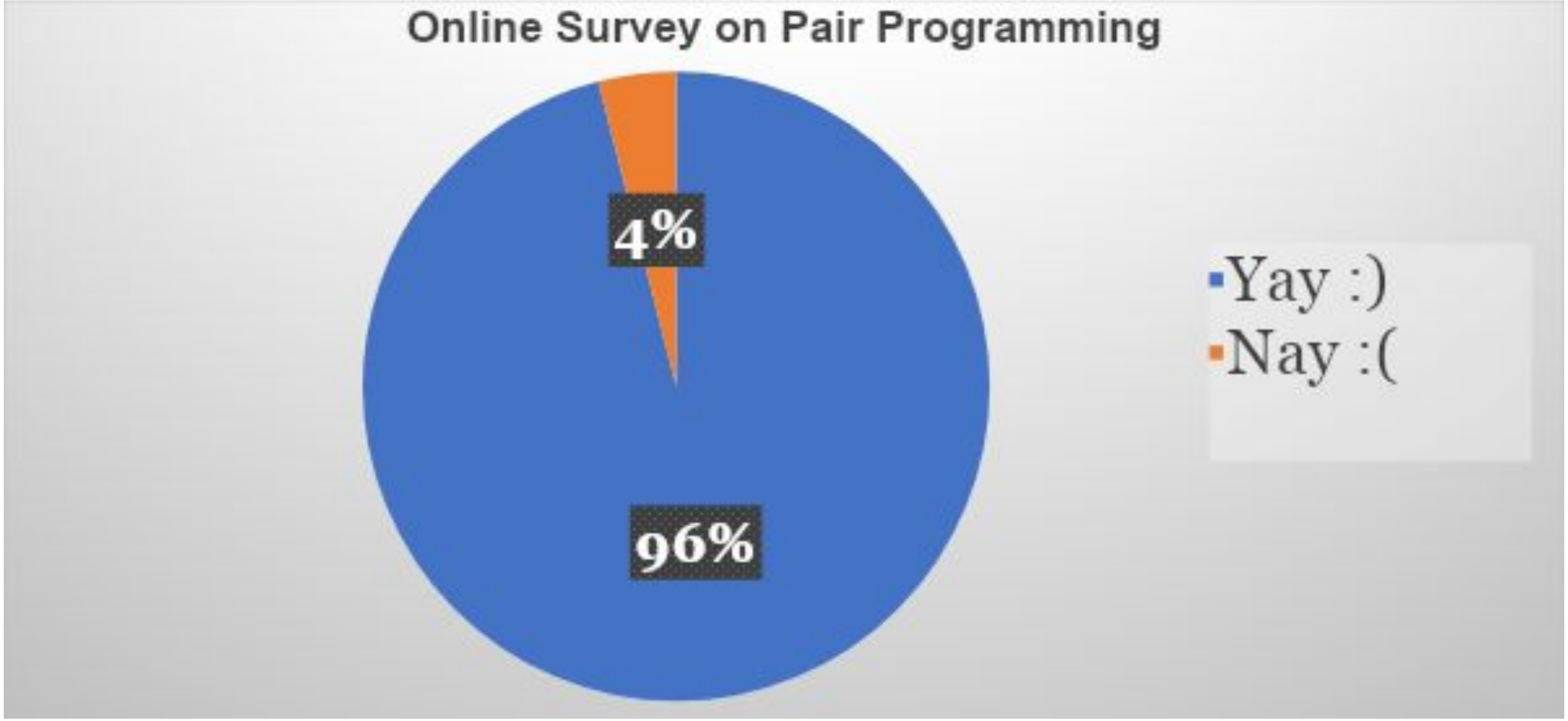
Best practices of Pair Programming and Code Review

- By Sumana Saha, Software Engineer at RatePAY GmbH

Agenda

- Industry trends in Software Development.
- “Peer programming” what is this new buzz word about?
- “Pair Programming” – why we need / How to do it ?
- “Code Review” – How & Who reviews the code ?
- Best practices – Takeaways
- Questions and Discussions ?

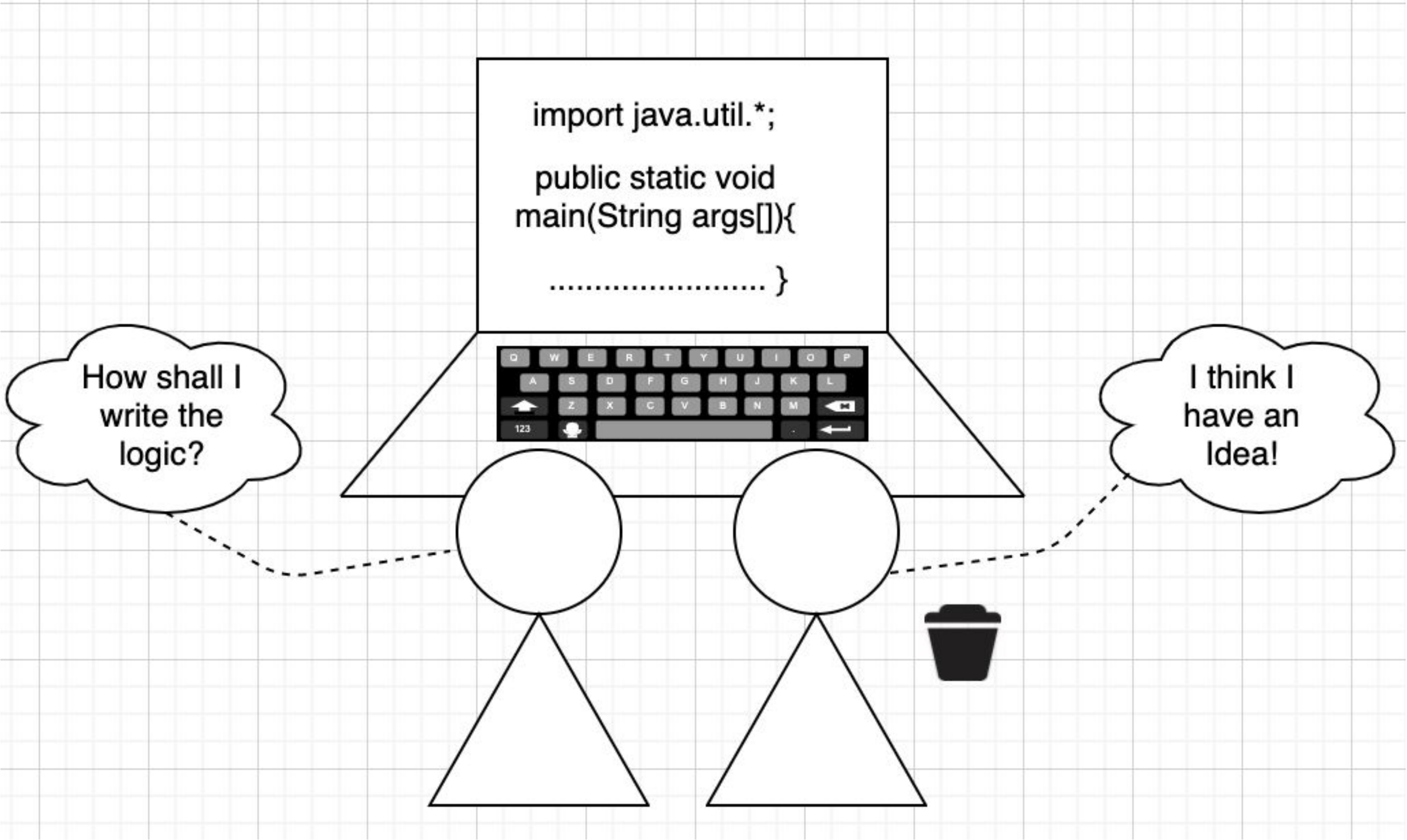
Before everything let‘s See Some Statistics!



