

# Software Product Design and Development I

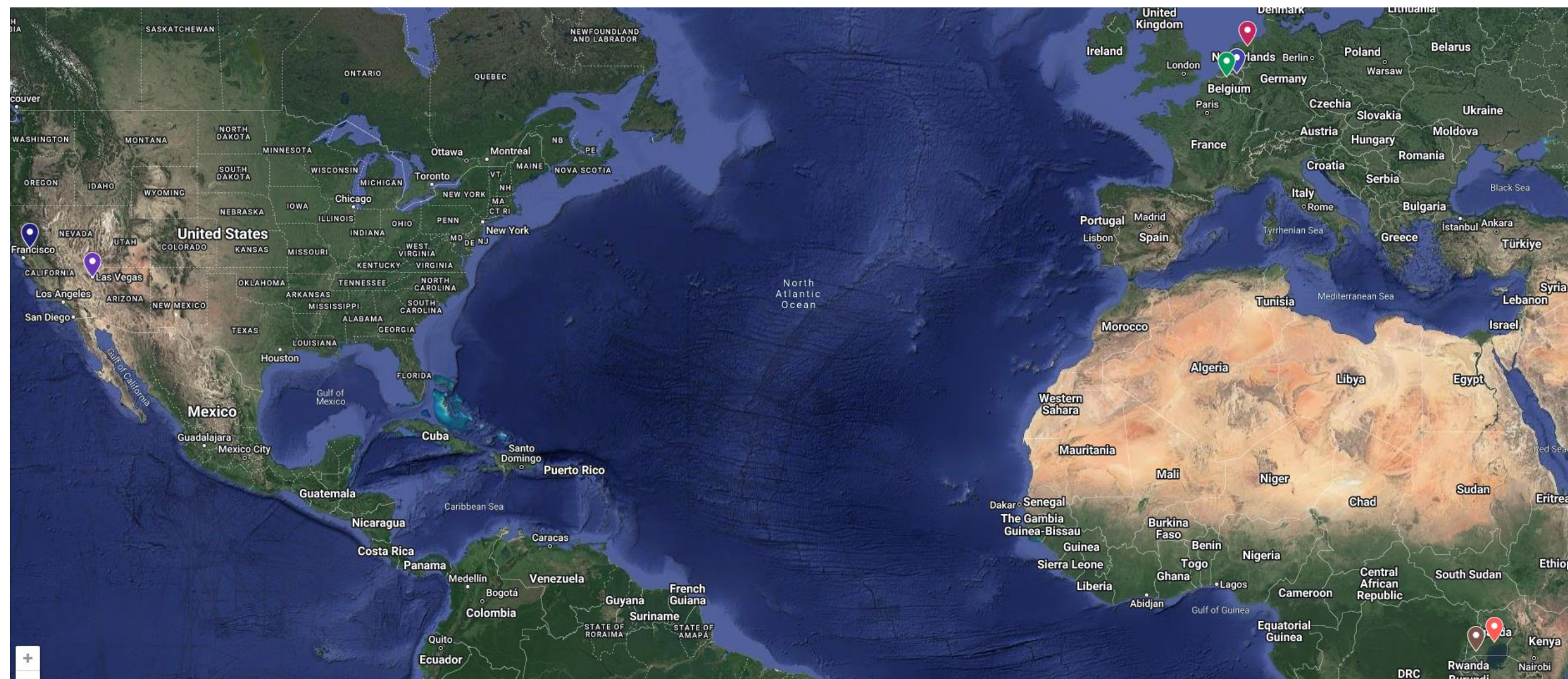
**Dr. John Businge**

[John.businge@unlv.edu](mailto:John.businge@unlv.edu)

**TA: Daniel Ogenrwot**

[ogenrwot@unlv.nevada.edu](mailto:ogenrwot@unlv.nevada.edu)

# My Journey to UNLV



# Administration

- Background Information survey.
- Go to - <https://johnxu21.github.io/teaching/CS472/>





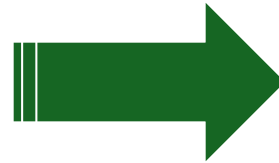
# Software Product Design and Development I

