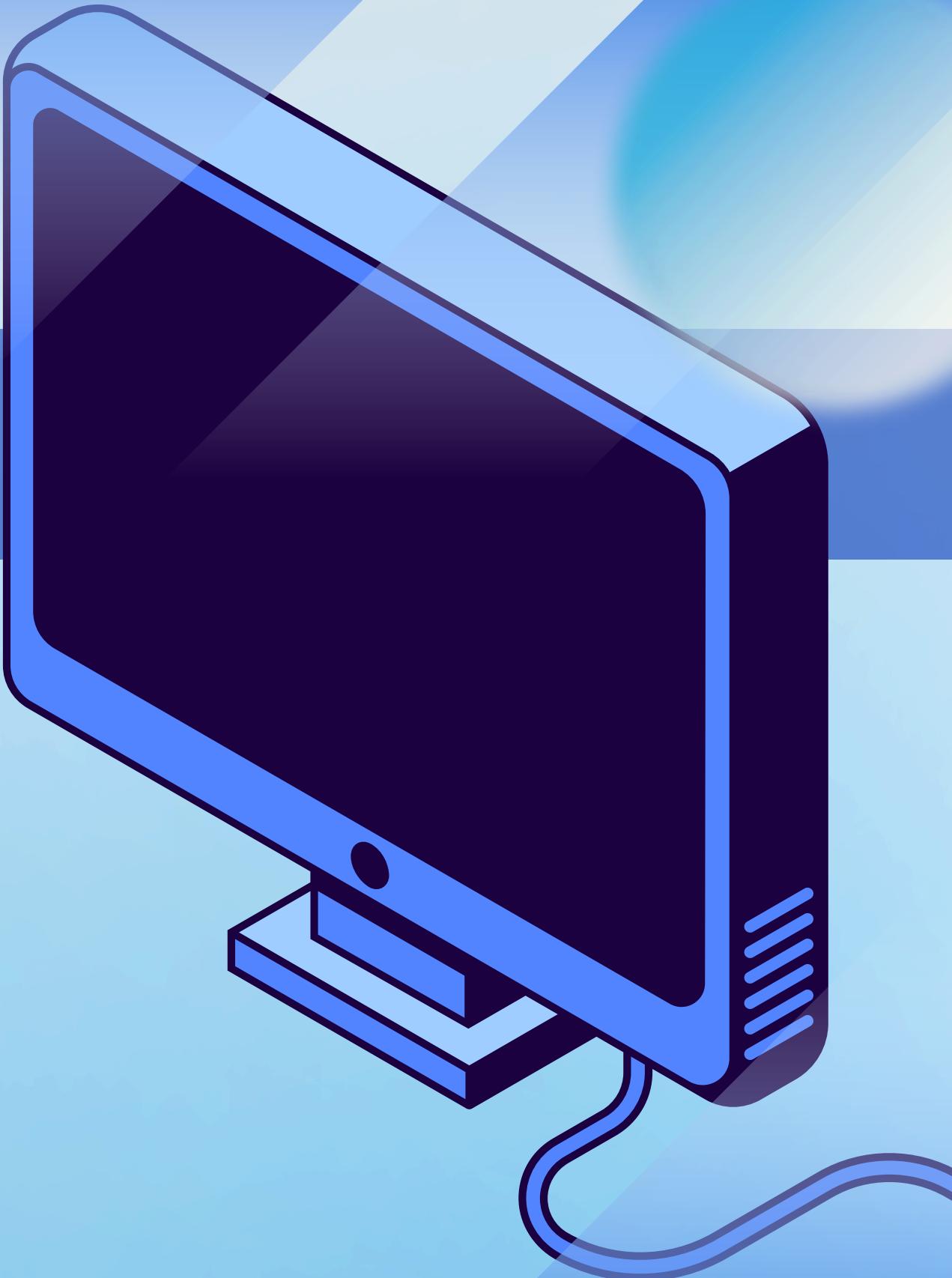


# Qualidade e teste

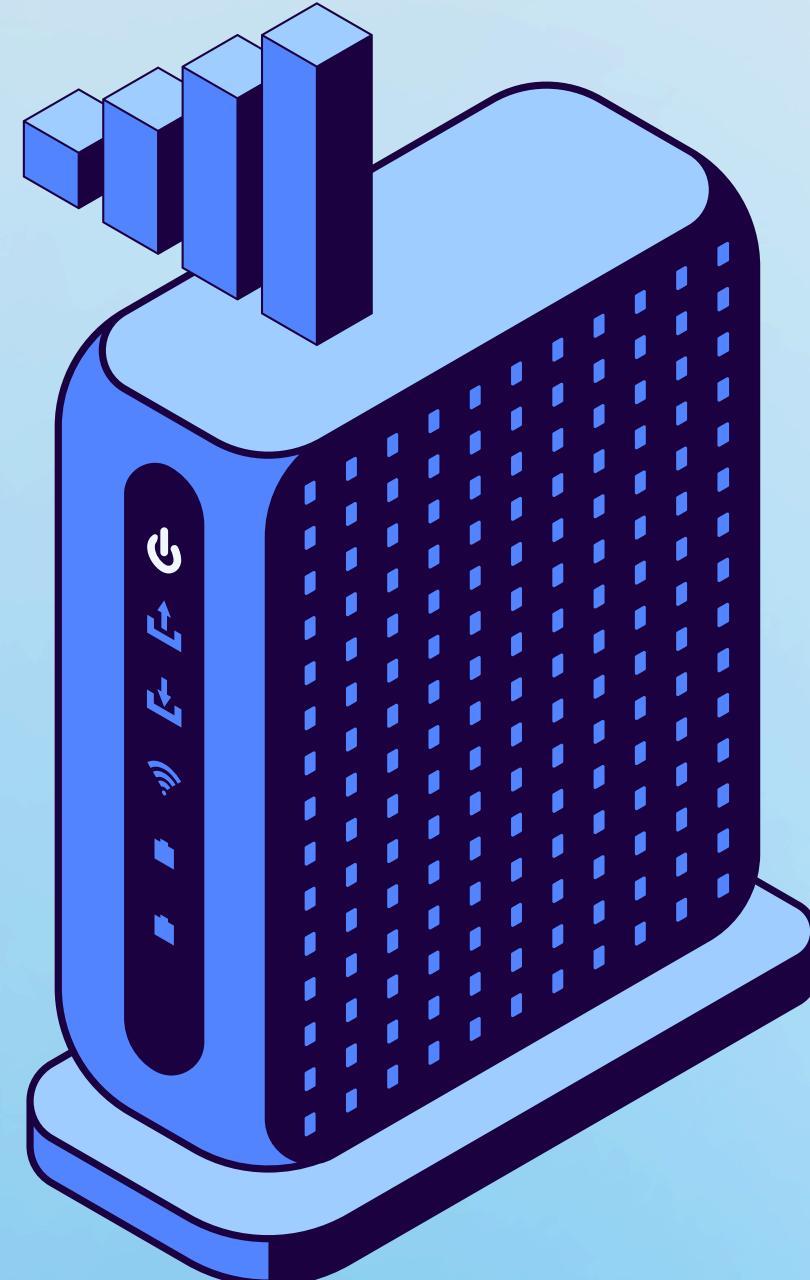
## Sistema de ERP PDV

**Erik Heringer, Gabriel  
Marinho, Gabriel Pinho,  
João Pedro Barboza,  
Jhonatan Silva**



# ÍNDICE

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- ✓ Relatório de Inspeção do Código Fonte
- ✓ Testes Baseados em Defeitos
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- ✓ Melhoria dos casos de teste
- ✓ Cobertura de código
- ✓ Testes de Sistema e Requisito não funcional
- ✓ Medidas de atributo da ISO 25010



# PDV

## O que é o Sistema PDV?

O projeto escolhido foi o Sistema ERP PDV. É voltado para a gestão de estabelecimentos comerciais, oferecendo funcionalidades para controle de vendas, estoque, cadastro de clientes e fornecedores e financeiro.

O sistema utiliza Java 8 com Spring Framework e MySQL para o banco de dados.

## Módulos/Componentes Aprimorados na Entrega 2:

- ProdutoService
- CartaoLancamentoService
- CaixaService
- RecebimentoService
- VendaService



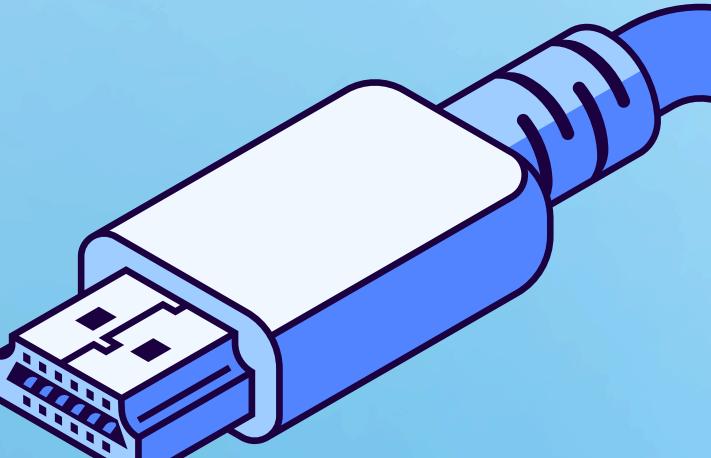
# Relatórios de Inspeção de Código Fonte

Nesta etapa, utilizamos o SonarQube para realizar a análise estática do código-fonte das classes designadas a cada membro do grupo.

O objetivo foi identificar e corrigir:

## Melhorias aplicadas:

- Criação de exceções dedicadas
- Remoção de injeções de campo desnecessárias
- Padronização de nomes de variáveis e remoção
- Utilização da Biblioteca Lombok para reduzir código
- Redução de complexidade desnecessária nos métodos de serviço

The SonarQube logo is displayed in a large, bold, black sans-serif font. The letters are slightly rounded and have a modern feel. To the right of the text, there are three blue curved lines of varying lengths, suggesting sound waves or signal transmission.