IBM reported spending about “$250 million repairing and reinstalling fixes to 30,000 customer-reported problems”. Pair programming significantly reduces these expenses by reducing the defects in the programs.

Source:IBM official website

„Buzz word“ PAIR Programming!

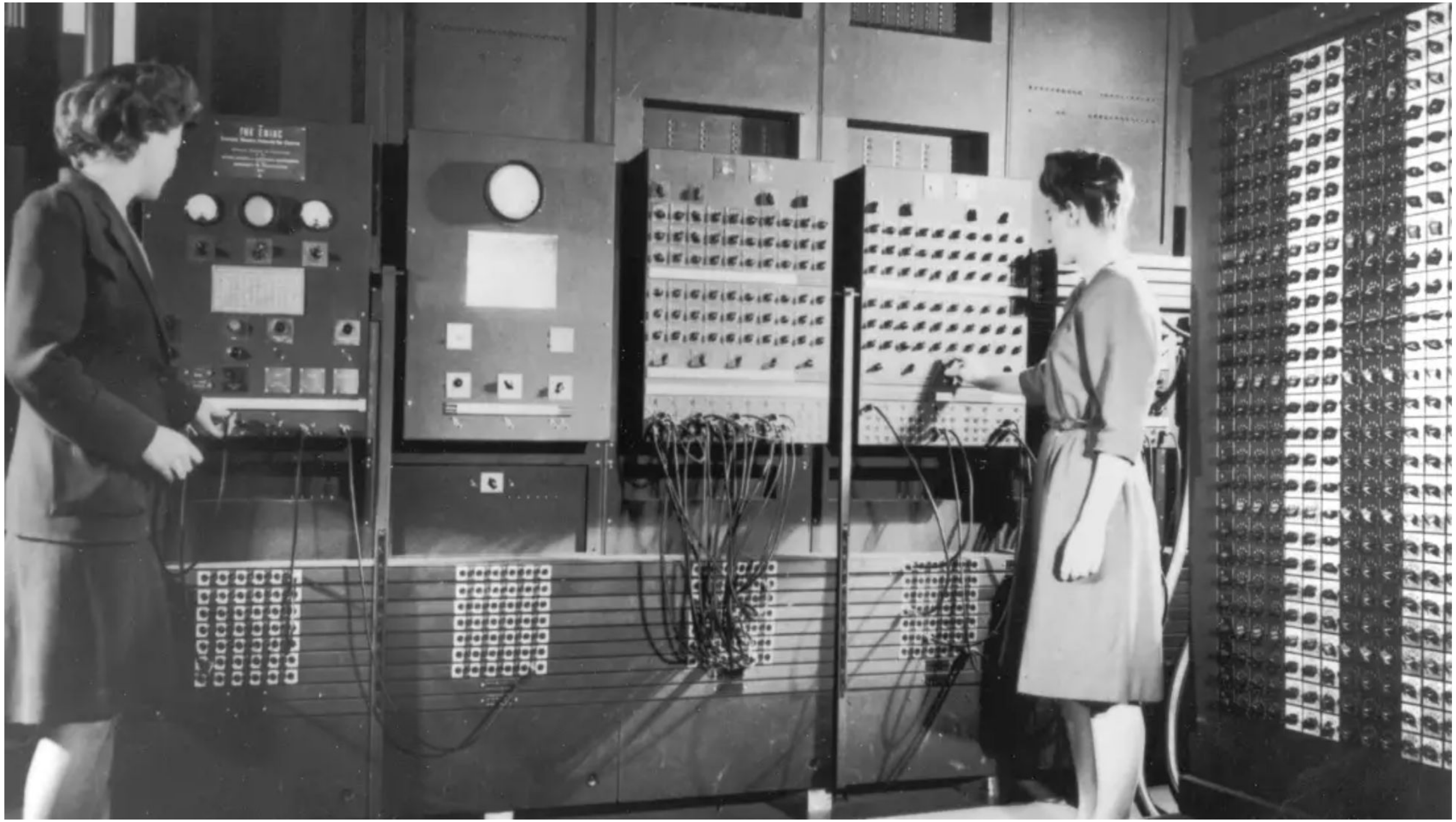


```
import java.util.*;

public static void
main(String args[]){

 ........................ }
```

Agile Software Development & Pair Programming

The importance of agile is that it focuses on empowering people to collaborate and make decisions together quickly and effectively. Pair programming takes collaboration to the next level for developers.

When this technique was first used?



The Refrigerator Ladies(From left Jean Bartik, Betty Snyder) ENIAC Programmers in 1940

Image Source:www.google.com

JEAN JENNINGS BARTIK

2008 Fellow

Image Source:www.google.com

For programming the ENIAC computer and helping adapt it to use software programs stored in memory.

"" ""

Betty Snyder and I, from the beginning, were a pair. And I believe that the best programs and designs are done by pairs, because you can criticise each other, and find each others errors, and use the best ideas.

