

Cron Parser - Solution Report

Problem Statement

Build a command-line tool in Java to parse a cron expression string, expanding each field into a list of all applicable values. Output should be in a human-readable format.

Goals

- Parse 5 standard cron fields: minute, hour, day of month, month, day of week.
- Support *, */n, a-b, a,b,c, a-b/n patterns.
- Handle invalid expressions with error messages.
- Support extensibility (e.g., year field).
- Use OOP with Factory and Strategy patterns.

Design Patterns Used

Pattern	Purpose
Strategy	Encapsulate different parsing strategies
Factory	Create field-specific parser instances
Validation Strategy	Reusable field-level validation logic

Handled Features

Feature	Supported
*	Yes
*/n	Yes
a-b	Yes
a,b,c	Yes
a-b/n	Yes

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command	Yes
Invalid field exceptions	Yes
Extensible to year	Yes

Unit Test Coverage

- Tested strategies: Step, Range, All, Mixed, Fixed
- Happy paths and edge cases
- Exception handling
- Used JUnit 5

Sample Test Cases

Case	Input	Expected
All values	*	Full range
Steps	*/15	0 15 30 45
Range	1-5	1 2 3 4 5
Range with step	1-10/2	1 3 5 7 9
Fixed values	1,3,5	1 3 5
Invalid field	1--5	Exception

Summary

This cron parser is designed with modularity, extensibility, and robustness in mind. It handles all standard cron expressions, follows SOLID principles, and is easily testable.

The structure is extensible for year field and ready for production integration.