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Programming Methodology 1

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Lab 8

Exercise 1

```
ex1 > test.txt
1 This is a test file.
2 It has multiple words on multiple lines.
3 We will count these words.
4
```

```
● samirvarma@Samirs-MacBook-Pro-2 ex1 % ./fileops
Number of words: 17
Error opening file 'nonexistent.txt' in mode 'r': No such file or directory
Successfully detected non-existent file
```

```
=== Comparing with wc -w command ===
File: test.txt
Our count: 17
wc -w count: 17
Difference: 0
```

```
○ samirvarma@Samirs-MacBook-Pro-2 ex1 %
```

Exercise 2

```
ex2 > students.csv
1 id,name,age,score
2 1,"Smith, John",25,95.5
3 2,Jane Doe,22,88.0
4 3,"Williams, Robert",28,76.5
5 4,"Johnson, Emily",21,92.0
6 5,Michael Brown,24,65.5
7
```

```
Student names:
Smith, John
Jane Doe
Williams, Robert
Johnson, Emily
Michael Brown
```

```
Score statistics:
Min: 65.5
Max: 95.5
Average: 83.5
```

```
○ samirvarma@Samirs-MacBook-Pro-2 ex2 %
```

```

=== Testing Error Handling for Malformed CSVs ===

Test 1: Nonexistent file
Error: Could not open file nonexistent.csv
✓ Successfully detected missing file

Test 2: Unclosed quotes
Parsed with 2 rows
First row has 4 fields
Second row field content check: 1

Test 3: Inconsistent number of columns
Parsed with 3 rows
Row 0 has 4 fields
Row 1 has 3 fields
Row 2 has 5 fields
Extracted 2 values from score column

Test 4: Empty file
Parsed empty file with 0 rows

Test 5: Invalid numeric data
Computed stats on non-numeric data: Min=0.0, Max=0.0, Avg=0.0
Converted non-numeric 'age' column: 0.000000
samirvarma@Samirs-MacBook-Pro-2 ex2 %

```

Exercise 3

```

samirvarma@Samirs-MacBook-Pro-2 ex3 % ./sensor_db
Read 3 sensor records:
ID: 1, Type: Temperature, Value: 25.50, Time: 1234567890
ID: 2, Type: Humidity, Value: 45.00, Time: 1234567891
ID: 3, Type: Pressure, Value: 1013.25, Time: 1234567892

Record at index 1:
ID: 2, Type: Humidity, Value: 45.00, Time: 1234567891
samirvarma@Samirs-MacBook-Pro-2 ex3 %

```

```

===== Testing Error Handling =====

Test 1: Non-existent file
✓ Successfully detected non-existent file

Test 2: Out-of-bounds record access
✓ Successfully detected out-of-bounds access

Test 3: Truncated file
✓ Successfully handled truncated file

Test 4: File with invalid size
Read 2 records from file with invalid size

Test 5: NULL parameters
✓ write_sensor_data correctly handles NULL filename
✓ write_sensor_data correctly handles NULL data

Test 6: Delete and update operations
✓ Successfully deleted record
  New record count: 2
  First record now: ID 2, Type Humidity
✓ Successfully updated record
  Updated record: ID 99, Type Updated, Value 100.0

Test 7: Searching for non-existent records
✓ find_readings_by_sensor correctly handles non-existent sensor ID
✓ find_readings_by_timerange correctly handles non-existent time range
samirvarma@Samirs-MacBook-Pro-2 ex3 %

```