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Output comparisons

Test1

Manual scanner output and stats

Output

```
=====
COMPARISON REPORT FOR: C:\Users\maazb\Desktop\cc_A1\tests\test1.txt
=====

[Manual Scanner Output]
<KEYWORD, "start", Line: 1, Col: 1>
<KEYWORD, "declare", Line: 2, Col: 1>
<IDENTIFIER, "Count", Line: 2, Col: 9>
<OPERATOR, "=" , Line: 2, Col: 15>
<INTEGER_LITERAL, "100", Line: 2, Col: 17>
<KEYWORD, "declare", Line: 3, Col: 1>
<IDENTIFIER, "Price", Line: 3, Col: 9>
<OPERATOR, "=" , Line: 3, Col: 15>
<FLOAT_LITERAL, "19.99", Line: 3, Col: 17>
<KEYWORD, "declare", Line: 4, Col: 1>
<IDENTIFIER, "Message", Line: 4, Col: 9>
<OPERATOR, "=" , Line: 4, Col: 17>
<STRING_LITERAL, "\"Hello World\"", Line: 4, Col: 19>
<KEYWORD, "loop", Line: 5, Col: 1>
<KEYWORD, "condition", Line: 5, Col: 6>
<PUNCTUATOR, "(", Line: 5, Col: 16>
<IDENTIFIER, "Count", Line: 5, Col: 17>
<OPERATOR, ">" , Line: 5, Col: 23>
<INTEGER_LITERAL, "0", Line: 5, Col: 25>
<PUNCTUATOR, ")", Line: 5, Col: 26>
<KEYWORD, "output", Line: 6, Col: 5>
<IDENTIFIER, "Message", Line: 6, Col: 12>
<IDENTIFIER, "Count", Line: 7, Col: 5>
<OPERATOR, "=" , Line: 7, Col: 11>
<IDENTIFIER, "Count", Line: 7, Col: 13>
<OPERATOR, "-", Line: 7, Col: 19>
<INTEGER_LITERAL, "1", Line: 7, Col: 21>
<KEYWORD, "finish", Line: 8, Col: 1>
```

Stats

Scanner Statistics:

Total Tokens: 28

Lines Processed: 9

Comments Removed: 0

KEYWORD: 8

IDENTIFIER: 7

INTEGER_LITERAL: 3

FLOAT_LITERAL: 1

STRING_LITERAL: 1

OPERATOR: 6

PUNCTUATOR: 2

Symbol Table:

Name	Type	First Line	Frequency
<hr/>			
Count	ID	2	4
Price	ID	3	1
Message	ID	4	2

Jflex

Output

```
[JFlex Scanner Output]
<KEYWORD, "start", Line: 1, Col: 1>
<KEYWORD, "declare", Line: 2, Col: 1>
<IDENTIFIER, "Count", Line: 2, Col: 9>
<OPERATOR, "=", Line: 2, Col: 15>
<INTEGER_LITERAL, "100", Line: 2, Col: 17>
<KEYWORD, "declare", Line: 3, Col: 1>
<IDENTIFIER, "Price", Line: 3, Col: 9>
<OPERATOR, "=", Line: 3, Col: 15>
<FLOAT_LITERAL, "19.99", Line: 3, Col: 17>
<KEYWORD, "declare", Line: 4, Col: 1>
<IDENTIFIER, "Message", Line: 4, Col: 9>
<OPERATOR, "=", Line: 4, Col: 17>
<STRING_LITERAL, ""Hello World"", Line: 4, Col: 19>
<KEYWORD, "loop", Line: 5, Col: 1>
<KEYWORD, "condition", Line: 5, Col: 6>
<PUNCTUATOR, "(", Line: 5, Col: 16>
<IDENTIFIER, "Count", Line: 5, Col: 17>
<OPERATOR, ">", Line: 5, Col: 23>
<INTEGER_LITERAL, "0", Line: 5, Col: 25>
<PUNCTUATOR, ")", Line: 5, Col: 26>
<KEYWORD, "output", Line: 6, Col: 5>
<IDENTIFIER, "Message", Line: 6, Col: 12>
<IDENTIFIER, "Count", Line: 7, Col: 5>
<OPERATOR, "=", Line: 7, Col: 11>
<IDENTIFIER, "Count", Line: 7, Col: 13>
<OPERATOR, "-", Line: 7, Col: 19>
<INTEGER_LITERAL, "1", Line: 7, Col: 21>
<KEYWORD, "finish", Line: 8, Col: 1>
```

