Automated Tests

> Testes automatizados são qualquer tipo de verificação do comportamento de um sistema executados automaticamente.

Por que utilizar testes automatizados?

- Documentação de código
- Safety Net
- Aumento de produtividade

Documentação de código

```
it(
  "should return empty list when teacher has no associated curricular component",
  async () => {···
  }
)

it(
  "should return one curricular component when teacher is associated",
  async () => {···
  }
)

it(
  "should return many curricular components when teacher is associated",
  async () => {···
  }
)
```

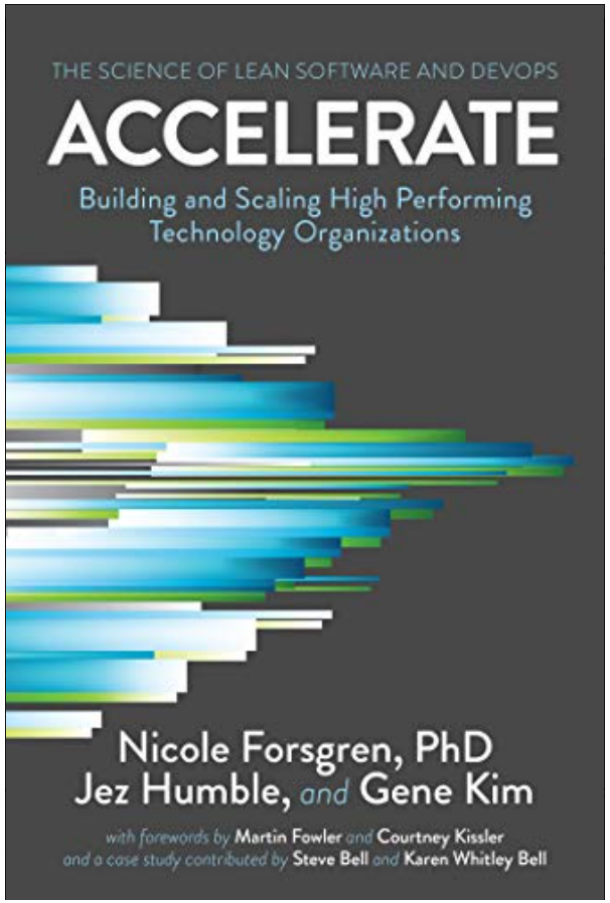
Safety Net

```
bbdac@DESKTOP-RAPR71V  C:\gh_branding\edusfera-frontend  develop
#  npm run test:unit

> edusfera-front@0.1.0 test:unit C:\gh_branding\edusfera-frontend
> vue-cli-service test:unit

 PASS  src/helpers/tests/ListComparer.spec.js
 PASS  src/helpers/tests/ObjectOperations.spec.js
 PASS  src/store/user/tests/UserCacheManager.spec.js
 PASS  src/services/tests/ShiroTaxonomyFilter.spec.js
 PASS  src/views/Teachers/Theme/tests/ThemeLoadingTest.spec.js
 PASS  src/helpers/tests/ListOperations.spec.js
 PASS  src/views/Teachers/Theme/tests/ThemeTeacherVisionButtonTest.spec.js
 PASS  src/services/tests/ShiroTeacherService.spec.js
 PASS  src/views/InAction/tests/ActionGroupsCacheService.spec.js
 PASS  src/services/tests/ShiroServiceTest.spec.js
```

Aumento de produtividade



Times que empregam técnicas como TDD, Continuous integration and delivery gastam 44 porcento mais tempo em trabalho útil (novas funcionalidades) do que corrigindo bugs

Tipos

- Integration Tests
- Security Tests
- Performance Tests
- Acceptance Tests

Fases

- Unit
- API (Application Programming Interface)
- UI (User interface)

Testes: O que são? Como vivem? O que fazem?