Pair Programming

Image Source:www.google.com

Kent Beck, an American software engineer who originally coined the term in the late 1990s and described two programmers working at different levels of abstraction. He is also known for his book „Test-Driven Development by Example"

How to make this work?

- Choose the pairing variation
- Decide the pairing style

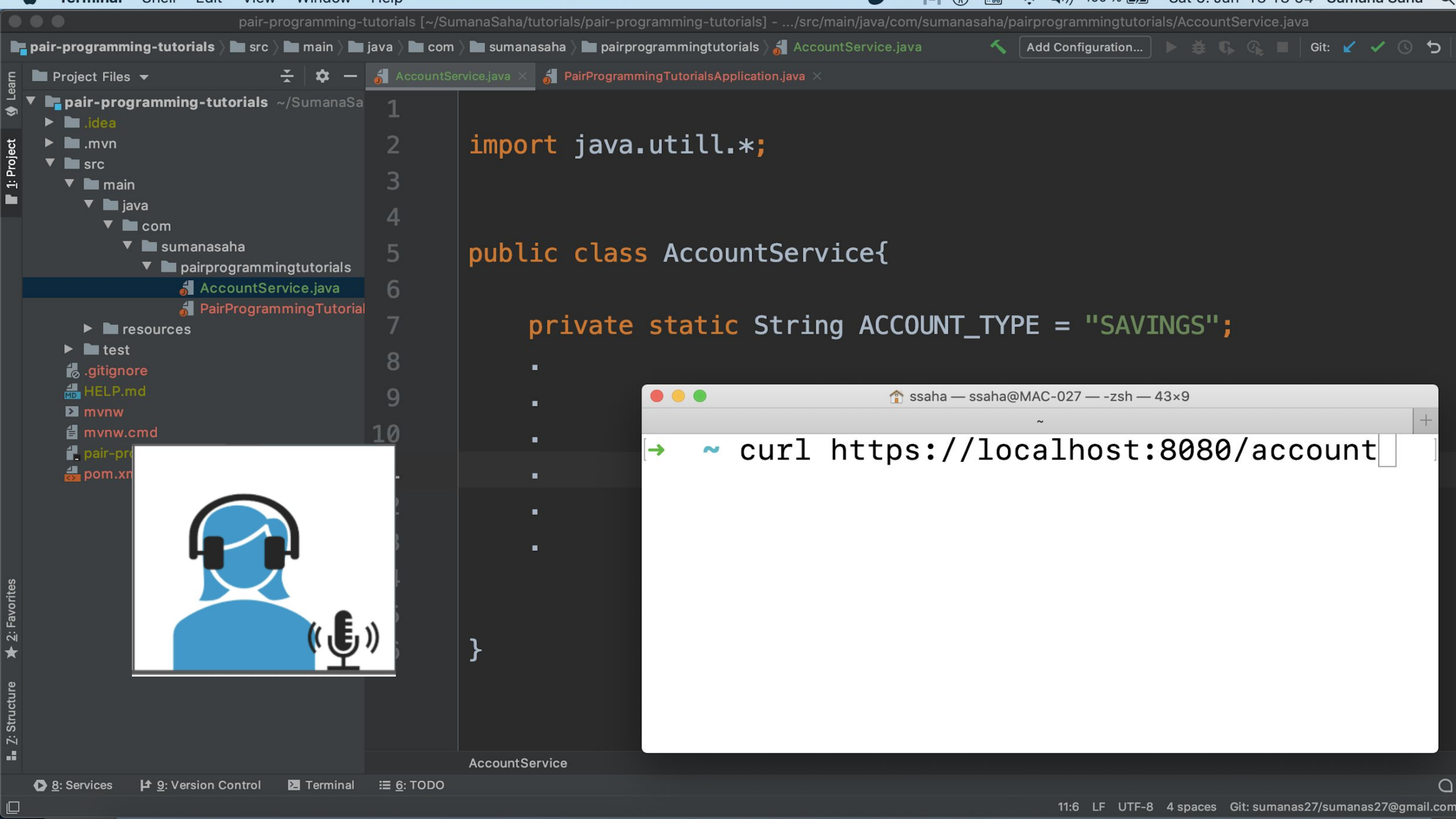
Variations of Pair programming

- Expert – Expert
  - High productivity | New approach to solve a problem
- Expert – Novice
  - Mentor mentee relationship | Out of the box ideas
- Novice – Novice
  - Produces significantly better result than working independently

Styles of pair programming

- Driver – Navigator
- Strong – Style
- Ping – Pong
- Remote pairing (Best for the present COVID19 situation)

Look and Feel of pair programming!

