
# Cognitive Complexity

an Overview and Evaluation

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# About Cognitive Complexity

- New(ish) metric designed to measure understandability
- Published Dec. 2016 in a SonarSource white paper
  https://sonarsource.com/docs/CognitiveComplexity.pdf
- Available in mainstream SonarSource code analyzers
  - rule
  - metric
- Also implemented in Code Climate
  https://docs.codeclimate.com/docs/cognitive-complexity
- Implementation submitted for clang-tidy
  https://reviews.llvm.org/D36836

# How it works

1. Ignore readable shorthand structures
2. Increment for breaks in the linear flow
3. Increment for nesting

# Cognitive vs Cyclomatic Complexity

```
String getWords(int number) { // +1
  switch (number) {           // +1
    case 1:                   // +1
      return "one";
    case 2:                   // +1
      return "a couple";
    case 3:                   // +1
      return "a few";
    default:
      return "lots";
  }
}       // Cognitive Complexity  1
        // Cyclomatic Complexity 4
```

```
int sumOfPrimes(int max) {                  // +1
  int total = 0;
  OUT: for (int i = 1; i <= max; ++i) {     // +1 +1
    for (int j = 2; j < i; ++j) {           // +2 +1
      if (i % j == 0) {                     // +3 +1
        continue OUT;                       // +1
      }
    }
    total += i;
  }
  return total;
}                   // Cognitive Complexity  7
                    // Cyclomatic Complexity 4
```

# Q. Do developers accept Cognitive Complexity?

## Selection Method

- SonarCloud
  https://sonarcloud.io
- Java, C#, JavaScript, C++
- "Actively Managed" issues
  (at least 1 Cognitive Complexity issue marked False Positive or Won't Fix)

Yield: 22 projects

Result: 5 reject, 17 accept => 77.27% acceptance