# GABRIEL PINHO

Date	Description	Resource
1 month ago	Call "Optional#isPresent()" before accessing the value.	CaixaService.j...
1 month ago	Call "caixaAtual.isPresent()" before accessing the value.	CaixaService.j...
1 month ago	Define and throw a dedicated exception instead of using a generic one.	CaixaService.j...
1 month ago	Define and throw a dedicated exception instead of using a generic one.	CaixaService.j...
1 month ago	Define and throw a dedicated exception instead of using a generic one.	CaixaService.j...
1 month ago	Define and throw a dedicated exception instead of using a generic one.	CaixaService.j...
1 month ago	Define and throw a dedicated exception instead of using a generic one.	CaixaService.j...
1 month ago	Define and throw a dedicated exception instead of using a generic one.	CaixaService.j...
1 month ago	Extract this nested ternary operation into an independent statement.	CaixaService.j...
1 month ago	Immediately return this expression instead of assigning it to the temporary variable "caixaOptional".	CaixaService.j...
1 month ago	Merge this if statement with the enclosing one. [+1 location]	CaixaService.j...
1 month ago	Merge this if statement with the enclosing one. [+1 location]	CaixaService.j...
1 month ago	Refactor this method to reduce its Cognitive Complexity from 24 to the 15 allowed. [+17 locations]	CaixaService.j...
1 month ago	Remove the "usuario" field and declare it as a local variable in the relevant methods.	CaixaService.j...
1 month ago	Remove this field injection and use constructor injection instead.	CaixaService.j...
1 month ago	Remove this field injection and use constructor injection instead.	CaixaService.j...
1 month ago	Remove this field injection and use constructor injection instead.	CaixaService.j...
1 month ago	Rename "usuario" which hides the field declared at line 30.	CaixaService.j...
1 month ago	Replace this use of System.out by a logger.	CaixaService.j...
1 month ago	Replace this use of System.out by a logger.	CaixaService.j...

ENTREGA 1

Date	Description	Resource

ENTREGA 2

# JHONATAN SILVA

Date	Description	Resource
1 month ago	Define and throw a dedicated exception instead of using a generic one.	ProdutoService.java
1 month ago	Define and throw a dedicated exception instead of using a generic one.	ProdutoService.java
1 month ago	Method has 18 parameters, which is greater than 7 authorized.	ProdutoService.java
1 month ago	Remove this field injection and use constructor injection instead.	ProdutoService.java
1 month ago	Remove this field injection and use constructor injection instead.	ProdutoService.java
1 month ago	Rename this local variable to match the regular expression '^[a-z][a-zA-Z0-9]*\$'.	ProdutoService.java
1 month ago	Rename this local variable to match the regular expression '^[a-z][a-zA-Z0-9]*\$'.	ProdutoService.java
1 month ago	Rename this local variable to match the regular expression '^[a-z][a-zA-Z0-9]*\$'.	ProdutoService.java
1 month ago	Rename this local variable to match the regular expression '^[a-z][a-zA-Z0-9]*\$'.	ProdutoService.java
1 month ago	Replace this use of System.out by a logger.	ProdutoService.java

```
1 package net.originmobi.pdv.service;
2
3 import java.sql.Date;[]
22
23 @Service
24 public class ProdutoService {
25
26     private static final Logger log = LoggerFactory.getLogger(ProdutoService.class);
27
28     public ProdutoService(ProdutoRepository produtos, VendaProdutoService vendaProdutos) {
29         this.produtos = produtos;
30         this.vendaProdutos = vendaProdutos;
31     }
32
33     private ProdutoRepository produtos;
34
35     private VendaProdutoService vendaProdutos;
36
37     private LocalDate dataAtual = LocalDate.now();
38
39     public List<Produto> listar() {
40         return produtos.findAll();
41     }
42
43     public List<Produto> listaProdutosVendaveis() {
44         return produtos.produtosVendaveis();
```

Date	Description	Resource
0 items		

ENTREGA 1

ENTREGA 2

# GABRIEL MARINHO

Resource	Date	Description
CartaoLancamentoService.java	1 month ago	"getData_recebimento" returns a string, there's no need to call "toString()".
CartaoLancamentoService.java	1 month ago	Call "titulo.isPresent()" before accessing the value.
CartaoLancamentoService.java	1 month ago	Define and throw a dedicated exception instead of using a generic one.
CartaoLancamentoService.java	1 month ago	Define and throw a dedicated exception instead of using a generic one.
CartaoLancamentoService.java	1 month ago	Define and throw a dedicated exception instead of using a generic one.
CartaoLancamentoService.java	1 month ago	Define and throw a dedicated exception instead of using a generic one.
CartaoLancamentoService.java	1 month ago	Define and throw a dedicated exception instead of using a generic one.
CartaoLancamentoService.java	1 month ago	Define and throw a dedicated exception instead of using a generic one.
CartaoLancamentoService.java	1 month ago	Define and throw a dedicated exception instead of using a generic one.
CartaoLancamentoService.java	1 month ago	Define and throw a dedicated exception instead of using a generic one.
CartaoLancamentoService.java	1 month ago	Remove the "dataAtual" field and declare it as a local variable in the relevant methods.
CartaoLancamentoService.java	1 month ago	Remove this field injection and use constructor injection instead.
CartaoLancamentoService.java	1 month ago	Remove this field injection and use constructor injection instead.
CartaoLancamentoService.java	1 month ago	Remove this field injection and use constructor injection instead.
CartaoLancamentoService.java	1 month ago	Remove this useless assignment to local variable "taxa_ante".
CartaoLancamentoService.java	1 month ago	Remove this useless assignment to local variable "vl_liq_ant".
CartaoLancamentoService.java	1 month ago	Remove this useless assignment to local variable "vl_liq_parcela".
CartaoLancamentoService.java	1 month ago	Remove this useless assignment to local variable "vl_taxa".
CartaoLancamentoService.java	1 month ago	Remove this useless assignment to local variable "vl_taxa_ante".
CartaoLancamentoService.java	1 month ago	Rename this local variable to match the regular expression '^[a-zA-Z][a-zA-Z0-9]*\$'.
CartaoLancamentoService.java	1 month ago	Rename this local variable to match the regular expression '^[a-zA-Z][a-zA-Z0-9]*\$'.
CartaoLancamentoService.java	1 month ago	Rename this local variable to match the regular expression '^[a-zA-Z][a-zA-Z0-9]*\$'.
CartaoLancamentoService.java	1 month ago	Rename this local variable to match the regular expression '^[a-zA-Z][a-zA-Z0-9]*\$'.
CartaoLancamentoService.java	1 month ago	Rename this local variable to match the regular expression '^[a-zA-Z][a-zA-Z0-9]*\$'.
CartaoLancamentoService.java	1 month ago	Rename this local variable to match the regular expression '^[a-zA-Z][a-zA-Z0-9]*\$'.
CartaoLancamentoService.java	1 month ago	Replace this use of System.out by a logger.

# ENTREGA 1

Resource	Date	Description

# ENTREGA 2

# ERIK HERINGER

Resource	Date	Description
VendaService	1 month ago	Call "caixa.isPresent()" before accessing the value.
VendaService	1 month ago	Call "titulo.isPresent()" before accessing the value.
VendaService	1 month ago	Define and throw a dedicated exception instead of using a generic one.
VendaService	1 month ago	Define and throw a dedicated exception instead of using a generic one.
VendaService	1 month ago	Define and throw a dedicated exception instead of using a generic one.
VendaService	1 month ago	Define and throw a dedicated exception instead of using a generic one.
VendaService	1 month ago	Define and throw a dedicated exception instead of using a generic one.
VendaService	1 month ago	Define and throw a dedicated exception instead of using a generic one.
VendaService	1 month ago	Define and throw a dedicated exception instead of using a generic one.
VendaService	1 month ago	Define and throw a dedicated exception instead of using a generic one.
VendaService	1 month ago	Define and throw a dedicated exception instead of using a generic one.
VendaService	1 month ago	Define and throw a dedicated exception instead of using a generic one.
VendaService	1 month ago	Method has 10 parameters, which is greater than 7 authorized.
VendaService	1 month ago	Parameters to aprazo have the same names but not the same order as the method arguments. [+2 loc...]
VendaService	1 month ago	Parameters to avistaDinheiro have the same names but not the same order as the method arguments....
VendaService	1 month ago	Refactor this method to reduce its Cognitive Complexity from 22 to the 15 allowed. [+13 locations]
VendaService	1 month ago	Remove these unused method parameters "vlprodutos", "qtdVezes". [+1 location]
VendaService	1 month ago	Remove this field injection and use constructor injection instead.
VendaService	1 month ago	Remove this field injection and use constructor injection instead.
VendaService	1 month ago	Remove this field injection and use constructor injection instead.
VendaService	1 month ago	Remove this field injection and use constructor injection instead.
VendaService	1 month ago	Remove this field injection and use constructor injection instead.
VendaService	1 month ago	Remove this field injection and use constructor injection instead.
VendaService	1 month ago	Remove this field injection and use constructor injection instead.
VendaService	1 month ago	Remove this field injection and use constructor injection instead.
VendaService	1 month ago	Remove this field injection and use constructor injection instead.
VendaService	1 month ago	Remove this field injection and use constructor injection instead.
VendaService	1 month ago	Remove this field injection and use constructor injection instead.
VendaService	1 month ago	Replace this use of System.out by a logger.
VendaService	1 month ago	Replace this use of System.out by a logger.
VendaService	1 month ago	Replace this use of System.out by a logger.
VendaService	1 month ago	Use a primitive boolean expression here.