High Quality Software

Flexible

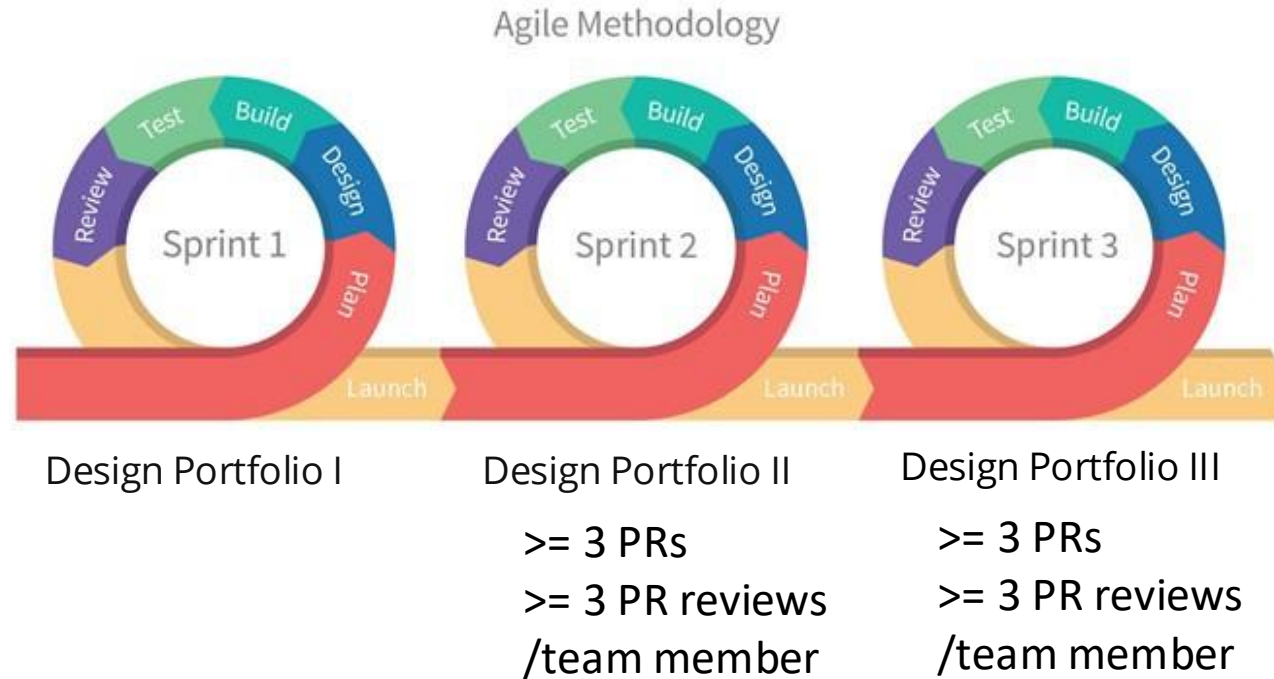
Reusable

Maintainable



Collaboratively

10 – 11 developers / team project



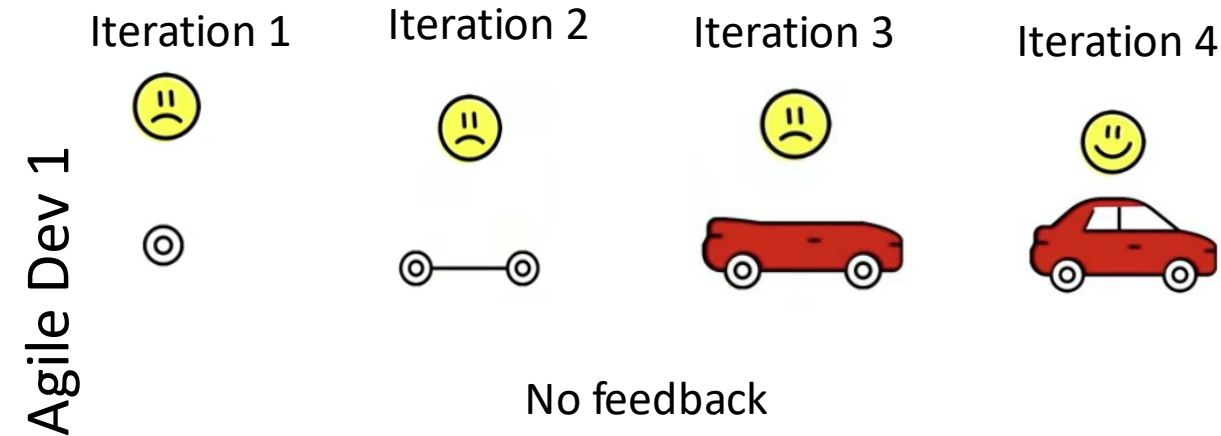
**Agile methodology:** Development delivers frequent, small software updates, enabling teams to quickly adapt to changes and continuously improving the product based on feedback.

# Minimum Viable product (MVP)

- During the DP we will focus on developing an MVP
- An MVP is the minimal thing that you can do to test a value hypothesis and gain learning and understanding
- MVP is focus on learning, not delivery
- Let us explain an MVP with an example using Agile developmemnt

# Minimum Viable product (MVP)

## Customer wants a red car



- Customer got exactly what they asked for
  - the dev team was just following a plan.
  - Increments were not useful.
- Team does not understand the value of MVP




- Customer got what they desired
  - Worked iteratively with the dev team.
- Developed something a little bit different but it's closer to what the customer really wanted.
- Giving the customer what they really want is the main purpose of delivering an MVP.
- A minimal viable product is a tool for learning.



apache / kafkaPublic


Watch1.1kFork11.3kStar21.5k

Pull requests953 Open ✓ 11,016 Closed



ijumaKAFKA-13418: Support key updates with TLS 1.3 (#11966)12 hours ago9,874 commits

Contributors884



1.7k

+ 873 contributors

Languages

Java74.2%

Python2.7%

Roff0.1%

Scala22.7%

Shell0.2%

Batchfile0.1%

configMINOR

connectKAFKA

coreMINOR

docsKAFKA

examples

generator/src

gradle

jmh-benchmarks

licensesMINOR: Add missing licenses and update versions in LICENSE-binary...