- Arrange (Preparação), Act (Ação), and Assert (Verificação)

```
test('should add two numbers and return sum value', () => {
  // arrange
  const calculator = new Calculator()

  // act
  const result = calculator.sum(1, 2)

  // assert
  expect(result).toBe(3);
})
```

Tipos mais comuns de verificações

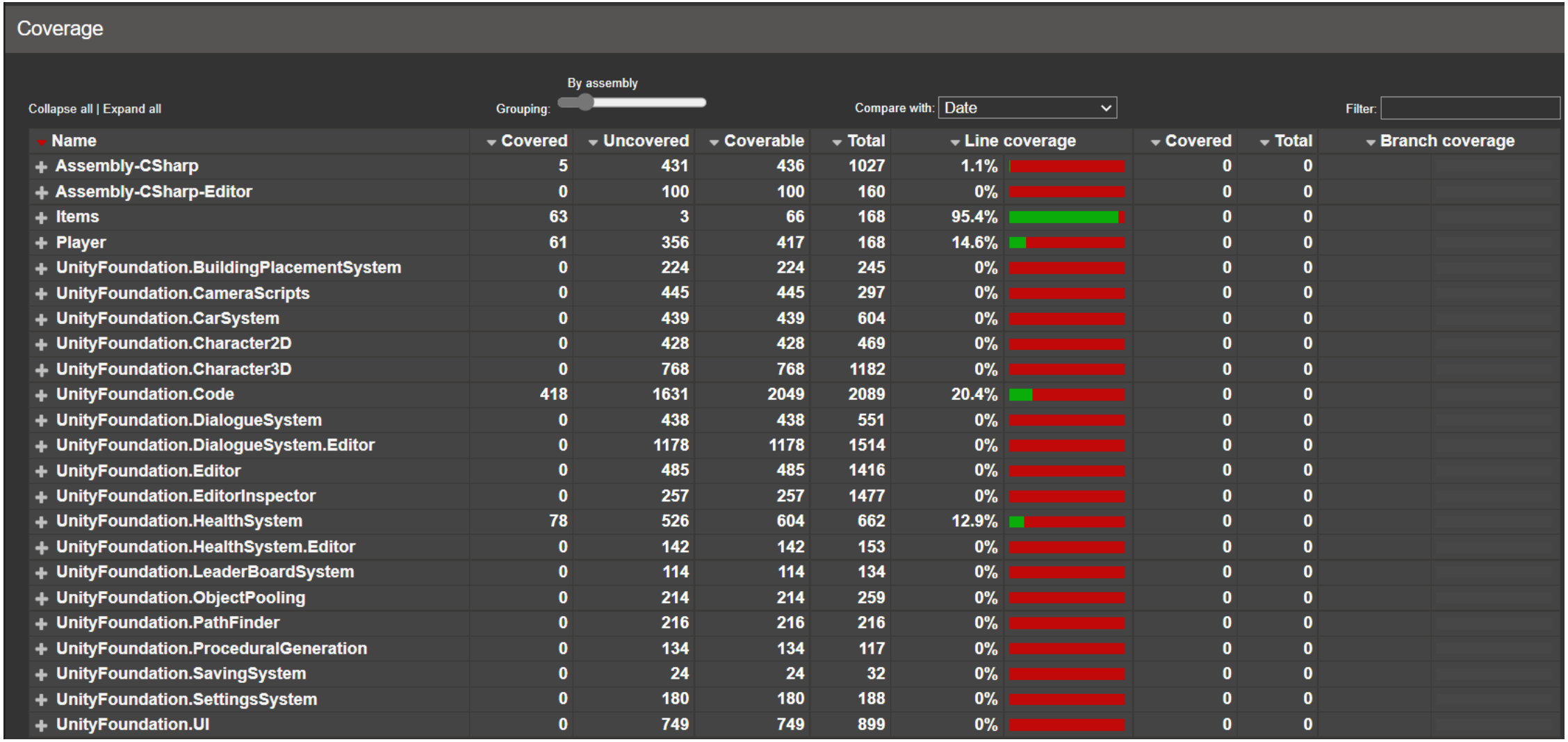
```
expect(result).toBe(number)                          // Espera um valor igual
expect(result).not.toBe(number)                      // Espera um valor diferente
expect(result).toBeGreaterThan(number | bigint)      // Espera um valor maior
expect(result).toBeLessThan(number | bigint)         // Espera um valor menor
expect(method()).toThrow(error?)                     // Espera que method lance uma exceção
```

