



Software Engineering (IT314)

G21 - Online Forum

Mutation Testing

Introduction

Mutation Testing is a method used in software development to evaluate the quality and effectiveness of test suites by introducing small, intentional changes (mutations) into them. If our input is able to differentiate between original and mutated code, then it is said that we have killed the mutant, else it survives, indicating potential weaknesses.

For mutation testing, we have used **Stryker-mutator (v8.6.0)** along with **mocha-runner**.

Given below is the configuration file used for Stryker

```
/**
 * @type {import('@stryker-mutator/api/core').StrykerOptions}
 */
const config = {
  mutate: [
    'back-end/server/controllers/**/*.js',
    '!test/**/*.test.js'
  ],
  testRunner: 'mocha',
  mochaOptions: {
    spec: ['test/**/*.test.js'],
  },
  reporters: ['html', 'clear-text', 'progress'],
  coverageAnalysis: 'perTest'
};

export default config;
```

Result

All files												
255									69	31		
File / Directory	Mutation Score		Killed	Survived	Timeout	No coverage	Ignored	Runtime errors	Compile errors	Detected	Undetected	Total
	Of total	Of covered										
All files	<div><div></div></div> 71.83	<div><div></div></div> 78.70	246	69	9	31	0	0	0	255	100	355
js authenticateAdmin.js	<div><div></div></div> 75.00	<div><div></div></div> 75.00	12	4	0	0	0	0	0	12	4	16
js login.js	<div><div></div></div> 85.71	<div><div></div></div> 85.71	21	4	3	0	0	0	0	24	4	28
js myProfileControllers.js	<div><div></div></div> 68.61	<div><div></div></div> 86.24	94	15	0	28	0	0	0	94	43	137
js questionController.js	<div><div></div></div> 70.00	<div><div></div></div> 70.00	32	15	3	0	0	0	0	35	15	50
js replyController.js	<div><div></div></div> 90.00	<div><div></div></div> 90.00	18	2	0	0	0	0	0	18	2	20
js signup.js	<div><div></div></div> 63.33	<div><div></div></div> 64.41	35	21	3	1	0	0	0	38	22	60
js spaceControllers.js	<div><div></div></div> 77.27	<div><div></div></div> 80.95	34	8	0	2	0	0	0	34	10	44

File	% Mutation score		# killed	# timeout	# survived	# no cov	# errors
	total	covered					
All files	71.83	78.70	246	9	69	31	0
authenticateAdmin.js	75.00	75.00	12	0	4	0	0
login.js	85.71	85.71	21	3	4	0	0
myProfileControllers.js	68.61	86.24	94	0	15	28	0
questionController.js	70.00	70.00	32	3	15	0	0
replyController.js	90.00	90.00	18	0	2	0	0
signup.js	63.33	64.41	35	3	21	1	0
spaceControllers.js	77.27	80.95	34	0	8	2	0