Apache Kafka is a distributed event store and stream-processing platform

9

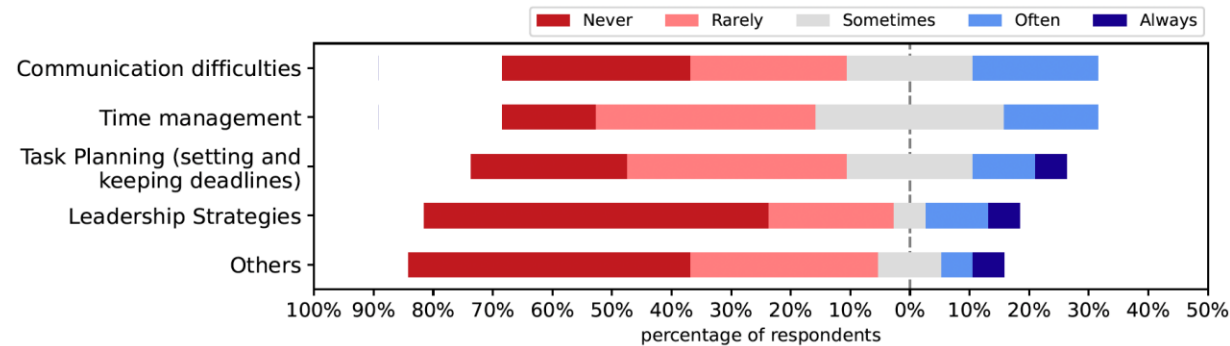
“People-related factors tend to be the greatest challenges—not technology.”

George Spafford,  
Senior Director Analyst  
at Gartner

# Survey Results – Team Challenges

Qn.6: Please rank the following challenges that could have impeded effective teamwork.

Qn.7: If your ranking for "Others" in Qn.6 above was 4 or 5, kindly provide us what it represents.



[R2]. **Others** -- People simply not doing work. We only had **about half of our group** contribute anything meaningful to the project. The half of the group that were not participating made it hard for the group to progress collaboratively.



# What is social coding?

- Open source practice - Open Source for Inner Source
- All repositories are public
- Everyone is encouraged to contribute
- Contribute back via Pull Requests