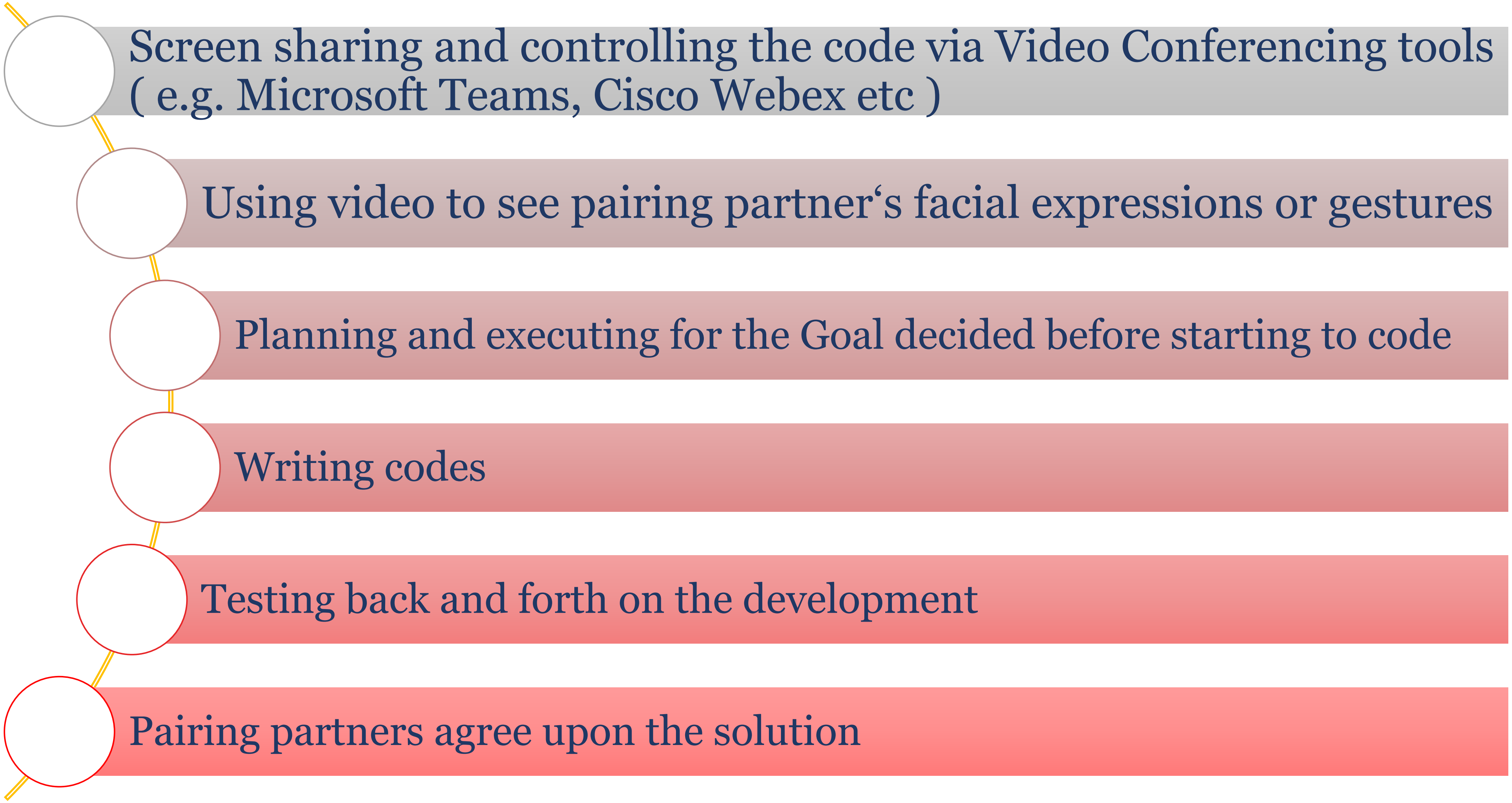

pair-programming-tutorials [~/SumanaSaha/tutorials/pair-programming-tutorials] - .../src/main/java/com/sumanasaha/pairprogrammingtutorials/AccountService.java
pair-programming-tutorials 〉 src 〉 main 〉 java 〉 com 〉 sumanasaha 〉 pairprogrammingtutorials 〉 AccountService.java
Add Configuration...
Git:
Project Files
AccountService.java
PairProgrammingTutorialsApplication.java
pair-programming-tutorials ~/SumanaSa
.idea
.mvn
src
main
java
com
sumanasaha
pairprogrammingtutorials
AccountService.java
PairProgrammingTutorial
resources
test
.gitignore
HELP.md
mvnw
mvnw.cmd
pair-pr
pom.xm
Learn
1: Project
2: Favorites
Z: Structure
AccountService
8: Services
9: Version Control
Terminal
6: TODO
11:6 LF UTF-8 4 spaces Git: sumanas27/sumanas27@gmail.com

```java

import java.utill.*;


public class AccountService{

    private static String ACCOUNT_TYPE = "SAVINGS";
    .
    .
    .
    .
    .
    .


}
```

ssaha — ssaha@MAC-027 — -zsh — 43×9

```
→  ~ curl https://localhost:8080/account
```

How to proceed now ?



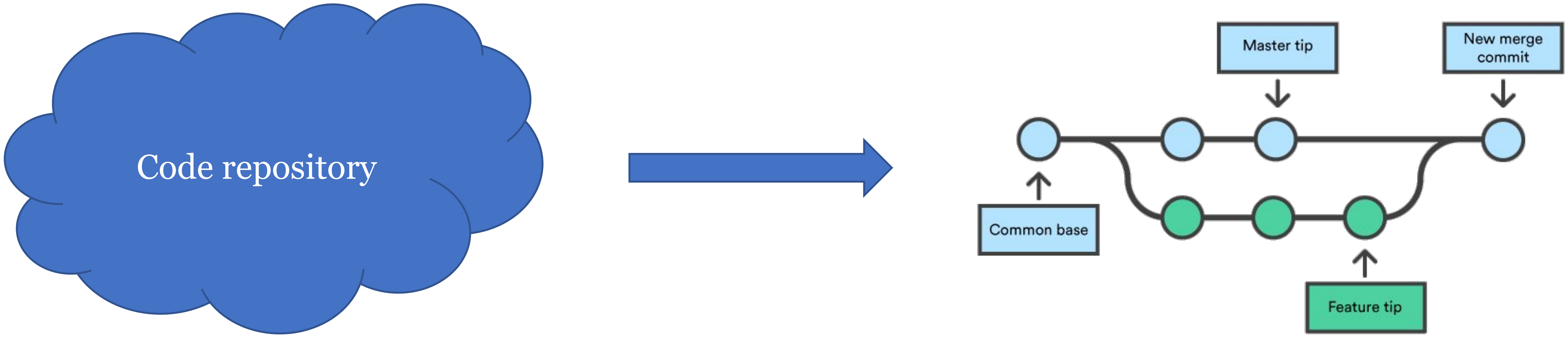
- Screen sharing and controlling the code via Video Conferencing tools (e.g. Microsoft Teams, Cisco Webex etc)
- Using video to see pairing partner‘s facial expressions or gestures
- Planning and executing for the Goal decided before starting to code
- Writing codes
- Testing back and forth on the development
- Pairing partners agree upon the solution

Things to remember before starting

What will happen when the solution goes to the common code base?

Code Collision!