Stats

```
JFlex Scanner Statistics:
Total Tokens: 28
KEYWORD: 8
IDENTIFIER: 7
INTEGER_LITERAL: 3
FLOAT_LITERAL: 1
STRING_LITERAL: 1
OPERATOR: 6
PUNCTUATOR: 2
```

```
[Performance Comparison]
Manual Scanner Time: 147.265 ms
JFlex Scanner Time: 15.246 ms
```

Conclusion

Outputs match exactly

Test 2

Manual scanner

Output

```
=====
COMPARISON REPORT FOR: C:\Users\maazb\Desktop\cc_A1\tests\test2.txt
=====

[Manual Scanner Output]
<KEYWORD, "declare", Line: 1, Col: 1>
<IDENTIFIER, "Result", Line: 1, Col: 9>
<OPERATOR, "=", Line: 1, Col: 16>
<PUNCTUATOR, "(", Line: 1, Col: 18>
<INTEGER_LITERAL, "10", Line: 1, Col: 19>
<OPERATOR, "+", Line: 1, Col: 22>
<INTEGER_LITERAL, "5", Line: 1, Col: 24>
<PUNCTUATOR, ")", Line: 1, Col: 25>
<OPERATOR, "*", Line: 1, Col: 27>
<INTEGER_LITERAL, "2", Line: 1, Col: 29>
<OPERATOR, "**", Line: 1, Col: 31>
<INTEGER_LITERAL, "3", Line: 1, Col: 34>
<KEYWORD, "condition", Line: 2, Col: 1>
<PUNCTUATOR, "(", Line: 2, Col: 11>
<IDENTIFIER, "Result", Line: 2, Col: 12>
<OPERATOR, ">=", Line: 2, Col: 19>
<INTEGER_LITERAL, "100", Line: 2, Col: 22>
<OPERATOR, "&&", Line: 2, Col: 26>
<BOOLEAN_LITERAL, "true", Line: 2, Col: 29>
<OPERATOR, "!=" , Line: 2, Col: 34>
<BOOLEAN_LITERAL, "false", Line: 2, Col: 37>
<PUNCTUATOR, ")", Line: 2, Col: 42>
<KEYWORD, "output", Line: 3, Col: 5>
<IDENTIFIER, "Result", Line: 3, Col: 12>
<OPERATOR, "/", Line: 3, Col: 19>
<FLOAT_LITERAL, "2.5", Line: 3, Col: 21>
<KEYWORD, "else", Line: 4, Col: 1>
<IDENTIFIER, "Result", Line: 5, Col: 5>
<OPERATOR, "+=", Line: 5, Col: 12>
<INTEGER_LITERAL, "10", Line: 5, Col: 15>
```

Stats

Scanner Statistics:

Total Tokens: 30

Lines Processed: 6

Comments Removed: 0

KEYWORD: 4

IDENTIFIER: 4

INTEGER_LITERAL: 6

FLOAT_LITERAL: 1

BOOLEAN_LITERAL: 2

OPERATOR: 9

PUNCTUATOR: 4

Symbol Table:

Name	Type	First Line	Frequency
------	------	------------	-----------

Result	ID	1	4
--------	----	---	---

Jflex

Output

```
[JFlex Scanner Output]
<KEYWORD, "declare", Line: 1, Col: 1>
<IDENTIFIER, "Result", Line: 1, Col: 9>
<OPERATOR, "=", Line: 1, Col: 16>
<PUNCTUATOR, "(", Line: 1, Col: 18>
<INTEGER_LITERAL, "10", Line: 1, Col: 19>
<OPERATOR, "+", Line: 1, Col: 22>
<INTEGER_LITERAL, "5", Line: 1, Col: 24>
<PUNCTUATOR, ")\"", Line: 1, Col: 25>
<OPERATOR, "*", Line: 1, Col: 27>
<INTEGER_LITERAL, "2", Line: 1, Col: 29>
<OPERATOR, "**", Line: 1, Col: 31>
<INTEGER_LITERAL, "3", Line: 1, Col: 34>
<KEYWORD, "condition", Line: 2, Col: 1>
<PUNCTUATOR, "(", Line: 2, Col: 11>
<IDENTIFIER, "Result", Line: 2, Col: 12>
<OPERATOR, ">=", Line: 2, Col: 19>
<INTEGER_LITERAL, "100", Line: 2, Col: 22>
<OPERATOR, "&&", Line: 2, Col: 26>
<BOOLEAN_LITERAL, "true", Line: 2, Col: 29>
<OPERATOR, "!=" , Line: 2, Col: 34>
<BOOLEAN_LITERAL, "false", Line: 2, Col: 37>
<PUNCTUATOR, ")\"", Line: 2, Col: 42>
<KEYWORD, "output", Line: 3, Col: 5>
<IDENTIFIER, "Result", Line: 3, Col: 12>
<OPERATOR, "/", Line: 3, Col: 19>
<FLOAT_LITERAL, "2.5", Line: 3, Col: 21>
<KEYWORD, "else", Line: 4, Col: 1>
<IDENTIFIER, "Result", Line: 5, Col: 5>
<OPERATOR, "+=", Line: 5, Col: 12>
<INTEGER_LITERAL, "10", Line: 5, Col: 15>

JFlex Scanner Statistics:
Total Tokens: 30
KEYWORD: 4
IDENTIFIER: 4
INTEGER_LITERAL: 6
FLOAT_LITERAL: 1
BOOLEAN_LITERAL: 2
OPERATOR: 9
PUNCTUATOR: 4
```

Conclusion

[Performance Comparison]
Manual Scanner Time: 25.818 ms
JFlex Scanner Time: 7.440 ms

[Output Correctness]
[PASS] Outputs MATCH exactly.

Test3

Manual scanner

```
COMPARISON REPORT FOR: C:\Users\maazb\Desktop\cc_A1\tests/test3.txt
```

```
=====
[Manual Scanner Output]
<KEYWORD, "declare", Line: 1, Col: 1>
<IDENTIFIER, "My", Line: 1, Col: 9>
<IDENTIFIER, "Char", Line: 1, Col: 11>
<OPERATOR, "=", Line: 1, Col: 16>
<CHAR_LITERAL, "'\n'", Line: 1, Col: 18>
<KEYWORD, "declare", Line: 2, Col: 1>
<IDENTIFIER, "Tab", Line: 2, Col: 9>
<OPERATOR, "=", Line: 2, Col: 13>
<CHAR_LITERAL, "'\t'", Line: 2, Col: 15>
<KEYWORD, "declare", Line: 3, Col: 1>
<IDENTIFIER, "Path", Line: 3, Col: 9>
<OPERATOR, "=", Line: 3, Col: 14>
<STRING_LITERAL, ""C:\\Users\\\\Desktop"", Line: 3, Col: 16>
<KEYWORD, "declare", Line: 4, Col: 1>
<IDENTIFIER, "Quote", Line: 4, Col: 9>
<OPERATOR, "=", Line: 4, Col: 15>
<STRING_LITERAL, ""He said, \"Hello!\""", Line: 4, Col: 17>
```

Scanner Statistics:

Total Tokens: 17

Lines Processed: 5

Comments Removed: 0

KEYWORD: 4

IDENTIFIER: 5

STRING_LITERAL: 2

CHAR_LITERAL: 2

OPERATOR: 4

Symbol Table:

Name	Type	First Line	Frequency
My	ID	1	1
Char	ID	1	1
Tab	ID	2	1
Path	ID	3	1
Quote	ID	4	1

Jflex and conclusion

```
[JFlex Scanner Output]
<KEYWORD, "declare", Line: 1, Col: 1>
<IDENTIFIER, "My", Line: 1, Col: 9>
<IDENTIFIER, "Char", Line: 1, Col: 11>
<OPERATOR, "=", Line: 1, Col: 16>
<CHAR_LITERAL, "'\n'", Line: 1, Col: 18>
<KEYWORD, "declare", Line: 2, Col: 1>
<IDENTIFIER, "Tab", Line: 2, Col: 9>
<OPERATOR, "=", Line: 2, Col: 13>
<CHAR_LITERAL, "'\t'", Line: 2, Col: 15>
<KEYWORD, "declare", Line: 3, Col: 1>
<IDENTIFIER, "Path", Line: 3, Col: 9>
<OPERATOR, "=", Line: 3, Col: 14>
<STRING_LITERAL, "\"C:\\\\Users\\\\Desktop\"", Line: 3, Col: 16>
<KEYWORD, "declare", Line: 4, Col: 1>
<IDENTIFIER, "Quote", Line: 4, Col: 9>
<OPERATOR, "=", Line: 4, Col: 15>
<STRING_LITERAL, "\"He said, \\\"Hello!\\\"", Line: 4, Col: 17>
```

JFlex Scanner Statistics:

Total Tokens: 17

KEYWORD: 4

IDENTIFIER: 5

STRING_LITERAL: 2

CHAR_LITERAL: 2

OPERATOR: 4

[Performance Comparison]

Manual Scanner Time: 21.125 ms

JFlex Scanner Time: 4.643 ms

[Output Correctness]

[PASS] Outputs MATCH exactly.

Test 4

```
=====
COMPARISON REPORT FOR: C:\Users\maazb\Desktop\cc_A1\tests\test4.txt
=====

[Manual Scanner Output]
<KEYWORD, "start", Line: 4, Col: 1>
<KEYWORD, "finish", Line: 4, Col: 7>

Scanner Statistics:
Total Tokens: 2
Lines Processed: 5
Comments Removed: 2
KEYWORD: 2

Symbol Table:
Name           Type      First Line Frequency
-----
[ JFlex Scanner Output]
<KEYWORD, "start", Line: 4, Col: 1>
<KEYWORD, "finish", Line: 4, Col: 7>

JFlex Scanner Statistics:
Total Tokens: 2
KEYWORD: 2

[Performance Comparison]
Manual Scanner Time: 4.837 ms
JFlex Scanner Time: 2.105 ms

[Output Correctness]
[PASS] Outputs MATCH exactly.
```