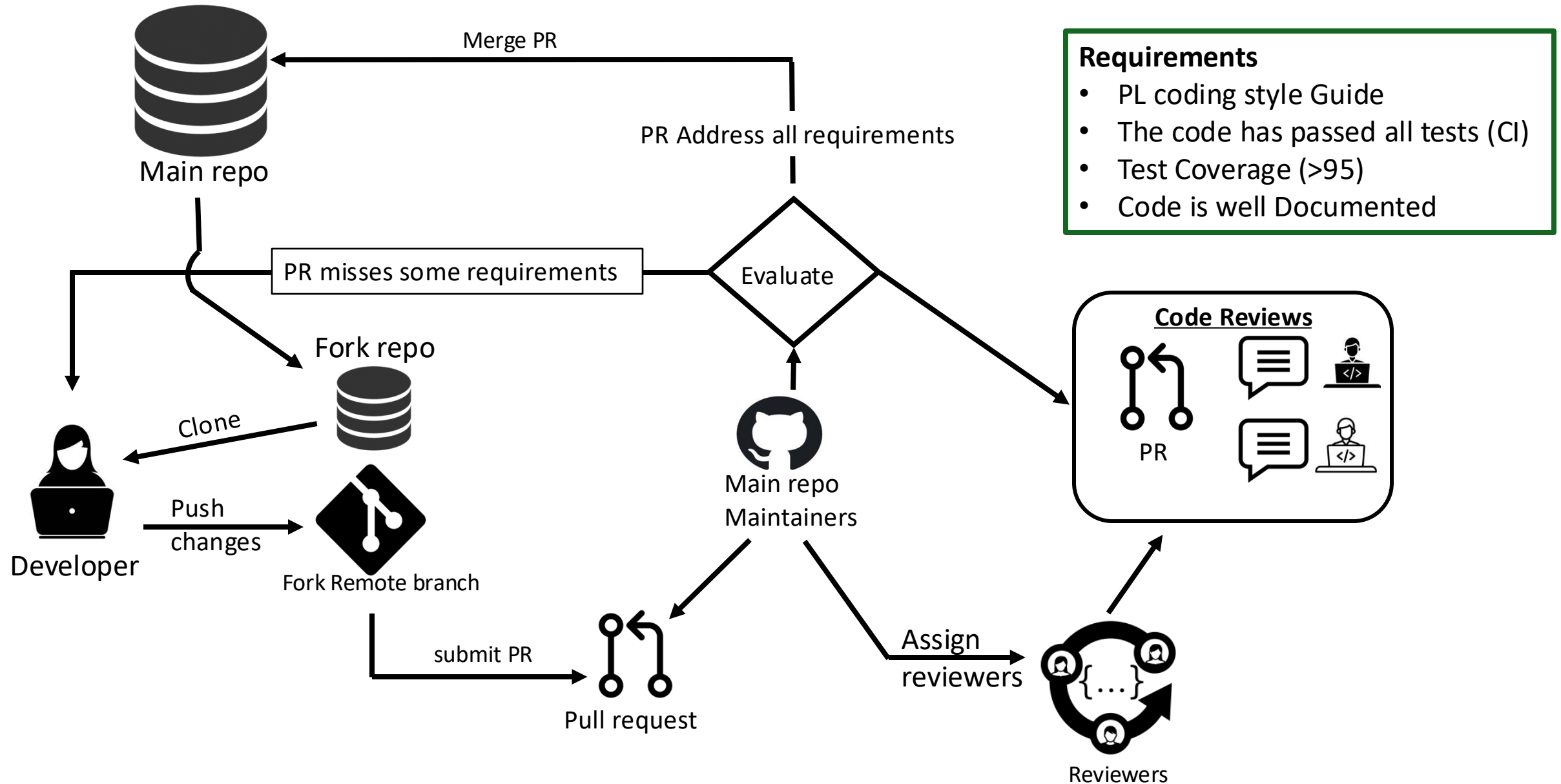
# Git-Github repository guidelines

- Create a repository for a project
- Create a new branch for every issue
- Use a Pull Requests to merge to mainline
- Every Pull Request is an opportunity for code review



Git Feature branch workflow

# A simple Code Review Workflow





# Best Practices Pull Requests Documentation

<https://github.com/Graylog2/graylog2-server/pull/14284>

## Concatenate query strings of queries/search types properly when exporting.

### #14284

**Merged** dennisoelkers merged 5 commits into `master` from `fix/issue-14268` 2 weeks ago

Conversation 2 Commits 5 Checks 1 Files changed 6 +29 -12

dennisoelkers commented last month · edited

**Note:** This needs to be backported to 4.3 and 5.0.

#### Description

#### Motivation and Context

This PR is fixing an issue related to exporting a search type. When both the search type and the query contain query strings, they are being concatenated, by simply combining them with an `AND`. For simple query strings this works, but it changes the logic for more complicated ones (e.g. when query string1 is `foo OR bar` and the second is also `foo OR bar`, the resulting query string `foo OR bar AND foo bar` has a different meaning, due to the stronger binding of the logical AND.

With this PR, concatenating two query strings wraps them in braces too, so `foo OR bar` concatenated to itself ends up as `(foo OR bar) AND (foo OR BAR)`, which returns the same, correct results.

Fixes #14268.

/jenkins-pr-deps Graylog2/graylog-plugin-enterprise#4502

#### How Has This Been Tested?

#### Screenshots (if appropriate):

#### Types of changes

- ☒ Bug fix (non-breaking change which fixes an issue)
- ☐ New feature (non-breaking change which adds functionality)
- ☐ Refactoring (non-breaking change)
- ☐ Breaking change (fix or feature that would cause existing functionality to change)

#### Checklist:

- ☒ My code follows the code style of this project.
- ☐ My change requires a change to the documentation.
- ☐ I have updated the documentation accordingly.
- ☒ I have read the **CONTRIBUTING** document.
- ☒ I have added tests to cover my changes.

#### Reviewers

danotorrey ✓

ryan-carroll-graylog ✓

#### Assignees

No one assigned

#### Labels

None yet

#### Projects

None yet

#### Milestone

No milestone

#### Development

Successfully merging this pull request may close these issues.

