

Assignment Report: Error Simulation & Debugging

Objective

To understand how AT command errors are reported by the modem and how to interpret them using the AT+CMEE=2 setting, which enables verbose (human-readable) error messages.

We will simulate errors by sending unsupported or invalid AT commands and analyze the responses.

Step-by-Step Procedure (Using Emulator)

Step 1: Enable Verbose Error Reporting

Command: AT+CMEE=2

AT+CMEE → Command Mobile Equipment Error

Format:

AT+CMEE=<mode>

Mode	Meaning
0	Disable errors (only ERROR)
1	Numeric error codes (e.g., +CME ERROR: 3)
2	Verbose errors (e.g., +CME ERROR: operation not allowed)

Expected Response:

OK

Step 2: Send Invalid Command to Simulate Error

Command:

AT+XYZ

Explanation: +XYZ is not a real AT command.

Expected Response (after enabling CMEE=2):

+CME ERROR: operation not supported

This means the modem doesn't recognize the command.

Step 3: Try Command in Wrong Context

Command:

AT+CMGS

Explanation: AT+CMGS is for sending SMS, but if used incorrectly (e.g., without = or without opening the message prompt), the emulator will return an error.

Possible Response:

+CME ERROR: invalid input value

Step 4: Simulate SIM or Network Errors

Though limited in emulator, real modems may return:

- +CME ERROR: SIM not inserted
- +CME ERROR: network not allowed
- +CMS ERROR: unknown error (from SMS operations)

AT+CMGS="123"

+CME ERROR: invalid input value

Manual Interpretation of Common Errors

Error Type	What it Means	Possible Cause
+CME ERROR: operation not supported	The command is not recognized by the modem	Typo or unsupported AT command
+CME ERROR: invalid input value	Incorrect command format or parameters	Missing = or wrong values
+CME ERROR: operation not allowed	Command used in wrong state	SMS send without SIM or config
+CMS ERROR: 500	Unknown SMS error	Invalid number, bad PDU/text

Conclusion

By using AT+CME=2, we can get **detailed error messages** which are crucial for **debugging AT command issues** in real-world modem and IoT applications. Error codes like +CME ERROR and +CMS ERROR help differentiate whether the error is due to **SMS issues, modem state, or syntax problems**. This assignment improves our ability to troubleshoot and develop robust serial communication systems.