Cycle 2

Exp no 13:

Write a program for error detection code using CRC - CCITT (16 - bits)

Code:

```
def crc_ccitt(data: bytes, polynomial: int = 0x1021,
              init_crc: int = 0xFFFF) -> int:
    crc = init_crc
    for byte in data:
        crc ^= (byte << 8)
        for _ in range(8)
            if crc & 0x8000:
                crc = (crc << 1) ^ polynomial
            else:
                crc <<= 1
            crc &= 0xFFFF
    return crc
def encode_data_with_crc(data: bytes) -> bytes:
    crc = crc_ccitt(data)
    crc_bytes = crc.to_bytes(2, byteorder='big')
    return data + crc_bytes
def verify_data_with_crc(data_with_crc: bytes) -> bool:
    data, received_crc = data_with_crc[:-2], data_with_crc[-2:]
    computed_crc = crc.ccitt(data)
    return computed_crc == int.from_bytes(received_crc,
                                          byteorder='big')
def main():
    message = "Hello World!"
    data = message.encode("utf-8")
    computed_crc = crc.ccitt(data)
    data_with_crc = encode_data_with_crc(data)
    print(f"Data: {message}")
```

if __name__

output:

Data:

Compute

Data R

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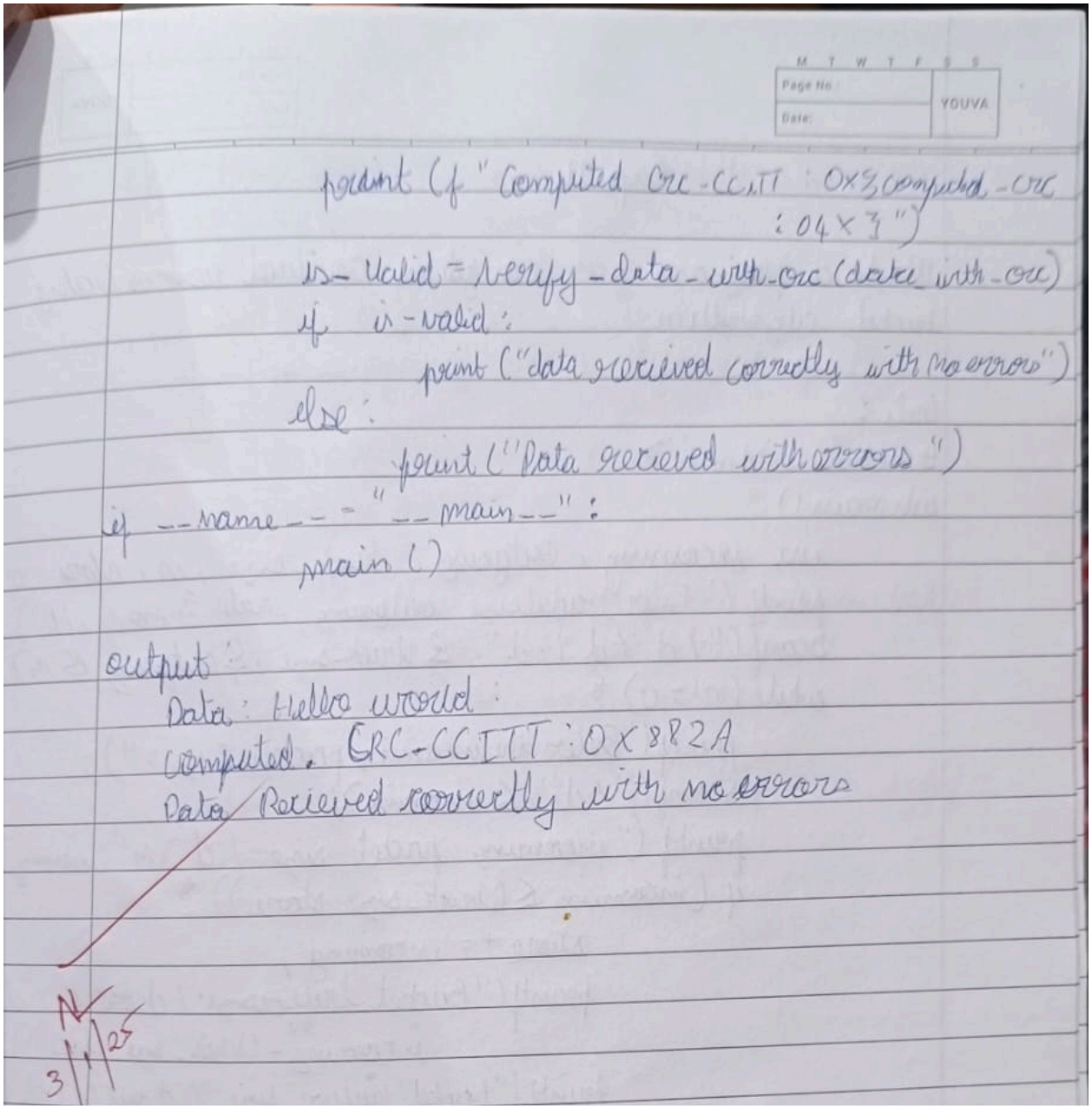

```
print (f" Computed Crc-CCITT : 0x{computed_crc :04x}")
is_valid = verify_data_with_crc(data_with_crc)
if is_valid:
    print ("data received correctly with no errors")
else:
    print ("Data received with errors")
if __name__ == "__main__":
    main()
```

output:

Data: Hello world
computed. CRC-CCITT : 0x882A
Data Recieved correctly with no errors

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```
= RESTART: C:/Users/91934/AppData/Local/Prc
Enter the data bits: 1001001000100100
Enter the key (divisor): 1101
Encoded Data: 1001001000100100111

Decoding the encoded data...
Remainder after decoding: 000
No error detected in received data
```