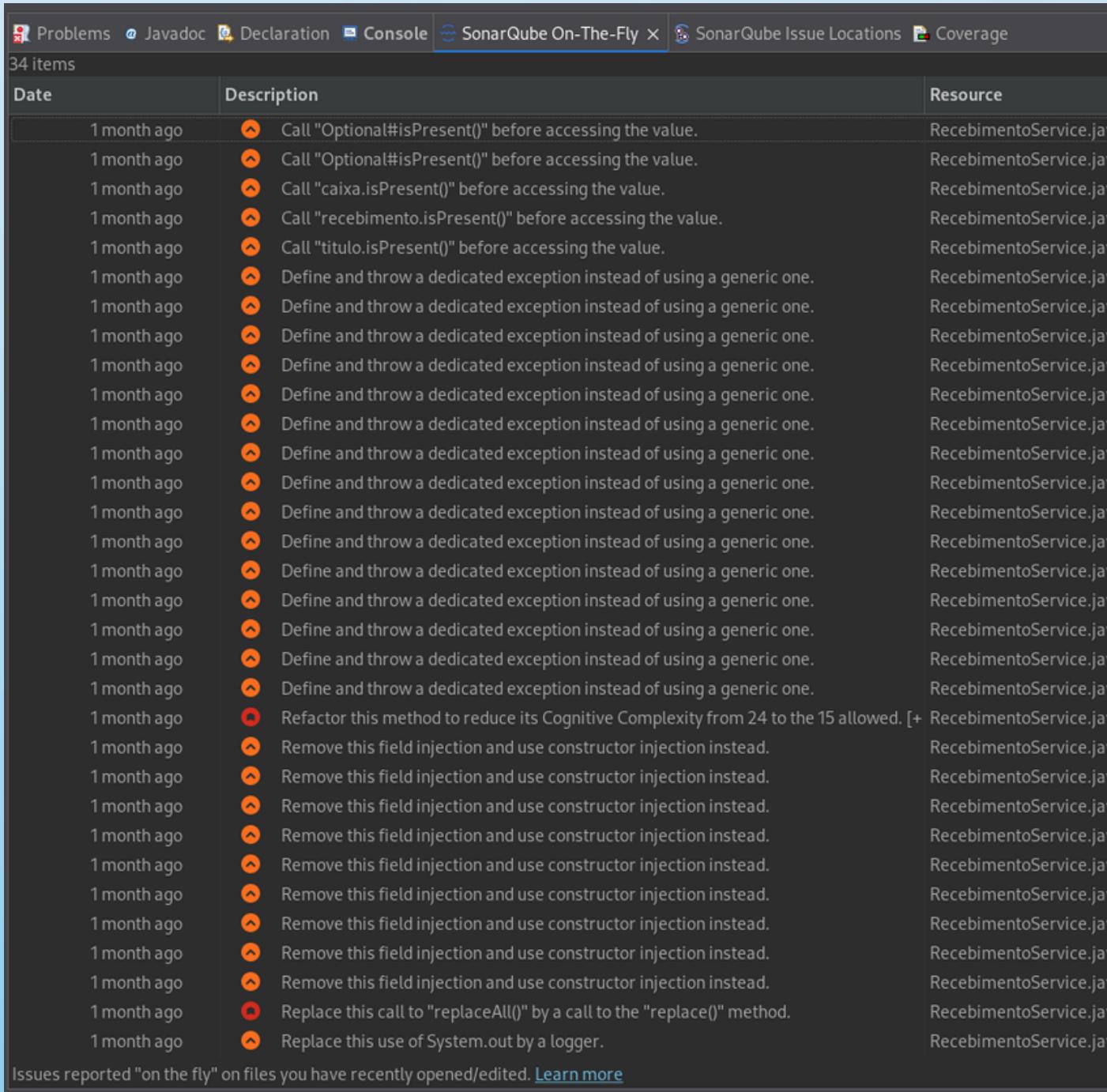
ENTREGA 1

Resource	Date	Description

ENTREGA 2

# JOÃO PEDRO

## ENTREGA 1

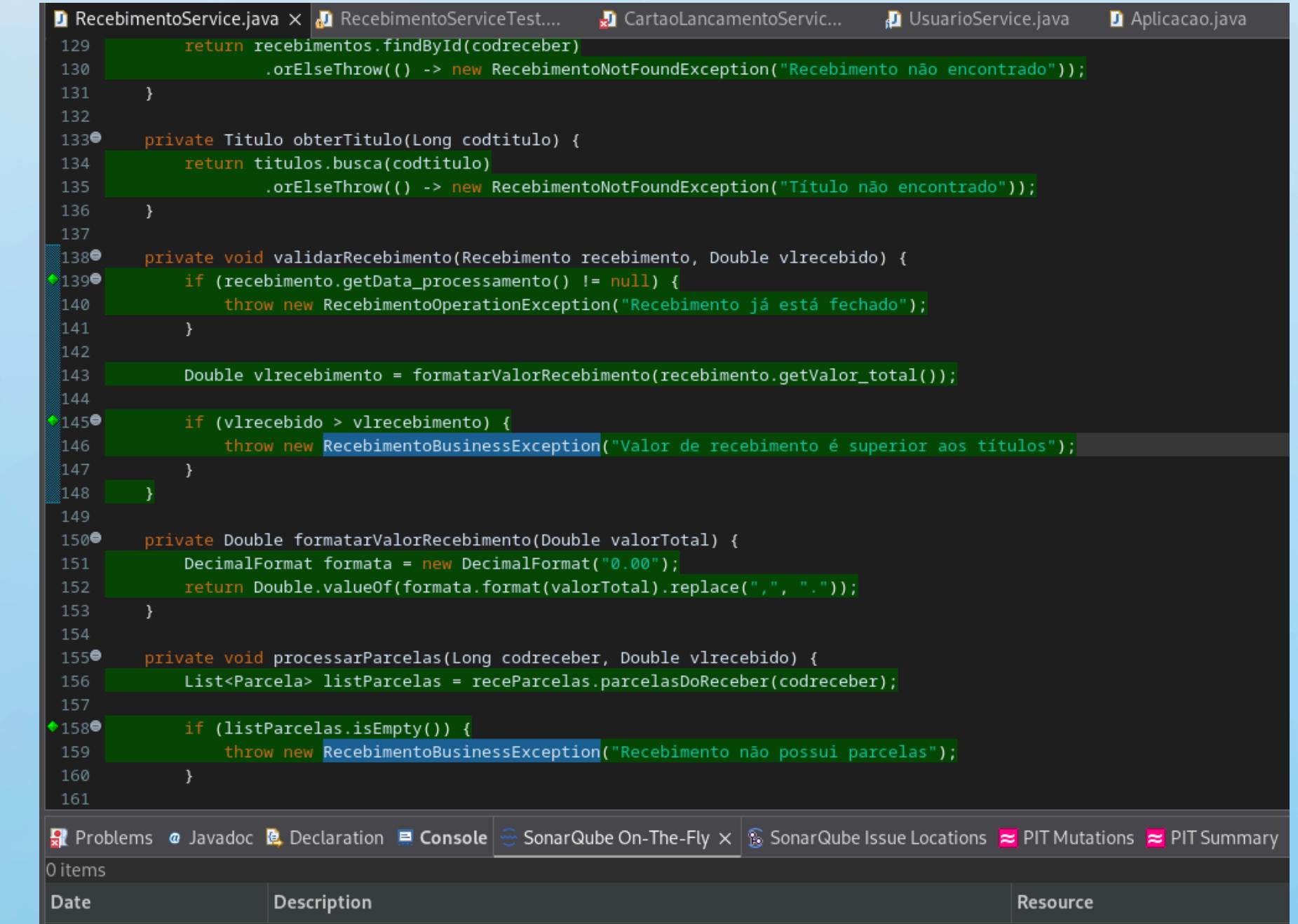


SonarQube On-The-Fly interface showing a list of 34 items. The table has columns for Date, Description, and Resource. Most descriptions are related to Optional#isPresent() usage and refactoring suggestions.

Date	Description	Resource
1 month ago	Call "Optional#isPresent()" before accessing the value.	RecebimentoService.java
1 month ago	Call "Optional#isPresent()" before accessing the value.	RecebimentoService.java
1 month ago	Call "caixa.isPresent()" before accessing the value.	RecebimentoService.java
1 month ago	Call "recebimento.isPresent()" before accessing the value.	RecebimentoService.java
1 month ago	Call "titulo.isPresent()" before accessing the value.	RecebimentoService.java
1 month ago	Define and throw a dedicated exception instead of using a generic one.	RecebimentoService.java
1 month ago	Define and throw a dedicated exception instead of using a generic one.	RecebimentoService.java
1 month ago	Define and throw a dedicated exception instead of using a generic one.	RecebimentoService.java
1 month ago	Define and throw a dedicated exception instead of using a generic one.	RecebimentoService.java
1 month ago	Define and throw a dedicated exception instead of using a generic one.	RecebimentoService.java
1 month ago	Define and throw a dedicated exception instead of using a generic one.	RecebimentoService.java
1 month ago	Define and throw a dedicated exception instead of using a generic one.	RecebimentoService.java
1 month ago	Define and throw a dedicated exception instead of using a generic one.	RecebimentoService.java
1 month ago	Define and throw a dedicated exception instead of using a generic one.	RecebimentoService.java
1 month ago	Define and throw a dedicated exception instead of using a generic one.	RecebimentoService.java
1 month ago	Define and throw a dedicated exception instead of using a generic one.	RecebimentoService.java
1 month ago	Define and throw a dedicated exception instead of using a generic one.	RecebimentoService.java
1 month ago	Define and throw a dedicated exception instead of using a generic one.	RecebimentoService.java
1 month ago	Refactor this method to reduce its Cognitive Complexity from 24 to the 15 allowed. [+]	RecebimentoService.java
1 month ago	Remove this field injection and use constructor injection instead.	RecebimentoService.java
1 month ago	Remove this field injection and use constructor injection instead.	RecebimentoService.java
1 month ago	Remove this field injection and use constructor injection instead.	RecebimentoService.java
1 month ago	Remove this field injection and use constructor injection instead.	RecebimentoService.java
1 month ago	Remove this field injection and use constructor injection instead.	RecebimentoService.java
1 month ago	Remove this field injection and use constructor injection instead.	RecebimentoService.java
1 month ago	Replace this call to "replaceAll()" by a call to the "replace()" method.	RecebimentoService.java
1 month ago	Replace this use of System.out by a logger.	RecebimentoService.java

Issues reported "on the fly" on files you have recently opened/edited. [Learn more](#)

## ENTREGA 2



SonarQube On-The-Fly interface showing a list of 0 items. The code editor shows the RecebimentoService.java file with several new error highlights. The code includes methods for finding a receipt by ID, getting a title by ID, validating a receipt, and processing parcels.

```
129     return recebimentos.findById(codreceber)
130         .orElseThrow(() -> new RecebimentoNotFoundException("Recebimento não encontrado"));
131     }
132
133     private Titulo obterTitulo(Long codtitulo) {
134         return titulos.busca(codtitulo)
135             .orElseThrow(() -> new RecebimentoNotFoundException("Título não encontrado"));
136     }
137
138     private void validarRecebimento(Recebimento recebimento, Double virecebido) {
139         if (recebimento.getData_processamento() != null) {
140             throw new RecebimentoOperationException("Recebimento já está fechado");
141         }
142
143         Double virecebimento = formatarValorRecebimento(recebimento.getValor_total());
144
145         if (virecebido > virecebimento) {
146             throw new RecebimentoBusinessException("Valor de recebimento é superior aos títulos");
147         }
148     }
149
150     private Double formatarValorRecebimento(Double valorTotal) {
151         DecimalFormat formata = new DecimalFormat("0.00");
152         return Double.valueOf(formata.format(valorTotal).replace(",","."));
153     }
154
155     private void processarParcelas(Long codreceber, Double virecebido) {
156         List<Parcela> listParcelas = receParcelas.parcelasDoReceber(codreceber);
157
158         if (listParcelas.isEmpty()) {
159             throw new RecebimentoBusinessException("Recebimento não possui parcelas");
160         }
161     }
```

0 items

Date	Description	Resource
------	-------------	----------

# Testes Baseados em defeitos

Para avaliar a qualidade dos nossos testes e sua capacidade de encontrar defeitos, aplicamos a técnica de Testes Baseados em Defeitos (Mutação), utilizando a ferramenta PIT Mutation Testing.