☒ Blank CSV dashboard export

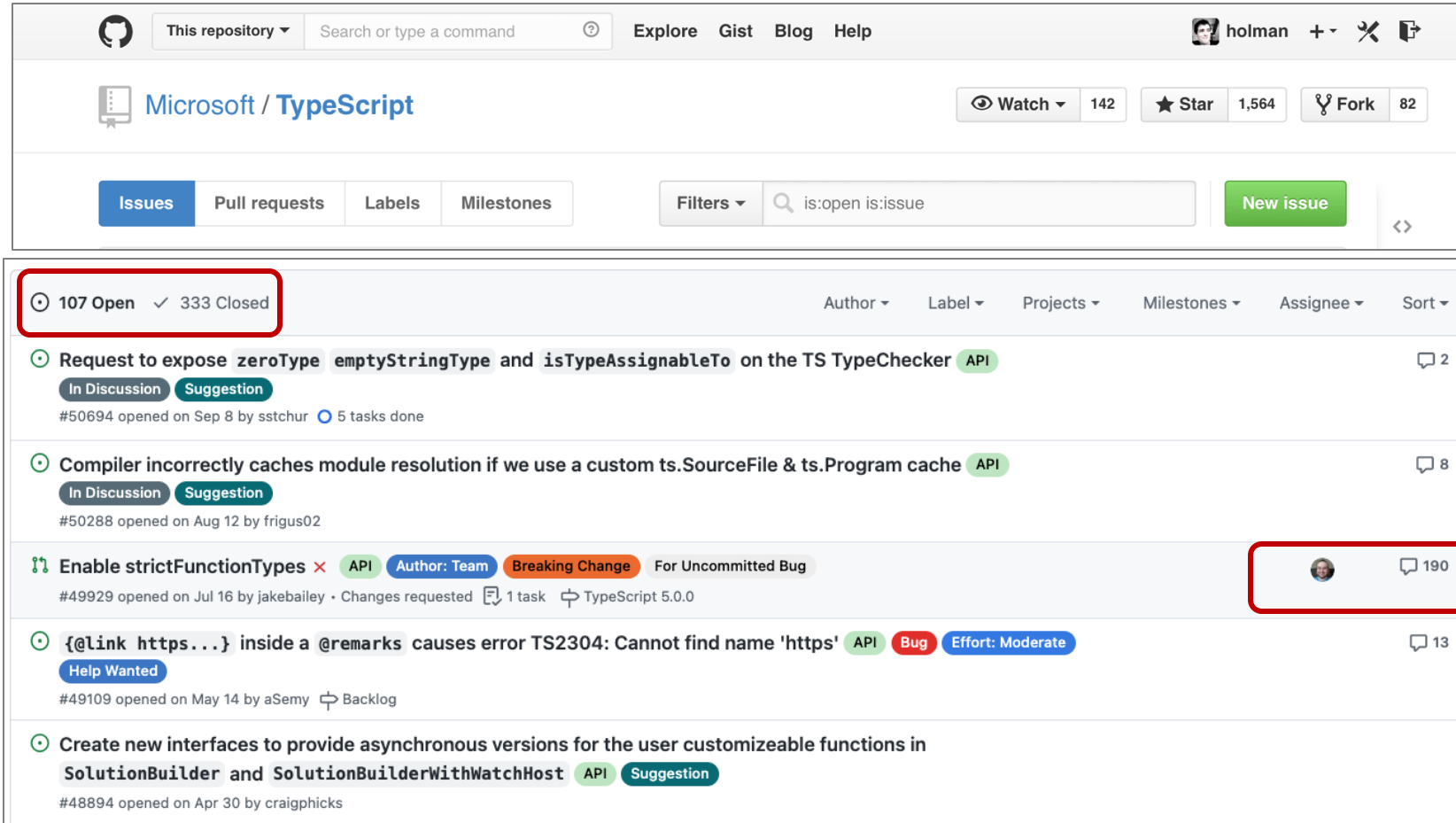
#### Notifications

Subscribe

You're not receiving notifications from this thread.

#### 3 participants

# Issue Tracker - GitHub



The screenshot shows the GitHub interface for the Microsoft/TypeScript repository. At the top, there's a navigation bar with the GitHub logo, a search bar, and links to Explore, Gist, Blog, and Help. Below this, the repository name "Microsoft / TypeScript" is displayed, along with statistics for Watch (142), Star (1,564), and Fork (82). The main section features tabs for Issues, Pull requests, Labels, and Milestones. A search bar with the filter "is:open is:issue" and a "New issue" button are also present. The issues list shows several open issues, with the third issue, "Enable strictFunctionTypes", highlighted by a red box. This issue is labeled as a "Breaking Change" and has 190 comments. Other issues include "Request to expose zeroType, emptyStringType and isTypeAssignableTo" and "Compiler incorrectly caches module resolution".

107 Open ✓ 333 Closed

Request to expose `zeroType`, `emptyStringType` and `isTypeAssignableTo` on the TS TypeChecker API

In Discussion Suggestion

#50694 opened on Sep 8 by sstchur 5 tasks done

Compiler incorrectly caches module resolution if we use a custom `ts.SourceFile` & `ts.Program` cache API

In Discussion Suggestion

#50288 opened on Aug 12 by frigus02

Enable `strictFunctionTypes` API Author: Team Breaking Change For Uncommitted Bug 190

#49929 opened on Jul 16 by jakebailey • Changes requested 1 task TypeScript 5.0.0

{@link https...} inside a @remarks causes error TS2304: Cannot find name 'https' API Bug Effort: Moderate 13

Help Wanted

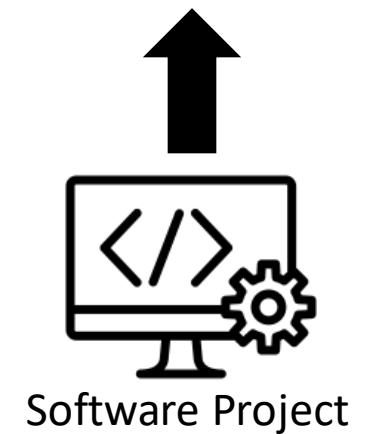
#49109 opened on May 14 by aSemy Backlog

Create new interfaces to provide asynchronous versions for the user customizable functions in `SolutionBuilder` and `SolutionBuilderWithWatchHost` API Suggestion

#48894 opened on Apr 30 by craighpicks

## Issues

- Use cases
- Bugs to fix
- Features to add
- Documentation



# Testing

“If it is worth building, it is worth testing.

If it is not worth testing, why are you wasting your time working on it?”