Git / GitHub comes here to rescue us



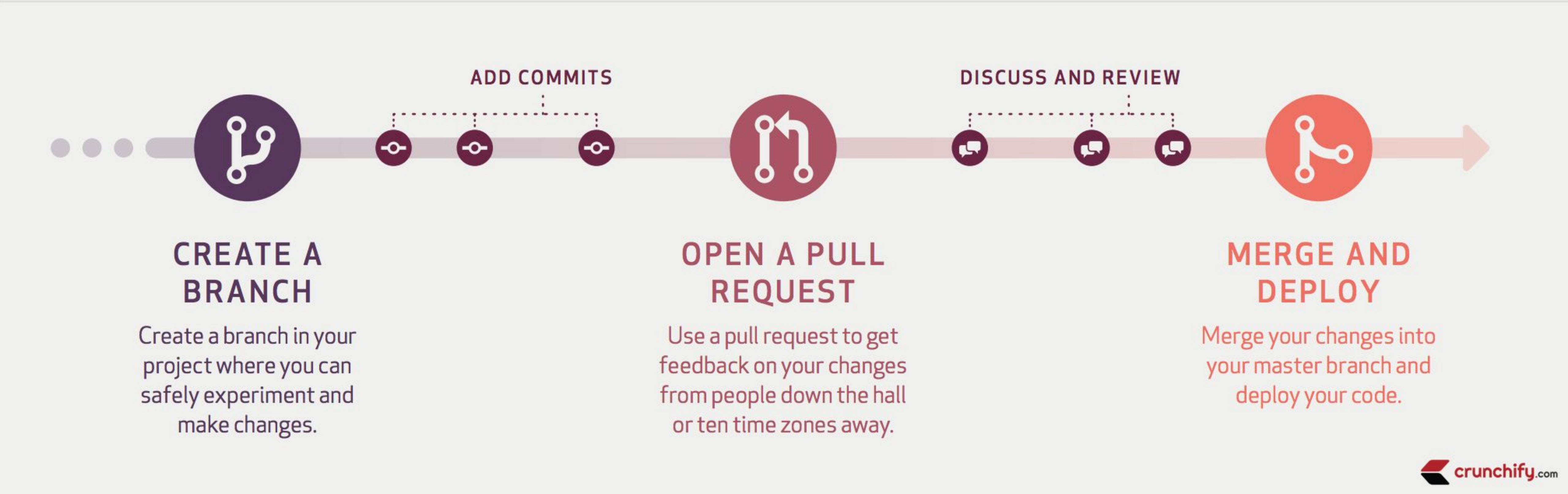
Code repository

Master tip

New merge commit

Common base

Feature tip



CREATE A BRANCH

Create a branch in your project where you can safely experiment and make changes.

OPEN A PULL REQUEST

Use a pull request to get feedback on your changes from people down the hall or ten time zones away.

MERGE AND DEPLOY

Merge your changes into your master branch and deploy your code.

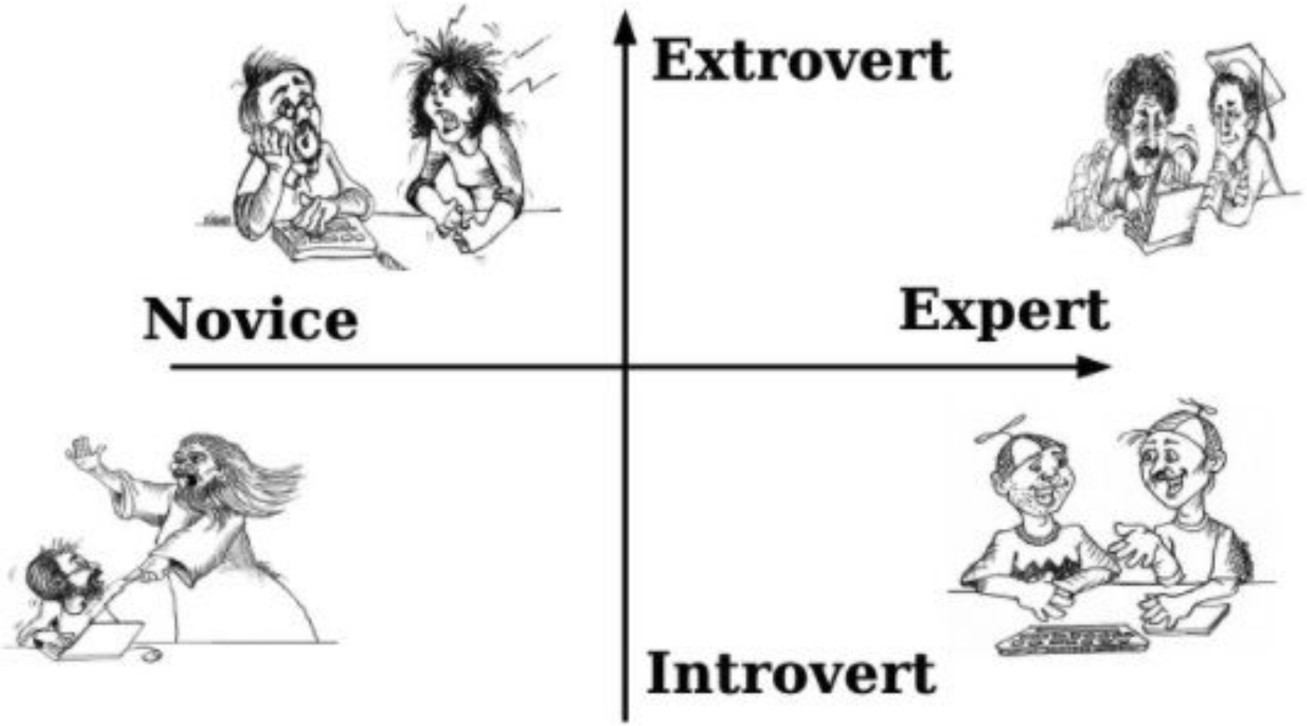
Let’s take a step back and think that do we had any problem on pairing?

ASCIIville
http://www.asciiville.com
Copyright 2008. Todd Presta. All rights reserved.
WHEN I SAY 4-SPACE INDENTS I MEAN 4-SPACE INDENTS!!! HAVE YOU EVER HEARD OF BREATHMINTS? AND I'M SICK AND TIRED OF YOUR DONUT CRUMBS ON MY KEYBOARD.
PRESTA

The dark side of pair programming.