O objetivo principal era alcançar um escore de mutação de pelo menos 80% nas classes já cobertas pelos testes estruturais.

Isso nos permitiu verificar se nossos testes eram robustos o suficiente para detectar pequenas alterações no código, simulando possíveis defeitos.

[pitest.org](http://pitest.org)

# JHONATAN SILVA

## Entrega 1:

S Problems Javadoc Declaration Search Console Progress SonarQube On-The-Fly Terminal SonarQube Bindings Coverage PIT Mutations PIT Summary

### Pit Test Coverage Report

#### Package Summary

net.originmobi.pdv.service

Number of Classes	Line Coverage	Mutation Coverage	Test Strength
38	4%   39/900	4%   19/501	90%   19/21

#### Breakdown by Class

Name	Line Coverage	Mutation Coverage	Test Strength
ProdutoService.java	89%   39/44	76%   19/25	90%   19/21

#### Mutations

Line	Mutation Description	Status
32	1. replaced return value with Collections.emptyList for net/originmobi/pdv/service/ProdutoService::listar	KILLED
36	1. replaced return value with Collections.emptyList for net/originmobi/pdv/service/ProdutoService::listaProdutosVendaveis	KILLED
40	1. replaced return value with null for net/originmobi/pdv/service/ProdutoService::busca	KILLED
44	1. replaced return value with Optional.empty for net/originmobi/pdv/service/ProdutoService::buscaProduto	KILLED
48	1. negated conditional	KILLED
49	1. replaced return value with null for net/originmobi/pdv/service/ProdutoService::filter	SURVIVED
56	1. negated conditional	KILLED
58	1. removed call to net/originmobi/pdv/repository/ProdutoRepository::insere	KILLED
62	1. removed call to java/io/PrintStream::println	NO_COVERAGE
63	1. replaced return value with "" for net/originmobi/pdv/service/ProdutoService::merger	NO_COVERAGE
68	1. removed call to net/originmobi/pdv/repository/ProdutoRepository::atualiza	KILLED
72	1. replaced return value with "" for net/originmobi/pdv/service/ProdutoService::merger	KILLED
74	1. removed call to java/io/PrintStream::println	NO_COVERAGE
75	1. replaced return value with "" for net/originmobi/pdv/service/ProdutoService::merger	NO_COVERAGE
80	1. replaced return value with "" for net/originmobi/pdv/service/ProdutoService::merger	KILLED
87	1. changed conditional boundary 2. Changed increment from 1 to -1 3. negated conditional	KILLED
93	1. negated conditional	KILLED
99	1. changed conditional boundary	SURVIVED
100	2. negated conditional	KILLED
107	1. removed call to net/originmobi/pdv/repository/ProdutoRepository::movimentaEstoque	KILLED
116	1. removed call to java/io/PrintStream::println	KILLED
119	1. negated conditional	KILLED
119	1. removed call to net/originmobi/pdv/repository/ProdutoRepository::movimentaEstoque	KILLED

# JHONATAN SILVA

## Entrega 2:

Pit Test Coverage Report

Package Summary

net.originmobi.pdv.service

Number of Classes	Line Coverage	Mutation Coverage	Test Strength
38	5% 45/901	5% 23/499	100% 23/23

Breakdown by Class

Name	Line Coverage	Mutation Coverage	Test Strength
<a href="#">ProdutoService.java</a>	100% 45/45	100% 23/23	100% 23/23

### Mutations

```
39 1. replaced return value with Collections.emptyList for net/originmobi/pdv/service/ProdutoService::listar → KILLED
43 1. replaced return value with Collections.emptyList for net/originmobi/pdv/service/ProdutoService::listaProdutosVendaveis → KILLED
47 1. replaced return value with null for net/originmobi/pdv/service/ProdutoService::busca → KILLED
51 1. replaced return value with Optional.empty for net/originmobi/pdv/service/ProdutoService::buscaProduto → KILLED
55 1. negated conditional → KILLED
56 1. replaced return value with null for net/originmobi/pdv/service/ProdutoService::filter → KILLED
63 1. negated conditional → KILLED
65 1. removed call to net/originmobi/pdv/repository/ProdutoRepository::insere → KILLED
70 1. replaced return value with "" for net/originmobi/pdv/service/ProdutoService::merger → KILLED
75 1. removed call to net/originmobi/pdv/repository/ProdutoRepository::atualiza → KILLED
79 1. replaced return value with "" for net/originmobi/pdv/service/ProdutoService::merger → KILLED
82 1. replaced return value with "" for net/originmobi/pdv/service/ProdutoService::merger → KILLED
87 1. replaced return value with "" for net/originmobi/pdv/service/ProdutoService::merger → KILLED
1. changed conditional boundary → KILLED
94 2. Changed increment from 1 to -1 → KILLED
3. negated conditional → KILLED
100 1. negated conditional → KILLED
106 1. changed conditional boundary → KILLED
2. negated conditional → KILLED
107 1. removed call to net/originmobi/pdv/repository/ProdutoRepository::movimentaEstoque → KILLED
114 1. removed call to java/io/PrintStream::println → KILLED
123 1. negated conditional → KILLED
126 1. removed call to net/originmobi/pdv/repository/ProdutoRepository::movimentaEstoque → KILLED
```

# ERIK HERINGER

## Entrega 1:

[TributacaoService.java](#)

0% 0/14

[UsuarioService.java](#)

0% 0/47

[VendaProdutoService.java](#)

0% 0/12

[VendaService.java](#)

83% 104/126

0% 0/7

0% 0/18

0% 0/7

69% 46/67

0% 0/0

0% 0/0

0% 0/0

74% 46/62

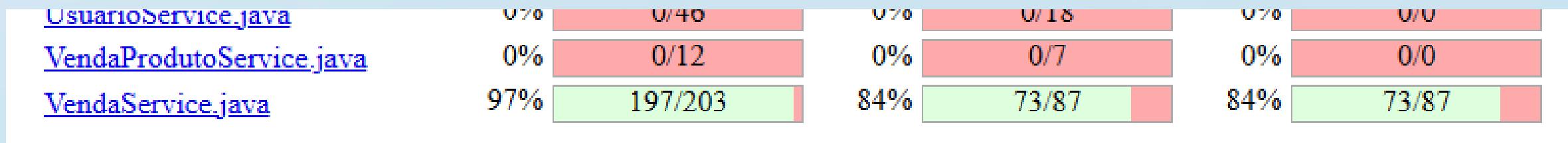
### Mutations

76 1. negated conditional → KILLED  
80 1. removed call to net/originmobi/pdv/model/Venda::setData\_cadastro → KILLED  
81 1. removed call to net/originmobi/pdv/model/Venda::setSituacao → KILLED  
82 1. removed call to net/originmobi/pdv/model/Venda::setUsuario → SURVIVED  
83 1. removed call to net/originmobi/pdv/model/Venda::setValor\_produtos → KILLED  
94 1. removed call to net/originmobi/pdv/repository/VendaRepository::updateDadosVenda → KILLED  
101 1. replaced Long return value with 0L for net/originmobi/pdv/service/VendaService::abreVenda → KILLED  
106 1. negated conditional → KILLED  
108 1. negated conditional → KILLED  
109 1. replaced return value with null for net/originmobi/pdv/service/VendaService::busca → KILLED  
111 1. replaced return value with null for net/originmobi/pdv/service/VendaService::busca → KILLED  
117 1. negated conditional → KILLED  
123 1. removed call to net/originmobi/pdv/service/VendaProdutoService::salvar → KILLED  
129 1. replaced return value with "" for net/originmobi/pdv/service/VendaService::addProduto → KILLED  
132 1. replaced return value with "" for net/originmobi/pdv/service/VendaService::addProduto → KILLED  
138 1. negated conditional → KILLED  
139 1. removed call to net/originmobi/pdv/service/VendaProdutoService::removeProduto → KILLED  
141 1. replaced return value with "" for net/originmobi/pdv/service/VendaService::removeProduto → KILLED  
146 1. replaced return value with "" for net/originmobi/pdv/service/VendaService::removeProduto → KILLED  
150 1. replaced return value with Collections.emptyList for net/originmobi/pdv/service/VendaService::lista → KILLED  
157 1. negated conditional → KILLED  
160 1. changed conditional boundary → KILLED  
2. negated conditional → KILLED  
169 1. Replaced double addition with subtraction → SURVIVED  
2. Replaced double subtraction with addition → SURVIVED  
179 1. changed conditional boundary → KILLED  
2. negated conditional → SURVIVED  
184 1. removed call to net/originmobi/pdv/model/Venda::setPagamentotipo → SURVIVED  
191 1. removed call to net/originmobi/pdv/service/ReceberService::cadastrar → KILLED  
193 1. removed call to java/io/PrintStream::println → NO\_COVERAGE  
197 1. Replaced double division with multiplication → SURVIVED  
198 1. Replaced double division with multiplication → SURVIVED  
1. changed conditional boundary → KILLED  
2. Changed increment from 1 to -1 → KILLED  
3. negated conditional → KILLED  
205 1. negated conditional → KILLED  
208 1. negated conditional → KILLED  
210 1. negated conditional → KILLED