Code Coverage

> Apresenta um visão gráfica da quantidade de código submetido a testes

- **Observação:** Não deve ser utilizada isoladamente como métrica de qualidade de código
- Utilizar Mutation e outros tipos de técnicas para garantir a qualidade

Exemplo de um relatório de cobertura de código



Coverage

Collapse all | Expand all

Grouping: By assembly

Compare with: Date

Filter:

Name	Covered	Uncovered	Coverable	Total	Line coverage	Covered	Total	Branch coverage
Assembly-CSharp	5	431	436	1027	1.1%	0	0	
Assembly-CSharp-Editor	0	100	100	160	0%	0	0	
Items	63	3	66	168	95.4%	0	0	
Player	61	356	417	168	14.6%	0	0	
UnityFoundation.BuildingPlacementSystem	0	224	224	245	0%	0	0	
UnityFoundation.CameraScripts	0	445	445	297	0%	0	0	
UnityFoundation.CarSystem	0	439	439	604	0%	0	0	
UnityFoundation.Character2D	0	428	428	469	0%	0	0	
UnityFoundation.Character3D	0	768	768	1182	0%	0	0	
UnityFoundation.Code	418	1631	2049	2089	20.4%	0	0	
UnityFoundation.DialogueSystem	0	438	438	551	0%	0	0	
UnityFoundation.DialogueSystem.Editor	0	1178	1178	1514	0%	0	0	
UnityFoundation.Editor	0	485	485	1416	0%	0	0	
UnityFoundation.EditorInspector	0	257	257	1477	0%	0	0	
UnityFoundation.HealthSystem	78	526	604	662	12.9%	0	0	
UnityFoundation.HealthSystem.Editor	0	142	142	153	0%	0	0	
UnityFoundation.LeaderBoardSystem	0	114	114	134	0%	0	0	
UnityFoundation.ObjectPooling	0	214	214	259	0%	0	0	
UnityFoundation.PathFinder	0	216	216	216	0%	0	0	
UnityFoundation.ProceduralGeneration	0	134	134	117	0%	0	0	
UnityFoundation.SavingSystem	0	24	24	32	0%	0	0	
UnityFoundation.SettingsSystem	0	180	180	188	0%	0	0	
UnityFoundation.UI	0	749	749	899	0%	0	0	

Exemplo de um arquivo específico no relatório de cobertura de código

File(s)

C:/Users/bbdac/Documents/projects/zombieluca/Assets/UnityFoundation/Code/Common/LinearInterpolation/LerpByTime.cs

#	Line	Line coverage
	1	`using UnityEngine;`
	2	
	3	`namespace UnityFoundation.Code`
	4	`{`
	5	`    public class LerpByTime`
	6	`    {`
4	7	`        public float StartValue { get; }`
4	8	`        public float EndValue { get; }`
12	9	`        public float CurrentValue { get; private set; }`
12	10	`        public float CurrentTime { get; private set; }`
4	11	`        public float Time { get; }`
	12	
3	13	`        public LerpByTime(float startValue, float endValue, float time)`
3	14	`        {`
3	15	`            StartValue = startValue;`
3	16	`            CurrentValue = startValue;`
3	17	`            EndValue = endValue;`
3	18	`            Time = time;`
3	19	`        }`
	20	
	21	`        public void Eval(float timeAmount)`
4	22	`        {`
4	23	`            CurrentTime += timeAmount;`
4	24	`            CurrentValue = Mathf.Lerp(`
	25	`                StartValue,`
	26	`                EndValue,`
	27	`                CurrentTime / Time`
	28	`            );`
4	29	`        }`
	30	`    }`
	31	`}`

Methods/Properties

- StartValue()
- EndValue()
- CurrentValue()
- CurrentValue(System.Single)
- CurrentTime()
- CurrentTime(System.Single)
- Time()
- LerpByTime(System.Single, System.Sing…
- Eval(System.Single)

Bibliografia

- Documentação do Jest
- Clean Code Class 4
- Accelerate: The Science of Lean Software and DevOps: Building and Scaling High Performing Technology Organizations