An Introduction to Mutation Testing







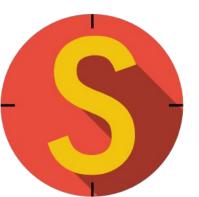




What is Mutation Testing?

It's a way to test your tests.

"Bugs, or *mutants*, are automatically inserted into your production code. Your tests are ran for each mutant. If your tests *fail* then the mutant is *killed*. If your tests passed, the mutant *survived*. The higher the percentage of mutants killed, the more *effective* your tests are." - https://stryker-mutator.io/



What about Code Coverage?

Code Coverage only tells you which lines of code have been "touched" by your tests, not if your tests actually do anything.

Let's see an example.





WorldsBestApiController.cs - Stryker.NET Report

All files / Controllers / WorldsBestApiController.cs

```
File / Directory
                                                                                                       Mutation score
WorldsBestApiController.cs
Survived (16)
                   Collapse all
using System;
using System.Collections.Generic;
using System.Ling;
using System. Threading. Tasks;
using Microsoft.AspNetCore.Http;
using Microsoft.AspNetCore.Mvc;
using Microsoft.Extensions.Logging;
namespace CopStryker.Api.Controllers
    [Route("api")]
    [ApiController]
    public class WorldsBestApiController : ControllerBase
        public WorldsBestApiController()
        [Route("ArithmeticOperator/{factor1}/{factor2}")]
        [HttpGet]
        public int GetUsingArithmeticOperator(int factor1, int factor2)
```

Stryker Documentation

Setup: https://stryker-mutator.io/stryker-net/quickstart

Configuration: https://github.com/stryker-mutator/stryker-net/blob/master/docs/Configuration.md

Mutators: https://github.com/stryker-mutator/stryker-handbook/blob/master/mutator-types.md

Reporters: https://github.com/stryker-mutator/stryker-net/blob/master/docs/Reporters.md



Stryker Config and PowerShell Script

```
"mutate": [
"stryker-config": {
 "reporters": [
                                                                        "**/Controllers/*.*"
  "dots"
                                                                       "excluded-mutations": [
 "timeout-ms": 10000,
                                                                           "string"
 "max-concurrent-test-runners": 4,
 "threshold-break": 60,
```