217 1. negated conditional → NO\_COVERAGE  
218 1. negated conditional → NO\_COVERAGE  
222 1. removed call to net/originmobi/pdv/service/cartao/CartaoLancamentoService::lancamento → NO\_COVERAGE  
228 1. negated conditional → KILLED  
237 1. Replaced double addition with subtraction → KILLED  
2. Replaced double subtraction with addition → KILLED  
239 1. removed call to net/originmobi/pdv/repository/VendaRepository::fechaVenda → KILLED  
242 1. removed call to java/io/PrintStream::println → NO\_COVERAGE  
249 1. removed call to net/originmobi/pdv/service/ProdutoService::movimentaEstoque → KILLED  
251 1. replaced return value with "" for net/originmobi/pdv/service/VendaService::fechaVenda → KILLED  
261 1. negated conditional → KILLED  
266 1. Replaced double addition with subtraction → SURVIVED  
2. Replaced double subtraction with addition → SURVIVED  
267 1. removed call to net/originmobi/pdv/service/ParcelaService::gerarParcela → KILLED  
276 1. Changed increment from 1 to -1 → SURVIVED  
277 1. replaced int return with 0 for net/originmobi/pdv/service/VendaService::aprazo → SURVIVED  
290 1. Replaced integer subtraction with addition → SURVIVED  
292 1. negated conditional → KILLED  
298 1. changed conditional boundary → KILLED  
2. negated conditional → KILLED  
299 1. Replaced double addition with subtraction → KILLED  
301 1. negated conditional → KILLED  
309 1. Replaced double addition with subtraction → SURVIVED  
2. Replaced double subtraction with addition → SURVIVED  
316 1. removed call to java/io/PrintStream::println → SURVIVED  
319 1. replaced int return with 0 for net/originmobi/pdv/service/VendaService::avistaDinheiro → SURVIVED  
324 1. replaced Boolean return with False for net/originmobi/pdv/service/VendaService::vendaIsAberta → KILLED  
2. replaced Boolean return with True for net/originmobi/pdv/service/VendaService::vendaIsAberta → KILLED  
328 1. replaced int return with 0 for net/originmobi/pdv/service/VendaService::qtdAbertos → KILLED

# ERIK HERINGER

## Entrega 2:

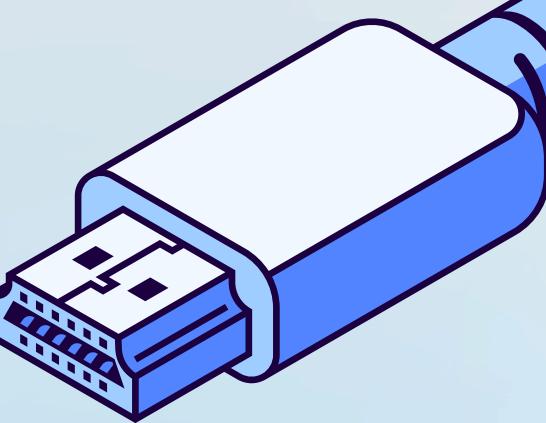


### Mutations

106 1. replaced return value with null for net/originmobi/pdv/service/VendaService\$PagamentoContext\$Builder::info → KILLED  
111 1. replaced return value with null for net/originmobi/pdv/service/VendaService\$PagamentoContext\$Builder::vlParcelas → KILLED  
116 1. replaced return value with null for net/originmobi/pdv/service/VendaService\$PagamentoContext\$Builder::desc → KILLED  
121 1. replaced return value with null for net/originmobi/pdv/service/VendaService\$PagamentoContext\$Builder::acre → KILLED  
126 1. replaced return value with null for net/originmobi/pdv/service/VendaService\$PagamentoContext\$Builder::dadosVenda → KILLED  
131 1. replaced return value with null for net/originmobi/pdv/service/VendaService\$PagamentoContext\$Builder::receber → KILLED  
136 1. replaced return value with null for net/originmobi/pdv/service/VendaService\$PagamentoContext\$Builder::dataAtual → KILLED  
141 1. replaced return value with null for net/originmobi/pdv/service/VendaService\$PagamentoContext\$Builder::vendaId → KILLED  
146 1. replaced return value with null for net/originmobi/pdv/service/VendaService\$PagamentoContext\$Builder::vlprodutos → KILLED  
151 1. replaced return value with null for net/originmobi/pdv/service/VendaService\$PagamentoContext\$Builder::desconto → KILLED  
156 1. replaced return value with null for net/originmobi/pdv/service/VendaService\$PagamentoContext\$Builder::acrescimo → KILLED  
161 1. replaced return value with null for net/originmobi/pdv/service/VendaService\$PagamentoContext\$Builder::formaPagamentoObj → KILLED  
166 1. replaced return value with null for net/originmobi/pdv/service/VendaService\$PagamentoContext\$Builder::sequencia → KILLED  
170 1. replaced return value with null for net/originmobi/pdv/service/VendaService\$PagamentoContext\$Builder::build → KILLED  
208 1. negated conditional → KILLED  
212 1. removed call to net/originmobi/pdv/model/Venda::setData\_cadastro → KILLED  
213 1. removed call to net/originmobi/pdv/model/Venda::setSituacao → KILLED  
214 1. removed call to net/originmobi/pdv/model/Venda::setUsuario → KILLED  
215 1. removed call to net/originmobi/pdv/model/Venda::setValor\_produtos → KILLED  
227 1. removed call to net/originmobi/pdv/repository/VendaRepository::updateDadosVenda → KILLED  
235 1. replaced Long return value with 0L for net/originmobi/pdv/service/VendaService::abreVenda → KILLED  
240 1. negated conditional → KILLED  
241 1. negated conditional → KILLED  
242 1. replaced return value with null for net/originmobi/pdv/service/VendaService::busca → KILLED  
244 1. replaced return value with null for net/originmobi/pdv/service/VendaService::busca → KILLED  
250 1. negated conditional → KILLED  
256 1. removed call to net/originmobi/pdv/service/VendaProdutoService::salvar → KILLED  
260 1. replaced return value with "" for net/originmobi/pdv/service/VendaService::addProduto → KILLED  
264 1. replaced return value with "" for net/originmobi/pdv/service/VendaService::addProduto → KILLED  
267 1. replaced return value with "" for net/originmobi/pdv/service/VendaService::addProduto → KILLED  
273 1. negated conditional → KILLED  
274 1. replaced return value with "" for net/originmobi/pdv/service/VendaService::removeProduto → KILLED  
276 1. negated conditional → KILLED  
277 1. removed call to net/originmobi/pdv/service/VendaProdutoService::removeProduto → KILLED  
279 1. replaced return value with "" for net/originmobi/pdv/service/VendaService::removeProduto → KILLED  
283 1. replaced return value with "" for net/originmobi/pdv/service/VendaService::removeProduto → KILLED  
286 1. replaced return value with "" for net/originmobi/pdv/service/VendaService::removeProduto → KILLED

290 1. replaced return value with Collections.emptyList for net/originmobi/pdv/service/VendaService::lista → KILLED  
298 1. negated conditional → KILLED  
302 1. negated conditional → KILLED  
312 1. Replaced double addition with subtraction → KILLED  
314 1. Replaced double addition with subtraction → KILLED  
2. Replaced double subtraction with addition → KILLED  
318 1. changed conditional boundary → SURVIVED  
315 2. Replaced double subtraction with addition → KILLED  
3. negated conditional → KILLED  
320 1. negated conditional → KILLED  
2. negated conditional → KILLED  
325 1. Replaced double addition with subtraction → SURVIVED  
2. Replaced double subtraction with addition → SURVIVED  
331 1. removed call to net/originmobi/pdv/model/Venda::setPagamentotipo → KILLED  
335 1. removed call to net/originmobi/pdv/service/ReceberService::cadastrar → KILLED  
340 1. Replaced double division with multiplication → SURVIVED  
341 1. Replaced double division with multiplication → SURVIVED  
343 1. changed conditional boundary → KILLED  
2. negated conditional → KILLED  
359 1. removed call to net/originmobi/pdv/service/VendaService::processaFormaPagamento → KILLED  
361 1. removed call to net/originmobi/pdv/service/ProdutoService::movimentaEstoque → KILLED  
362 1. replaced return value with "" for net/originmobi/pdv/service/VendaService::fechaVenda → KILLED  
367 1. negated conditional → KILLED  
370 1. negated conditional → KILLED  
371 1. negated conditional → KILLED  
372 1. negated conditional → KILLED  
375 1. negated conditional → SURVIVED  
376 1. negated conditional → SURVIVED  
378 1. removed call to net/originmobi/pdv/service/cartao/CartaoLancamentoService::lancamento → SURVIVED  
381 1. negated conditional → KILLED  
386 1. Replaced double addition with subtraction → KILLED  
2. Replaced double subtraction with addition → KILLED  
387 1. removed call to net/originmobi/pdv/repository/VendaRepository::fechaVenda → KILLED  
400 1. negated conditional → KILLED  
404 1. Replaced double addition with subtraction → SURVIVED  
2. Replaced double subtraction with addition → SURVIVED  
405 1. removed call to net/originmobi/pdv/service/ParcelaService::gerarParcela → KILLED  
412 1. Changed increment from 1 to -1 → SURVIVED  
413 1. replaced int return with 0 for net/originmobi/pdv/service/VendaService::aprazo → SURVIVED  
422 1. negated conditional → KILLED

# Teste de Integração



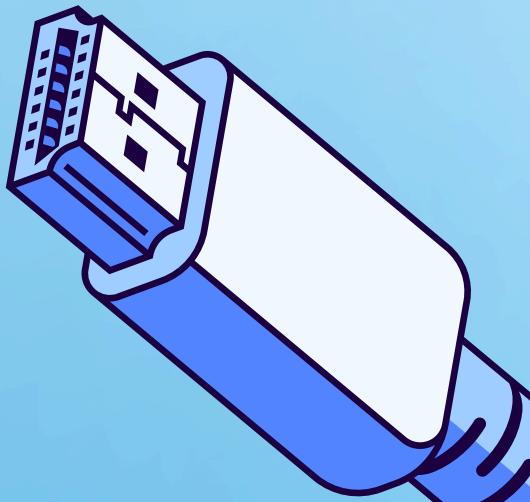
Nesta etapa, nosso objetivo foi implementar casos de teste de integração, visando validar a comunicação e o funcionamento conjunto entre diferentes módulos e serviços do sistema ERP PDV. Utilizamos a ferramenta.

## O que fizemos ?

- Implementamos diversos casos de teste de integração para as principais funcionalidades (Produto, Login, Caixa, Recebimentos, Venda, Cartão Lançamento).
- Validamos fluxos de sucesso e falha nas operações de integração.



