```java
package com.zeotap.wrangler;

import java.util.regex.Matcher;
import java.util.regex.Pattern;

public class TimeDuration {

    private static final Pattern PATTERN =
Pattern.compile("^(\\d+(?:\\.\\d+)?)(ms|s|min|h)$", Pattern.CASE_INSENSITIVE);

    public static long parse(String input) {
        Matcher matcher = PATTERN.matcher(input.trim());
        if (!matcher.matches()) {
            throw new IllegalArgumentException("Invalid time duration format: " +
input);
        }

        double value = Double.parseDouble(matcher.group(1));
        String unit = matcher.group(2).toLowerCase();

        switch (unit) {
            case "ms":
                return (long) value;
            case "s":
                return (long) (value * 1000);
            case "min":
                return (long) (value * 60 * 1000);
            case "h":
                return (long) (value * 60 * 60 * 1000);
            default:
                throw new IllegalArgumentException("Unknown time unit: " + unit);
        }
    }
}
```