Common Pitfalls

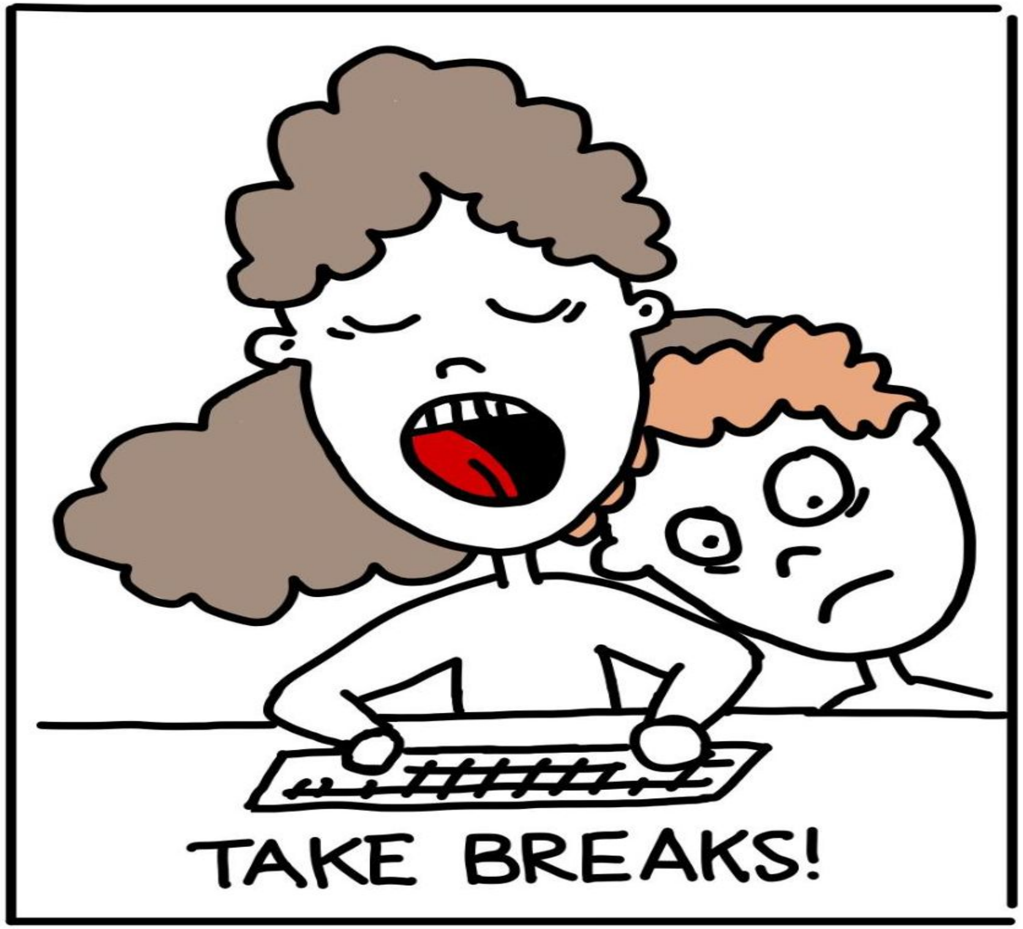
- Compatibility Issues
- Lack of willingness to do pairing
- More talk, Less code
- Lack of Courage
- Loss of confidence
- Insecurity complex



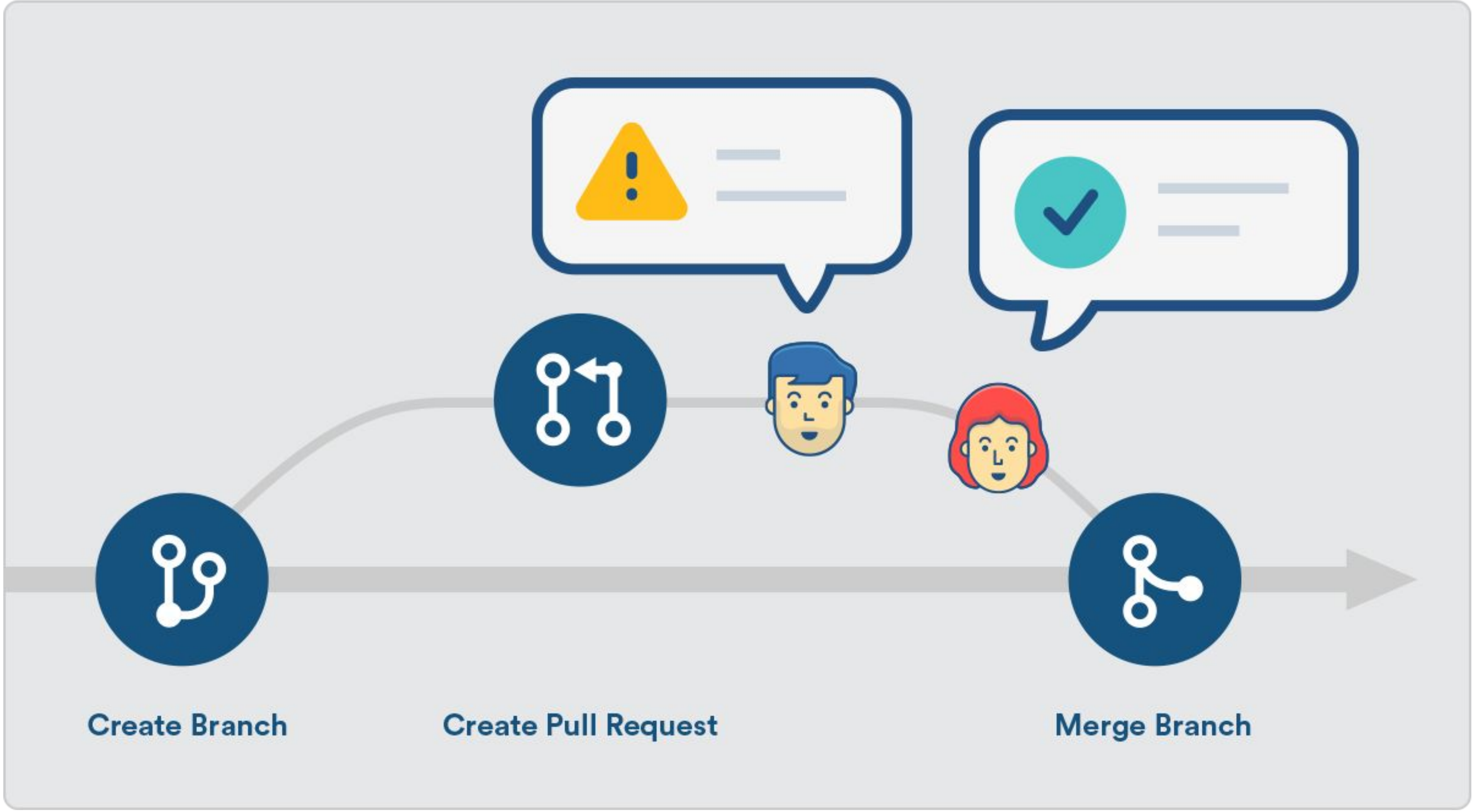
How to solve the problem?