POSTMAN



# TESTES DE INTEGRAÇÃO

## PDV-CartaoLancamento

### Login

**POST** Fazer Login : SUCESSO

**POST** Fazer Login : FALHA

### CartaoLancamento

**GET** Listar CartaoLancamentos

**PUT** Processar CartaoLancamento

**PUT** Antecipar CartaoLancamento

## PDV-Caixa-Collection

### Caixa

**GET** Listar Caixas (SUCESSO)

**GET** Gerenciar Caixa

**GET** Listar Caixa (FALHA)

### Login

**POST** Login

## PDV-QUALIDADE\_E\_TESTE\_PRODUTO\_JHONATAN

### Produto

**GET** Listar Produtos

**POST** Cadastrar Produto : SUCESSO

**POST** Cadastrar Produto : FALHA

**POST** Update Produto : SUCESSO

**POST** Update Produto : FALHA

**GET** Buscar Produto por Descrição : SUCESSO

**GET** Buscar Produto por Descrição : LISTA VAZIA

### Login

**POST** Fazer Login : SUCESSO

**POST** Fazer Login : FALHA

## PDV-QUALIDADE\_E\_TESTE\_PRODUTO\_JOHNATAN

### Login

**POST** Fazer Login : SUCESSO

**POST** Fazer Login : FALHA

### Recebimentos

**GET** Listar Recebimentos

**GET** Buscar Recebimento : SUCESSO

**GET** Buscar Recebimento : FALHA

## PDV-ChickenJockey-ErikHeringer

### Login

### Venda

**GET** Listar Vendas em Aberto

**GET** Listar Vendas Fechadas

**POST** Cadastrar Venda - Valido

**POST** Cadastrar Venda - Invalido

**GET** Buscar Venda - Valida(necessario venda registrada)

**GET** Buscar Venda - Invalida



# Testes Funcionais

Para o desenvolvimento dos testes do projeto, utilizamos os critérios de testes funcionais como: Particionamento em Classes de Equivalência, Análise do Valor Limite E Grafo de Causa e Efeito

Para o Particionamento em Classes de Equivalência, temos como exemplo testes de **ProdutoServiceTest** e **VendaServiceTest**, que cobrem as classes:

- Produto com estoque suficiente (classe válida)
- Produto com estoque insuficiente (classe inválida)
- Produto não encontrado (classe inválida)

Na Análise do Valor Limite, temos como exemplo a classe **RecebimentoServiceTest**, onde são testados limites como zero, nulos ou negativos.

Em relação ao Grafo de Causa e Efeito, temos como exemplo testes de **RecebimentoServiceTest**. Um exemplo é o recebimento de parcelas, que só pode ser realizado se as seguintes causas forem cumpridas:

- A parcela não estiver quitada
- O valor recebido for maior que zero
- O caixa estiver aberto

# Melhoria dos casos de teste + Cobertura de código

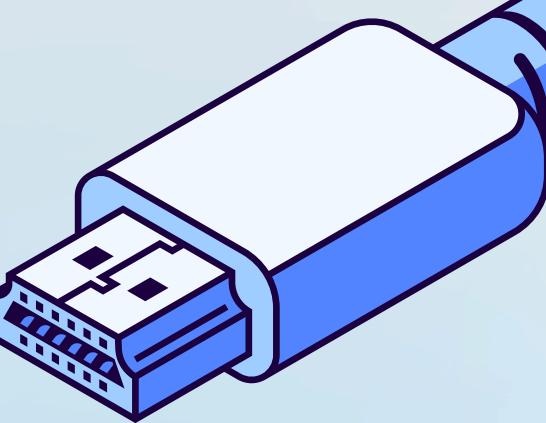
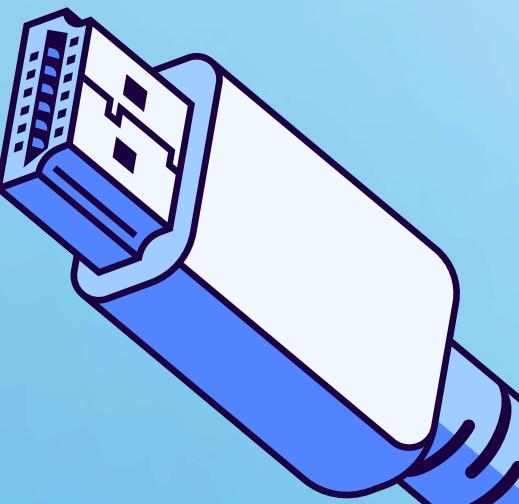
Nesta etapa, o foco principal foi melhorar e aumentar a qualidade dos nossos testes unitários, isolando suas dependências para maior robustez e confiabilidade. Utilizamos a ferramenta JUnit como base para essa evolução assim como na entrega 1.

## O que fizemos ?

- Ampliamos a cobertura de testes unitários nas classes que escolhemos na entrega 1.
- Implementamos testes para cenários de erro.
- Aplicamos técnicas de mock para isolar dependências.

JUnit

JACOCO  
Java Code Coverage



## Properties for ProdutoService.java

### Coverage

Session: ProdutoServiceTest (6 de jul. de 2025 06:43:35)

Counter	Coverage	Covered	Missed	Total
Instructions	91,7 %	209	19	228
Branches	83,3 %	10	2	12
Lines	86,1 %	38	6	44
Methods	100,0 %	9	0	9
Types	100,0 %	1	0	1
Complexity	86,7 %	13	2	15

# JHONATAN SILVA

### ■ Coverage classe de teste - ENTREGA 2

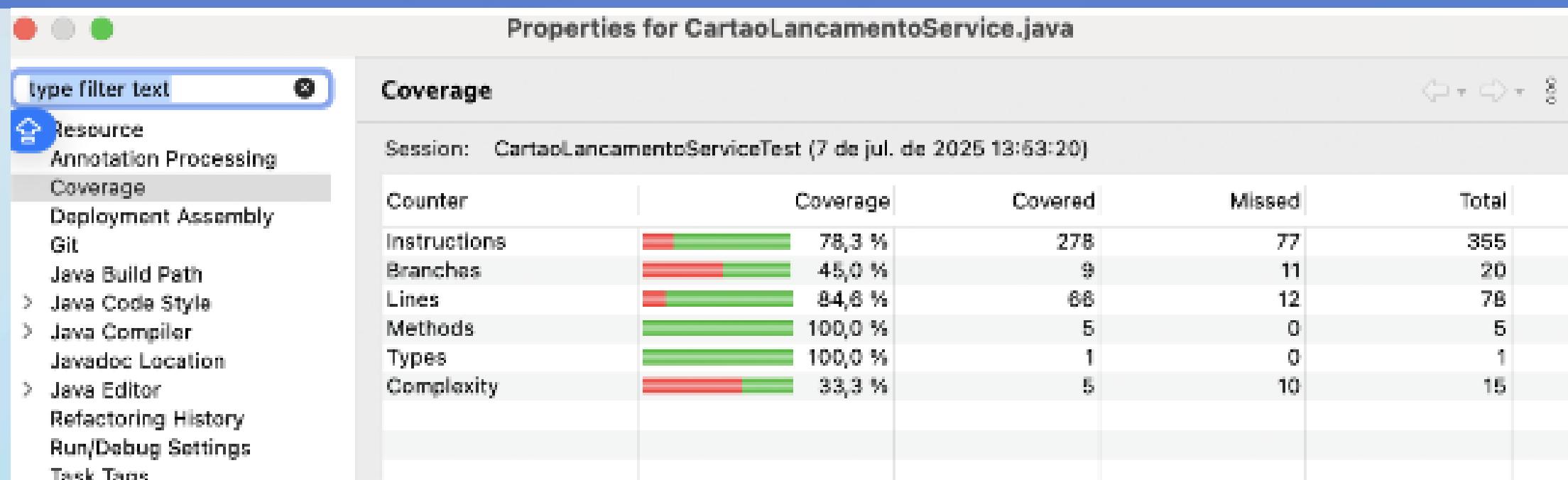
## Properties for ProdutoService.java

### Coverage

Session: ProdutoServiceTest (7 de jul. de 2025 04:07:11)

Counter	Coverage	Covered	Missed	Total
Instructions	100,0 %	293	0	293
Branches	100,0 %	14	0	14
Lines	100,0 %	55	0	55
Methods	100,0 %	10	0	10
Types	100,0 %	1	0	1
Complexity	100,0 %	17	0	17

# GABRIEL MARINHO



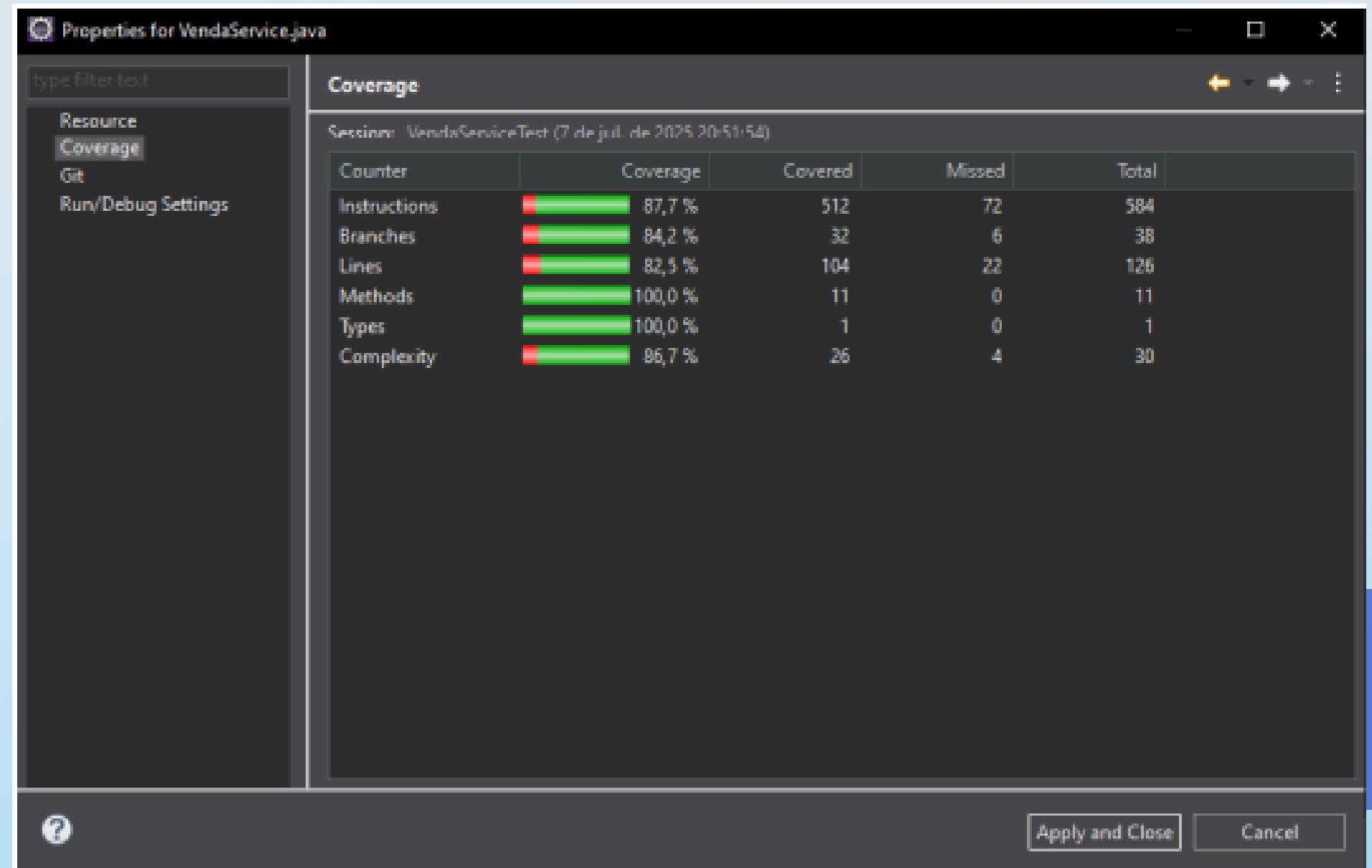
## ■ Coverage classe de teste - ENTREGA 2