Scott Ambler, [agiledata.org](http://agiledata.org)

# Importance of test coverage

- High test coverage gives you confidence that your code works as expected
- Test coverage reports can reveal which lines of code were not tested

Python cmd tool

```
$ coverage report -m
```

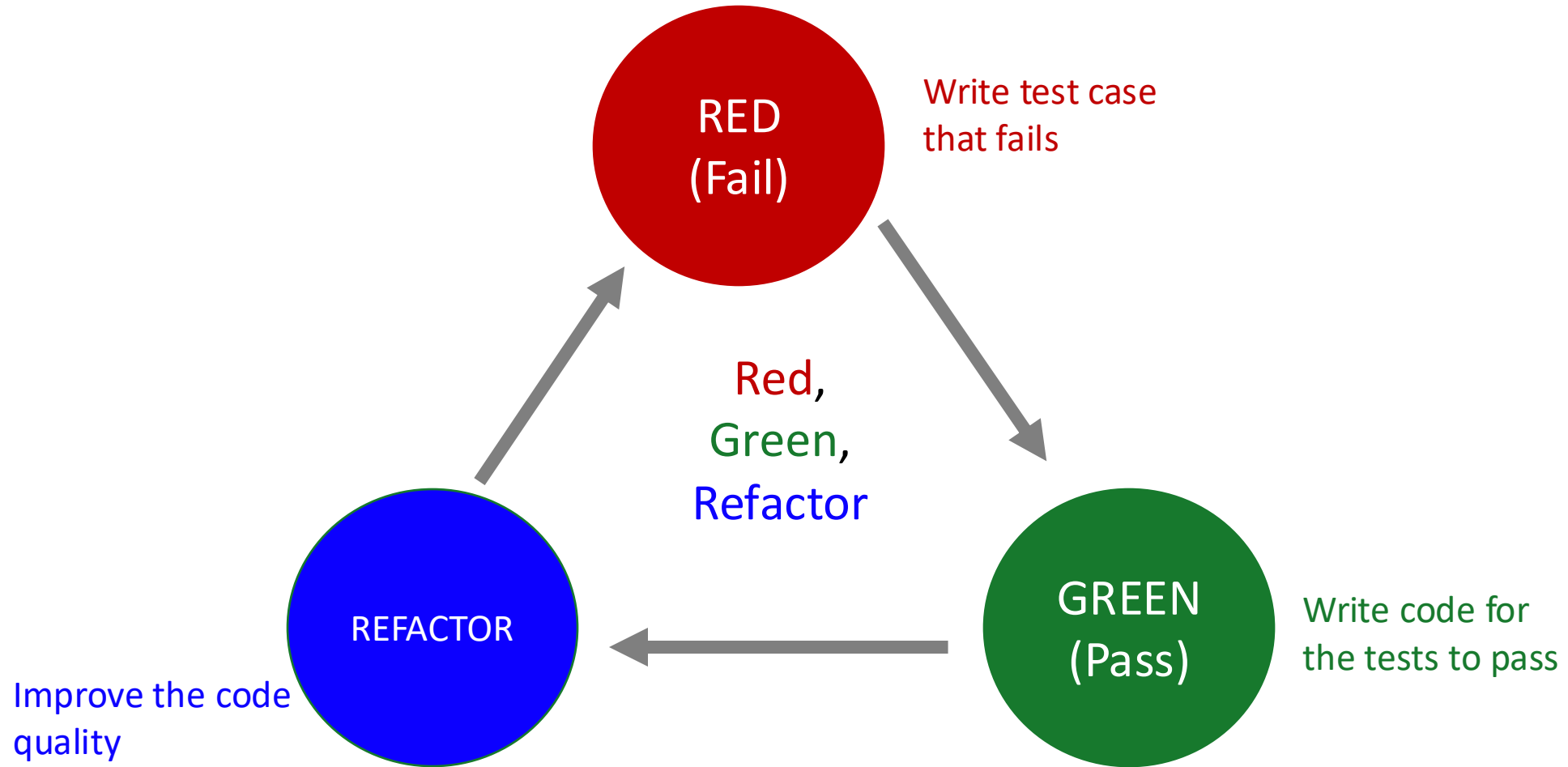
Name	Stmts	Miss	Cover	Missing
server.py	81	5	94%	62, 66, 167-169