Best Practices

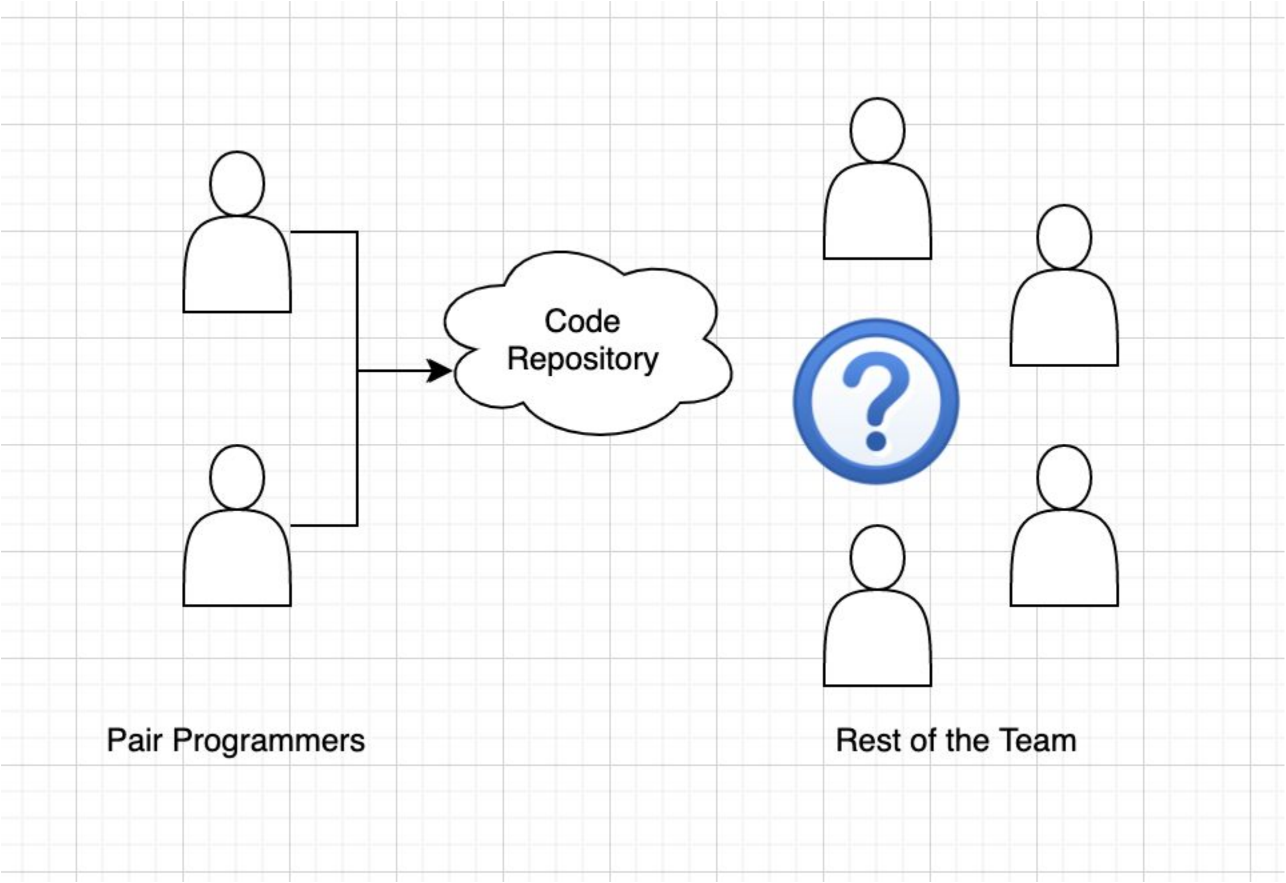
- Trust your Instinct
- Research together with partner
- Break the problem into smaller chunks
- Put validation on each idea shared by pairing partner
- Take breaks
- Be humorous and open 🙂



How to let your Team know about your Solution?


Create Branch
Create Pull Request
Merge Branch

What‘s Next ?



Now it is the time for CODE REVIEW!!

