## Analysis

### Menu.cs

Graphical user interface, text, application, email

Description automatically generatedText

Description automatically generatedText

Description automatically generatedText

Description automatically generated with medium confidence

### Program.cs

Chart, scatter chart

Description automatically generated with medium confidenceA picture containing chart

Description automatically generatedA picture containing background pattern

Description automatically generatedA picture containing table

Description automatically generatedA picture containing table

Description automatically generatedA picture containing text

Description automatically generatedA picture containing background pattern

Description automatically generatedA picture containing graphical user interface

Description automatically generatedGraphical user interface, text, application, chat or text message

Description automatically generatedChart, scatter chart

Description automatically generated with medium confidence

### Normal.cs

Text

Description automatically generatedText

Description automatically generatedGraphical user interface, text, application, email

Description automatically generatedText

Description automatically generatedText

Description automatically generatedGraphical user interface, text, application

Description automatically generatedText

Description automatically generated

### Optimization.cs

Graphical user interface, text, application

Description automatically generatedText

Description automatically generatedText, letter

Description automatically generatedGraphical user interface, text, application, chat or text message

Description automatically generatedText

Description automatically generatedGraphical user interface, text, application

Description automatically generatedGraphical user interface, text, application

Description automatically generatedText

Description automatically generatedGraphical user interface, text, application, chat or text message

Description automatically generatedText

Description automatically generatedText

Description automatically generatedText

Description automatically generated with medium confidenceText

Description automatically generatedGraphical user interface, text, application

Description automatically generatedText

Description automatically generatedText

Description automatically generatedText

Description automatically generatedGraphical user interface, text, application

Description automatically generatedText

Description automatically generatedGraphical user interface, text, application

Description automatically generatedText

Description automatically generatedGraphical user interface, text, application

Description automatically generatedText

Description automatically generatedText

Description automatically generated with medium confidence

## Execution Time

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Type** | **Test case** | **Movies** | **Actors** | **Queries** | **Normal (s)** | **Optimization (s)** | **Diff (s)** | **Improvement** |
| Small | 1 | 193 | 2513 | 110 | 1.482 | 0.3 | 1.182 | 494% |
| Small | 2 | 187 | 8264 | 50 | 5.729 | 0.6 | 5.129 | 955% |
| Medium | 3 | 967 | 13848 | 85 | 16.241 | 1.5 | 14.741 | 1083% |
| Medium | 4 | 967 | 13848 | 4000 | 262.766 | 26 | 236.766 | 1011% |
| Medium | 5 | 4735 | 43923 | 110 | 46.423 | 5 | 41.423 | 928% |
| Medium | 6 | 4735 | 43923 | 2000 | 175.366 | 22 | 153.366 | 797% |
| Large | 7 | 14129 | 170518 | 26 | 231.683 | 26 | 205.683 | 891% |
| Large | 8 | 14129 | 170518 | 600 | 24.732 | 4 | 20.732 | 618% |
| Extreme | 9 | 122806 | 418451 | 22 | 1651.905 | 85 | 1566.905 | 1943% |
| Extreme | 10 | 122806 | 418451 | 200 | 101.333 | 8 | 93.333 | 1267% |