Test 5
Manual scanner

```
=====
COMPARISON REPORT FOR: C:\Users\maazb\Desktop\cc_A1\tests\test5.txt
=====

[Manual Scanner Output]
<KEYWORD, "declare", Line: 1, Col: 1>
Error: [Lexical Error] at Line 1, Column 9
    Lexeme: "@Invalid"
    Reason: Invalid identifier (contains illegal character start)
-----
<OPERATOR, "=", Line: 1, Col: 18>
<INTEGER_LITERAL, "10", Line: 1, Col: 20>
<KEYWORD, "declare", Line: 2, Col: 1>
Error: [Lexical Error] at Line 2, Column 9
    Lexeme: "$Money"
    Reason: Invalid identifier (contains illegal character start)
-----
<OPERATOR, "=", Line: 2, Col: 16>
<INTEGER_LITERAL, "500", Line: 2, Col: 18>
<KEYWORD, "declare", Line: 3, Col: 1>
<IDENTIFIER, "Long", Line: 3, Col: 9>
<IDENTIFIER, "Ident", Line: 3, Col: 13>
<OPERATOR, "=", Line: 3, Col: 19>
<IDENTIFIER, "A", Line: 3, Col: 21>
<IDENTIFIER, "B", Line: 3, Col: 22>
Error: [Lexical Error] at Line 3, Column 23
    Lexeme: "Cdef123456789012345678901234567890"
    Reason: Identifier exceeds maximum length of 31 characters
-----
<KEYWORD, "declare", Line: 4, Col: 1>
<IDENTIFIER, "Bad", Line: 4, Col: 9>
<IDENTIFIER, "Float", Line: 4, Col: 12>
<OPERATOR, "=", Line: 4, Col: 18>
Error: [Lexical Error] at Line 4, Column 20
    Lexeme: "1.2.3"
    Reason: Malformed floating-point literal
-----
```

Stats

Scanner Statistics:

Total Tokens: 16

Lines Processed: 5

Comments Removed: 0

KEYWORD: 4

IDENTIFIER: 6

INTEGER_LITERAL: 2

OPERATOR: 4

Symbol Table:

Name	Type	First Line	Frequency
Long	ID	3	1
Ident	ID	3	1
A	ID	3	1
B	ID	3	1
Bad	ID	4	1
Float	ID	4	1

Jflex

```
[JFlex Scanner Output]
<KEYWORD, "declare", Line: 1, Col: 1>
Error: [Lexical Error] at Line 1, Column 9
    Lexeme: "@"
    Reason: character not recognized by scanner
-----
<UNKNOWN, "@", Line: 1, Col: 9>
<IDENTIFIER, "Invalid", Line: 1, Col: 10>
<OPERATOR, "=", Line: 1, Col: 18>
<INTEGER_LITERAL, "10", Line: 1, Col: 20>
<KEYWORD, "declare", Line: 2, Col: 1>
Error: [Lexical Error] at Line 2, Column 9
    Lexeme: "$"
    Reason: character not recognized by scanner
-----
<UNKNOWN, "$", Line: 2, Col: 9>
<IDENTIFIER, "Money", Line: 2, Col: 10>
<OPERATOR, "=", Line: 2, Col: 16>
<INTEGER_LITERAL, "500", Line: 2, Col: 18>
<KEYWORD, "declare", Line: 3, Col: 1>
<IDENTIFIER, "Long", Line: 3, Col: 9>
<IDENTIFIER, "Ident", Line: 3, Col: 13>
<OPERATOR, "=", Line: 3, Col: 19>
<IDENTIFIER, "A", Line: 3, Col: 21>
<IDENTIFIER, "B", Line: 3, Col: 22>
<IDENTIFIER, "Cdef123456789012345678901234567", Line: 3, Col: 23>
<INTEGER_LITERAL, "890", Line: 3, Col: 54>
<KEYWORD, "declare", Line: 4, Col: 1>
<IDENTIFIER, "Bad", Line: 4, Col: 9>
<IDENTIFIER, "Float", Line: 4, Col: 12>
<OPERATOR, "=", Line: 4, Col: 18>
<FLOAT_LITERAL, "1.2", Line: 4, Col: 20>
Error: [Lexical Error] at Line 4, Column 23
    Lexeme: "."
    Reason: character not recognized by scanner
-----
<UNKNOWN, ".", Line: 4, Col: 23>
<INTEGER_LITERAL, "3", Line: 4, Col: 24>
```

JFlex Scanner Statistics:

Total Tokens: 25

KEYWORD: 4

IDENTIFIER: 9

INTEGER_LITERAL: 4

FLOAT_LITERAL: 1

OPERATOR: 4

UNKNOWN: 3

[Performance Comparison]

Manual Scanner Time: 21.603 ms

JFlex Scanner Time: 8.139 ms

[Output Correctness]