Total  
lines of  
code

# lines  
without  
test cases

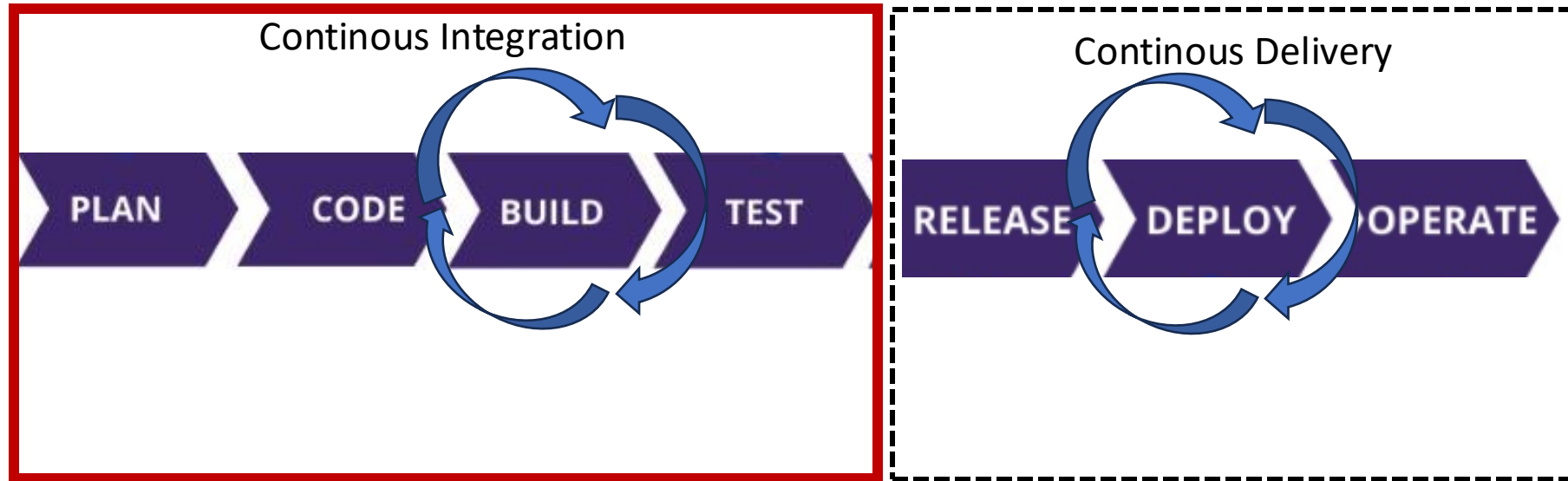
Lines without test cases

# Basic TDD workflow



I have prepared the lab which will guide you in practicing with TDD

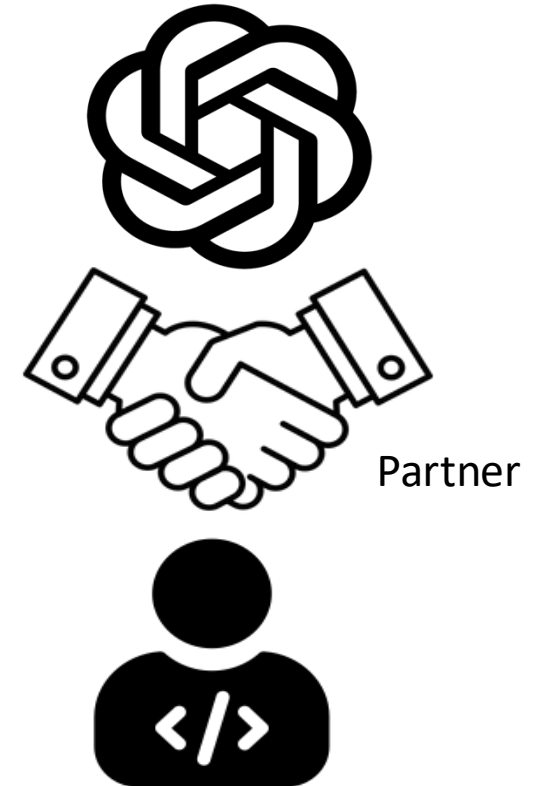
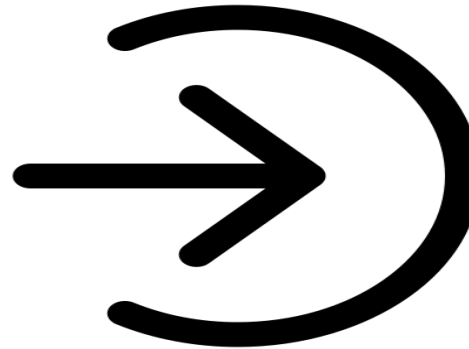
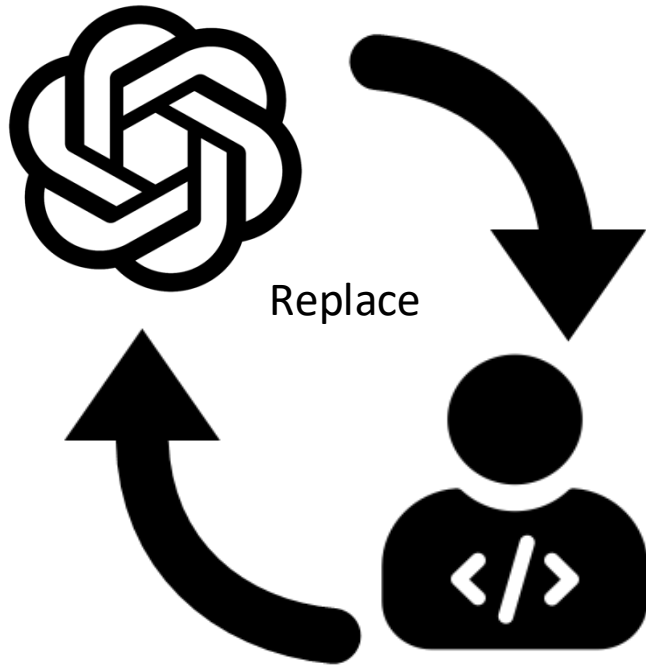
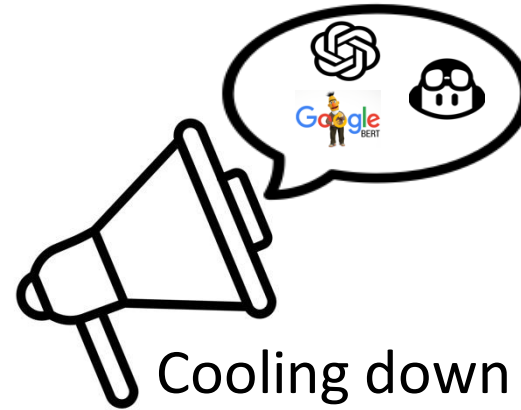
# CI/CD pipeline