Coverage

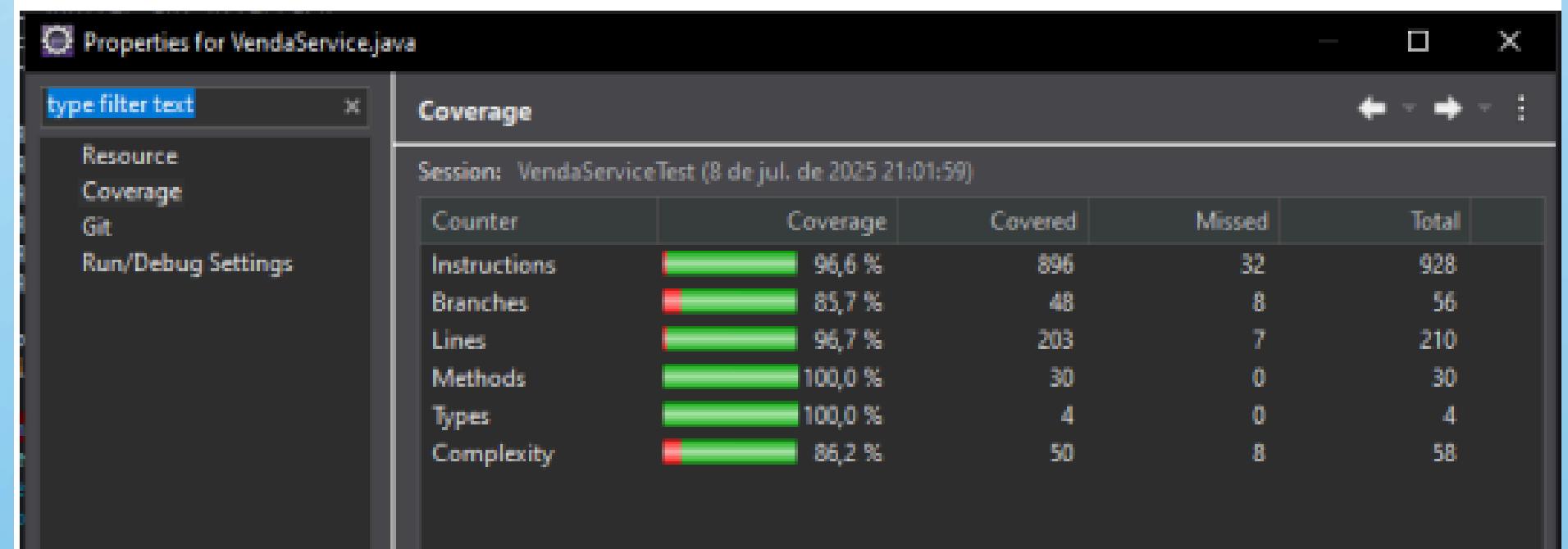
Session: CartaoLancamentoServiceTest (7 de jul. de 2025 16:07:57)

Counter	Coverage	Covered	Missed	Total
Instructions	100,0 %	355	0	355
Branches	95,0 %	19	1	20
Lines	100,0 %	78	0	78
Methods	100,0 %	5	0	5
Types	100,0 %	1	0	1
Complexity	93,3 %	14	1	15

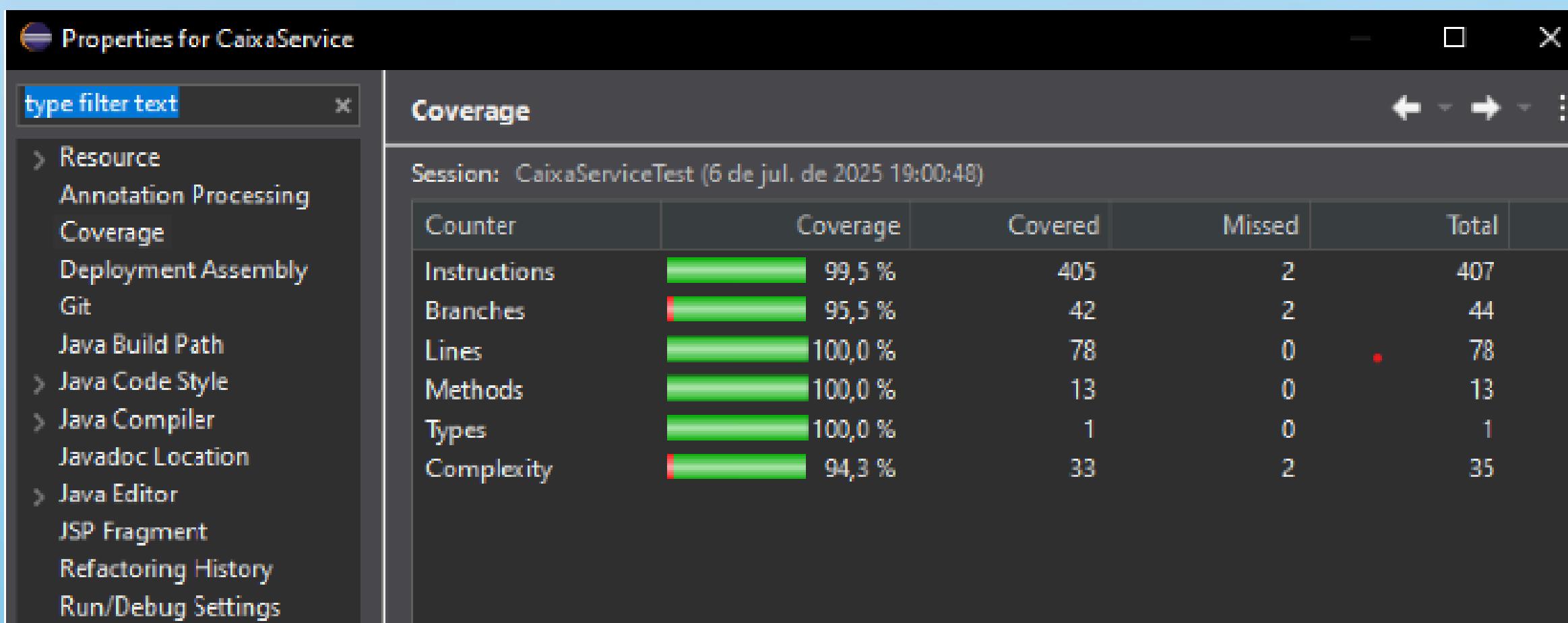
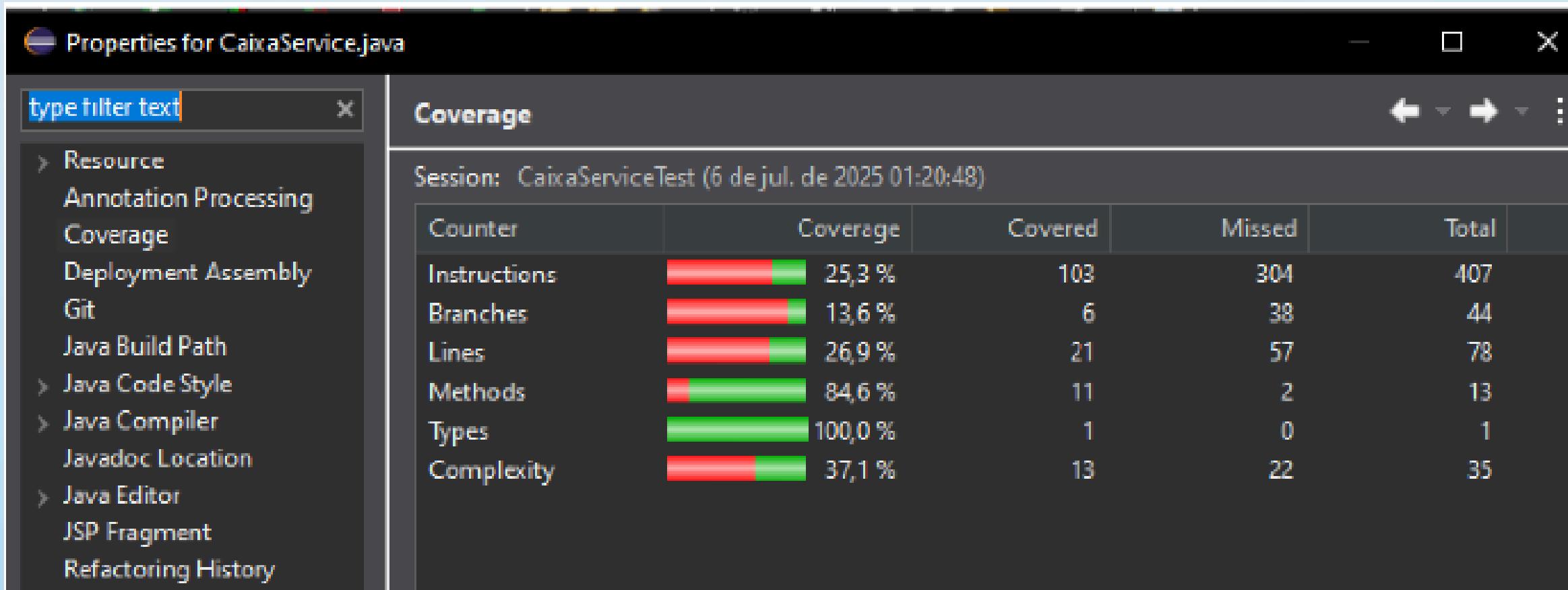
# ERIK HERINGER



