

# Software Testing Assignment - E-Commerce Utility Library

coverage 98%  Test and Coverage passing

## Project Overview

This repository contains comprehensive unit tests for a utility library used in an e-commerce application selling food products from small vendors.

**Course:** COMP.SE.200-2025-2026-1 - Software Testing

**Institution:** Tampere University

**Team Members:**

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## Test Coverage

- **302 unit tests** implemented
- **98.55% line coverage** (exceeds 80% requirement)
- **94.95% branch coverage** (exceeds 75% requirement)
- **10 critical functions** tested comprehensively

## Functions Tested

1. **isEmpty** (Critical) - Form validation
2. **get** (Critical) - Safe object access
3. **filter** (Critical) - Product search
4. **add** (Critical) - Price calculations
5. **toNumber** (High) - Type conversion
6. **reduce** (High) - Cart totals
7. **map** (High) - Data transformation
8. **defaultTo** (High) - Optional fields
9. **clamp** (Medium) - Range validation
10. **capitalize** (Medium) - Text formatting

## Quick Start

## Prerequisites

- Node.js 18+
- npm

## Installation

```
▶ pm install
```

## Run Tests

```
▶ pm test  
▶
```

## Run Tests with Coverage

```
▶ pm run test:coverage
```

## View Coverage Report

```
▶ open coverage/lcov-report/index.html
```

## Documentation

- [Testing Instructions](#) - Complete guide for running tests locally
- [Bug Report](#) - Detailed documentation of 4 bugs found during testing

## Bugs Found

During comprehensive testing, we discovered **4 significant bugs**:

1. 🛡 **clamp()** - CRITICAL: Always returns lower bound (completely broken)
2. 🛡 **add()** - HIGH: String concatenation instead of numeric addition
3. 🛡 **filter()** - HIGH: Returns `[[ ]]` instead of `[]` for empty results
4. 🛡 **defaultTo()** - MEDIUM: Doesn't handle NaN values

See [BUG\\_REPORT.md](#) for detailed analysis and business impact.

# CI/CD Pipeline

- **GitHub Actions:** Automated testing on every push
- **Coveralls:** Coverage tracking and reporting
- **Quality Gates:** 80% line coverage, 75% branch coverage

# Project Structure

```
|- src/          # Source code (DO NOT MODIFY)
|   |- .internal/    # Excluded from testing
|   |   |- *.js        # Utility functions
|   |- __tests__/     # Test suites
|   |   |- isEmpty.test.js  # Pre-planned tests
|   |   |- isEmpty.ai.test.js # AI-generated tests
|   |   |- get.test.js
|   |   |- get.ai.test.js
|   |   |- add.test.js
|   |   |- filter.test.js
|   |   |- toNumber.test.js
|   |   |- reduce.test.js
|   |   |- map.test.js
|   |   |- defaultTo.test.js
|   |   |- clamp.test.js
|   |   |- capitalize.test.js
|   |- coverage/      # Coverage reports (generated)
|   |- BUG_REPORT.md    # Bug documentation
|   |- TESTING_INSTRUCTIONS.md # Testing guide
|   |- README.md       # This file
```

# Testing Approach

## Self-Designed Tests

- 18 tests for isEmpty and get (Phase 1 pre-planned)
- 224 tests for remaining 8 functions
- Focus on e-commerce scenarios and business logic

## AI-Generated Tests

- 105 tests for isEmpty and get
- Comprehensive edge case coverage
- Generated using Microsoft Copilot

**Total: 302 Tests**

- Normal cases
- Edge cases
- Boundary conditions
- E-commerce specific scenarios

# Quality Assessment

## Achievements

- All 302 tests passing
- Coverage exceeds requirements
- 4 bugs discovered and documented
- CI/CD pipeline functional

## Findings

- Library is **NOT production-ready** due to critical bugs
- Requires bug fixes before deployment
- Further integration and E2E testing recommended

# License

Source code folder contains a separate license file that must **NOT** be removed under any circumstances! Removing this license file directly violates terms and conditions of the software under testing.

# Links

- **GitHub Repository:** <https://github.com/Ozayer/software-testing-class-project>
- **Coveralls:** <https://coveralls.io/github/Ozayer/software-testing-class-project>
- **GitHub Actions:** <https://github.com/Ozayer/software-testing-class-project/actions>

**Last Updated:** December 2025