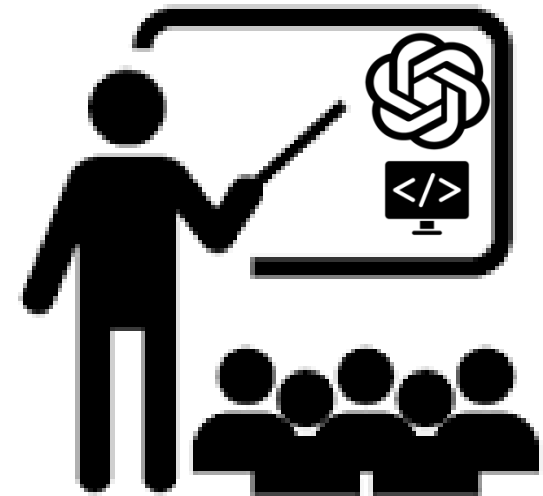
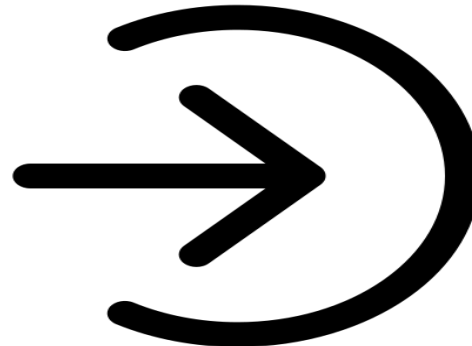
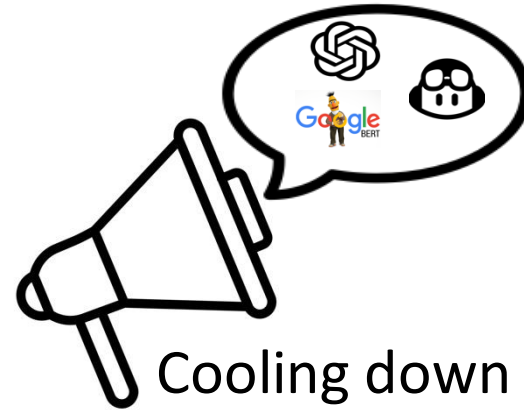


Using Generative AI to perform specific SDLC activities

# The Hype around Generative AI for Software Development



# The Hype around LLMs for Software Development



# What SE Tasks have been addressed to date using LLM4SE

SE Activity	SE Task		Total
Requirements engineering	Anaphoric ambiguity treatment (3)	Requirements term identification (1)	11
	Requirements classification (3)	Coreference detection (1)	
	Requirement analysis and evaluation (2)	Traceability automation (1)	
Software design	GUI retrieval (1)	Software specification synthesis (1)	3
	Rapid prototyping (1)		
Software development	Code generation (62)	Agile story point estimation (1)	136
	Code completion (16)	API documentation smell detection (1)	
	Code summarization (10)	API entity and relation extraction (1)	
	Code understanding (7) ←	Code optimization (1)	
	Code search (5)	Code example recommendation (1)	
	Program synthesis (5)	Control flow graph generation (1)	
	API recommendation (2) ←	Data analysis (1)	
	API synthesis (2)	Identifier normalization (1)	
	Code comment generation (2) ←	Instruction generation (1)	
	Code representation (2)	Type inference (1)	
	Method name generation (2)	Others (11)	
Software quality assurance	Test generation (8) ←	Bug localization (1)	24
	Vulnerability detection (7)	Failure-inducing test identification (1)	
	Test automation (4)	Flaky test prediction (1)	
	Verification (2)		
Software maintenance	Program repair (23)	Duplicate bug report detection (1)	58
	Code review (6) ←	Decompilation (1)	
	Debugging (4)	Program merge conflicts repair (1)	
	Bug report analysis (3)	Sentiment analysis (1)	
	Code clone detection (3)	Tag recommendation (1)	
	Logging (2)	Vulnerability repair (1)	
	Bug prediction (1)	Commit classification (1)	
	Bug triage (1)	Traceability recovery (1)	
	Bug report replay (1)	Others (6)	
Software management	Effort estimation (1)		1

Hou et al. LLMs for SE: A Systematic Literature Review

- <https://arxiv.org/pdf/2308.10620.pdf>
- Analyzed 229 research papers on the subject
- Read Section 6 of the paper to find which papers have addressed the SE tasks.

# Assessment