## ■ Coverage classe de teste - ENTREGA 2



# GABRIEL PINHO



# JOÃO BARBOZA

Coverage					
Session: RecebimentoServiceTest (8 de jul. de 2025 23:55:16)					
Counter	Coverage	Covered	Missed	Total	
Instructions	<div style="width: 56.6%;"><div style="width: 56.6%; background-color: red;"></div><div style="width: 43.4%; background-color: green;"></div></div> 56,6 %	260	199		459
Branches	<div style="width: 64.7%;"><div style="width: 14.7%; background-color: red;"></div><div style="width: 85.3%; background-color: green;"></div></div> 64,7 %	22	12		34
Lines	<div style="width: 54.7%;"><div style="width: 14.7%; background-color: red;"></div><div style="width: 85.3%; background-color: green;"></div></div> 54,7 %	47	39		86
Methods	<div style="width: 100.0%;"><div style="width: 100.0%; background-color: green;"></div></div> 100,0 %	4	0		4
Types	<div style="width: 100.0%;"><div style="width: 100.0%; background-color: green;"></div></div> 100,0 %	1	0		1
Complexity	<div style="width: 52.4%;"><div style="width: 12.4%; background-color: red;"></div><div style="width: 87.6%; background-color: green;"></div></div> 52,4 %	11	10		21

## ■ Coverage classe de teste - ENTREGA 2

Counter	Coverage	Covered	Missed	Total
Instructions	<div style="width: 77,1%;"><div style="width: 77,1%; background-color: red;"></div><div style="width: 22,9%; background-color: green;"></div></div> 77,1 %	408	121	529
Branches	<div style="width: 91,2%;"><div style="width: 91,2%; background-color: red;"></div><div style="width: 8,8%; background-color: green;"></div></div> 91,2 %	31	3	34
Lines	<div style="width: 69,0%;"><div style="width: 19,0%; background-color: red;"></div><div style="width: 80,0%; background-color: green;"></div></div> 69,0 %	80	36	116
Methods	<div style="width: 85,0%;"><div style="width: 5,0%; background-color: red;"></div><div style="width: 95,0%; background-color: green;"></div></div> 85,0 %	17	3	20
Types	<div style="width: 100.0%;"><div style="width: 100.0%; background-color: green;"></div></div> 100,0 %	1	0	1
Complexity	<div style="width: 83,8%;"><div style="width: 13,8%; background-color: red;"></div><div style="width: 86,2%; background-color: green;"></div></div> 83,8 %	31	6	37

Ativar o W

# Testes de Sistema e Requisito não funcional

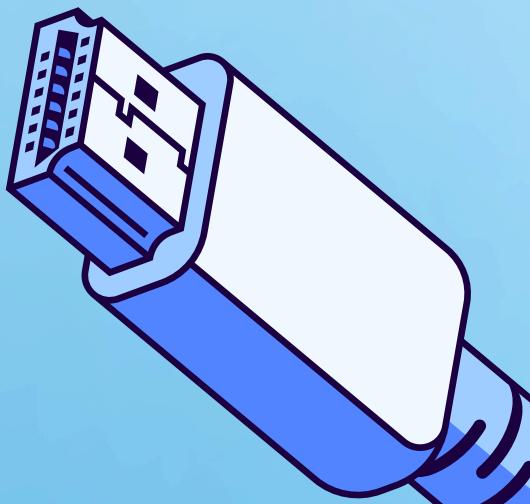
Nesta etapa da Entrega 2, nosso objetivo foi implementar testes de sistema para validar os requisitos funcionais do ERP PDV, além de abordar pelo menos um requisito não funcional (desempenho).

## O que fizemos ?

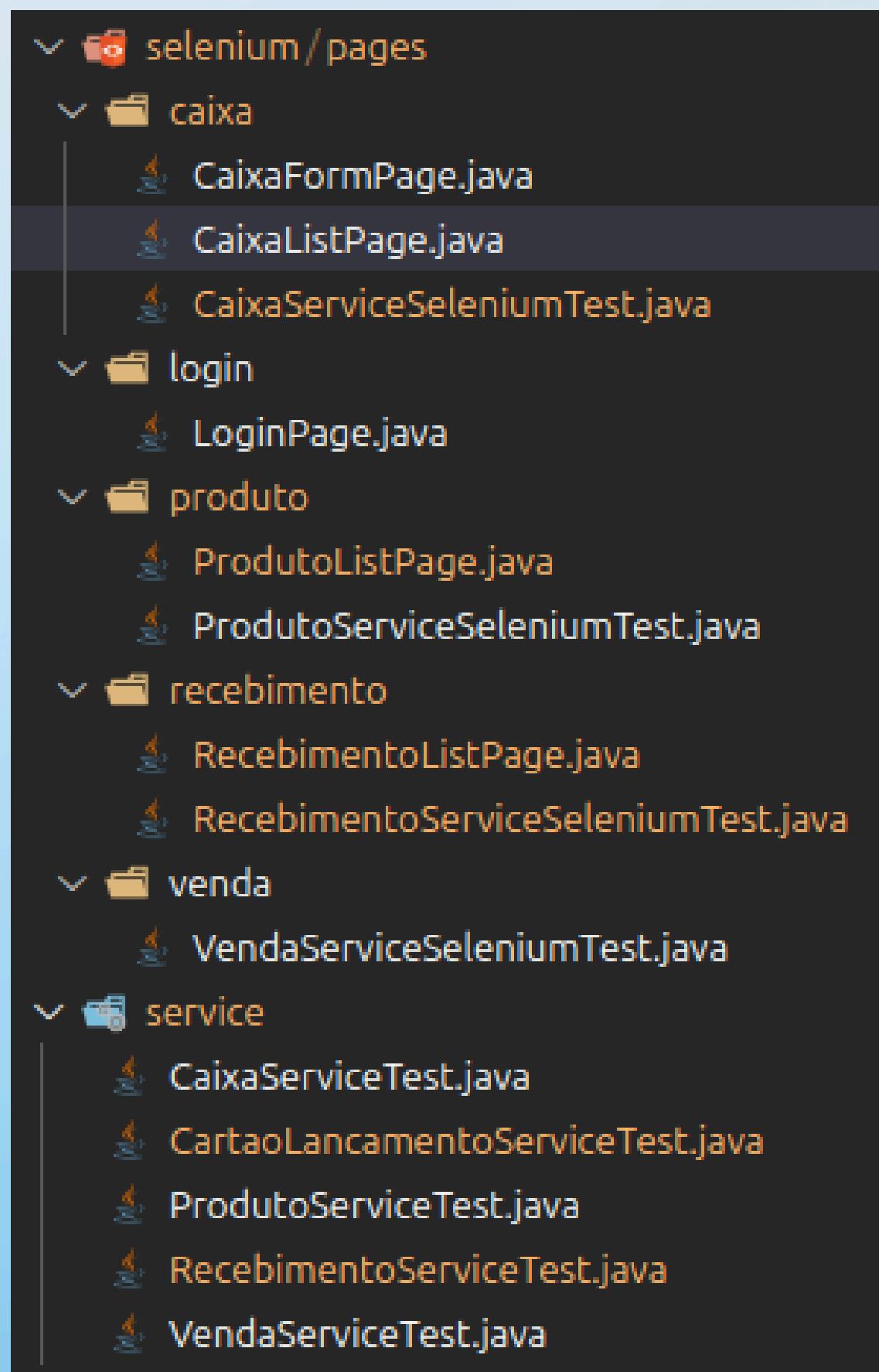
- Automatizamos fluxos de usuário para garantir o funcionamento end-to-end.
- Cobertura de funcionalidades como Login, Cadastro e Busca de Produto, etc utilizando selenium.
- **Requisito Não Funcional (Desempenho):**
  - **Exemplos:** Login (< 300ms) , abertura da página de recebimentos (< 300ms) , e listagem de vendas abertas (< 500ms).



POSTMAN



# Selenium + teste não funcional



**Teste de desempenho**  
**Testando tempo de resposta da requisição de login**

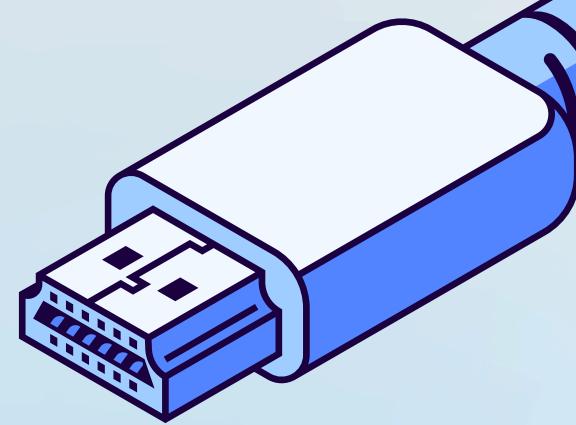
The screenshot shows a Postman collection for a login endpoint:

- Method: POST
- URL: <http://localhost:8080/login>
- Tests tab is selected.
- Body tab contains a script:

```
4 );
5
6 pm.test("Teste de tempo de resposta", function () {
7     pm.expect(pm.response.responseTime).to.be.below(300);
8 });
9
```

A red box highlights the script, and a red arrow points from the top right towards it.
- Test Results tab is selected, showing 7/7 tests passed.
- Passed tests:
  - PASS TestAcessibilidade
  - PASS Teste de tempo de resposta

# Medidas ideias de atributo da ISO 25010



Avaliamos o sistema ERP PDV com base em atributos chave da norma ISO 25010:

## O que fizemos ?

Característica	Nota (0-5)	Justificativa
Adequação Funcional	5	Fundamental: o sistema deve executar todas as funções de PDV (vendas, devoluções, relatórios) correta e completamente. Alcançar exigências legais e operacionais é obrigatório. <a href="#">iso25000.com+15Wikipédia+15arc42 Quality Model+15</a>
Confiabilidade	4	Alta prioridade: o caixa deve estar disponível e confiável, mas tolera janelas de manutenção se houver backup e recuperação rápidas.
Desempenho/Eficiência	5	Crítico: respostas rápidas, sem atrasos nas filas. Recursos otimizados dentro do ambiente local.
Usabilidade	4	Interface intuitiva é importante, mas treinamento mitigará problemas; acessibilidade é desejável, porém não essencial no início.
Segurança	4	Crucial proteger dados de clientes e transações, mas não precisa implementar controle de não-repúdio 100 % se compensado por processos físicos.
Compatibilidade	3	Deve funcionar com impressoras fiscais e sistemas de superloja, mas integração com todos os sistemas ERP é secundária no rollout inicial.
Manutenibilidade	3	Atualizações devem ser possíveis sem grande esforço, mas arquitetura monolítica inicial pode ser aceitável, desde que versões futuras melhorem modularidade.
Portabilidade	2	Operará em hardware específico de PDV; não é necessário portabilidade para outros sistemas (nuvem, mobile) agora. Adaptabilidade futura pode ser prevista.