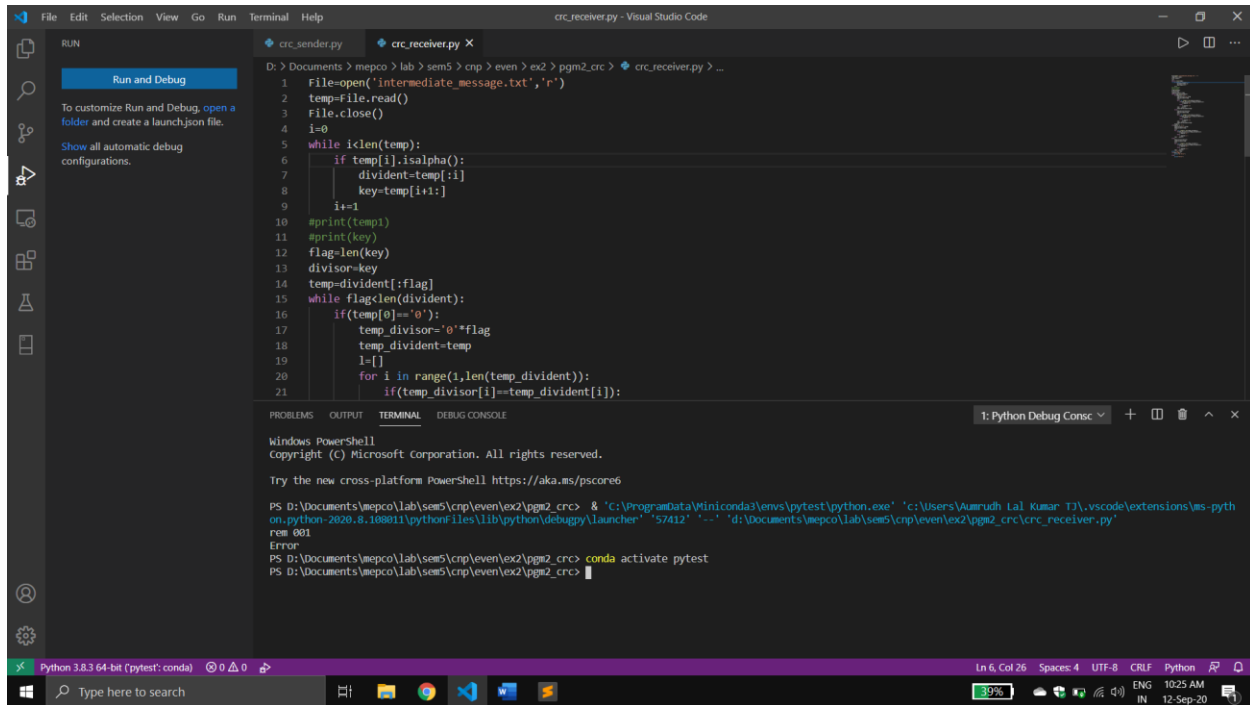


The screenshot shows the Sublime Text editor with the file `intermediate_message.txt` open. The file contains the following text:

```
1 100100000k1101
```

The status bar at the bottom indicates the file is saved at `D:\Documents\mepco\lab\sem5\crp\even\ex2\pgm2_crc\intermediate_message.txt (UTF-8)`.

Receiver (Error)



```
File Edit Selection View Go Run Terminal Help
crc_receiver.py - Visual Studio Code

RUN
Run and Debug
To customize Run and Debug, open a folder and create a launch.json file.
Show all automatic debug configurations.

D:\Documents\mepco\lab\sem5\cnp\even\ex2\pgm2_crc> .\crc_receiver.py ...
1  File=open('intermediate_message.txt','r')
2  temp=File.read()
3  File.close()
4  i=0
5  while i<len(temp):
6      if temp[i].isalpha():
7          dividant=temp[i:]
8          key=temp[i+1:]
9          i+=1
10 #print(temp1)
11 #print(key)
12 flag=len(key)
13 divisor=key
14 temp=divident[:flag]
15 while flag<len(divident):
16     if(temp[0]!='0'):
17         temp_divisor='0'*flag
18         temp_divident=temp
19         l=[]
20         for i in range(1,len(temp_divident)):
21             if(temp_divisor[i]==temp_divident[i]):
```

```
PROBLEMS OUTPUT TERMINAL DEBUG CONSOLE
1: Python Debug Consc

Windows PowerShell
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PS D:\Documents\mepco\lab\sem5\cnp\even\ex2\pgm2_crc> & 'C:\ProgramData\Miniconda3\envs\pytest\python.exe' 'c:\Users\Aamruth Lal Kumar TJ\.vscode\extensions\ms-python.python-2020.8.108011\python\files\lib\python\debugpy\launcher' '57412' '-.-' 'd:\Documents\mepco\lab\sem5\cnp\even\ex2\pgm2_crc\crc_receiver.py'
rem 001
Error:
PS D:\Documents\mepco\lab\sem5\cnp\even\ex2\pgm2_crc> conda activate pytest
PS D:\Documents\mepco\lab\sem5\cnp\even\ex2\pgm2_crc>
```

Python 3.8.3 64-bit (pytest: conda) 0 0 0

Type here to search

Ln 6, Col 26 Spaces: 4 UTF-8 CRLF Python

39% 10:25 AM 12-Sep-20

Result:

The error detection using cyclic redundancy check was executed successfully using python. If any bit is modified remainder is not equal to 0's in receiver. Divisor is indicated using k.