What is Code review ?

```
integer   idAlgorithm (int A, int
B){
      A=Math.abs(A);
      B=Math.abs(B);
      while (B!=0){
            if (A>B) A=A-B;
            else B=B-A;
      }
      return A;
}

integer euclidAlgorithm (int A, int
B){
      A=Math.abs(A);
      B=Math.abs(B);
      while (B!=0){
            if (A>B) A=A-B;
            else B=B-A;
      }
      return A;
}

integer euclidAlgorithm (int A, int
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      }
      return A;
}
```
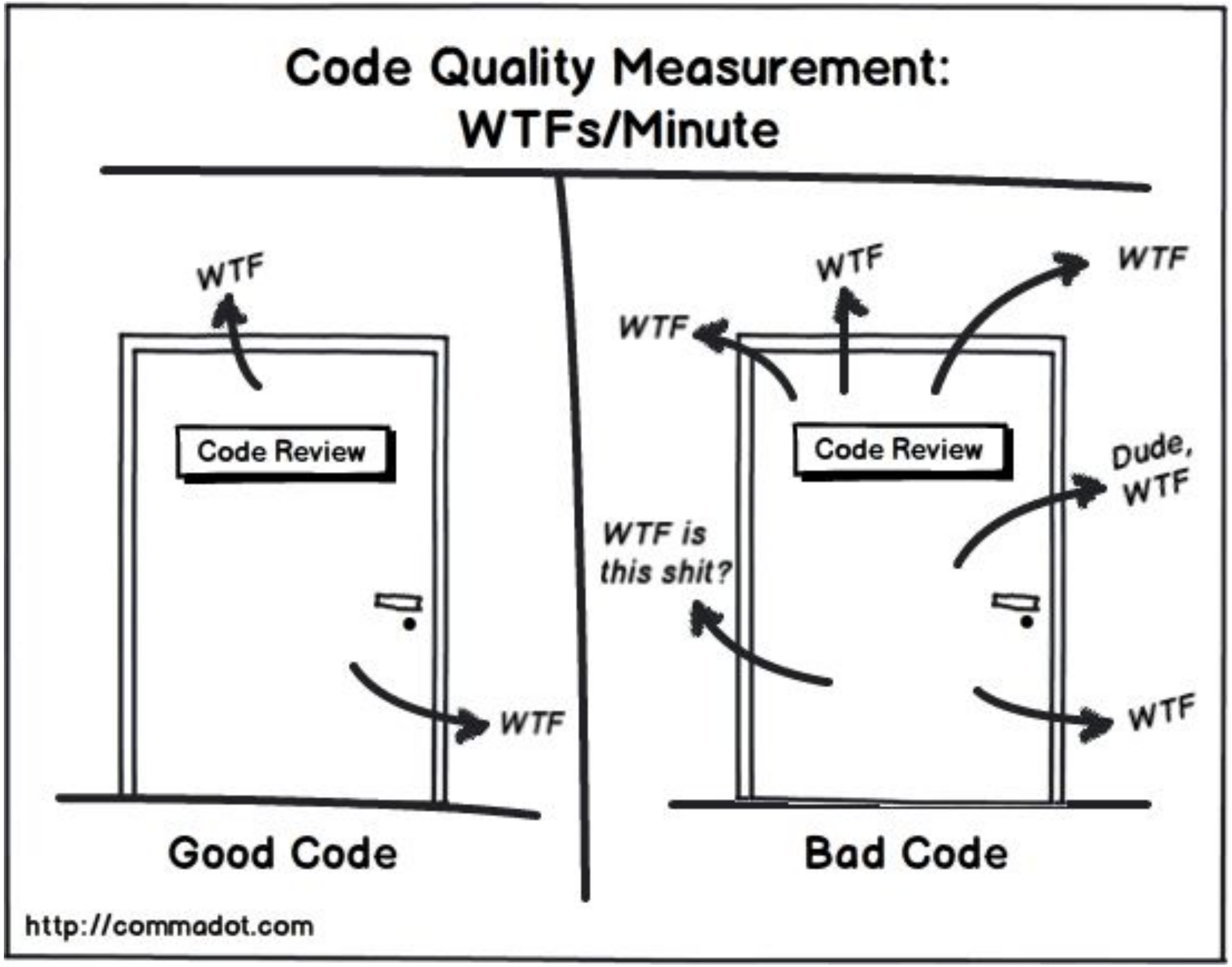

Code review is an act of software quality assurance in which one or several people take part and check the piece of code for correctness.

Code review control flow

- Developed code is ready to be reviewed
- Code Authors sent invitation around the Team via Email / Tool used to create Pull request
- Reviewers review the code and provide feedback to the code author
- If there are no open questions, Pull request is marked as “Approved” and it is ready to be merged in the Code repository.

How to review a Code?

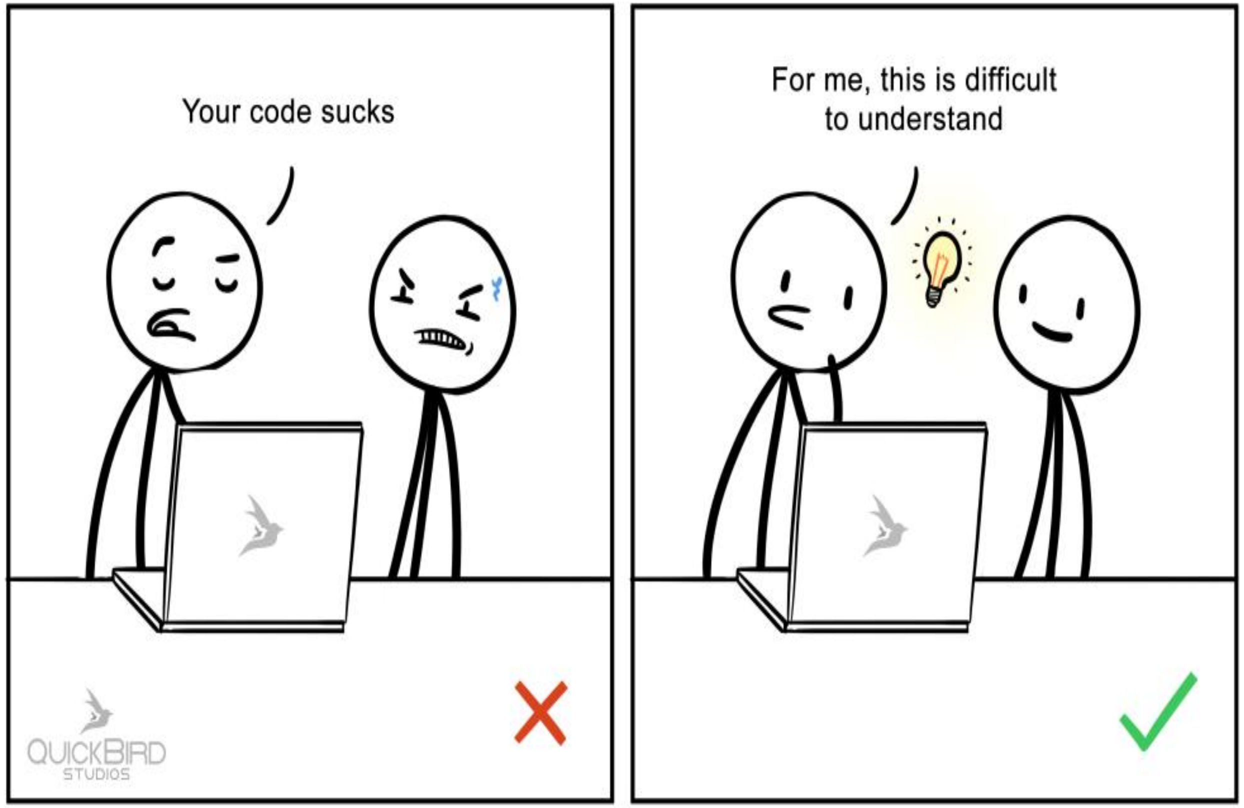

Code Quality Measurement:
WTFs/Minute
WTF
Code Review
WTF
Good Code
WTF
WTF
WTF
WTF
Code Review
Dude, WTF
WTF is this shit?
WTF
Bad Code
http://commadot.com

Define a Checklist!

- Common guideline is established in the team
- Get the context of the code before reviewing
- Is there any Bad Code Smells?
- Is the Code Readable and correct performance wise?
- If there is uncertainty , ask the code author and don’t give approval

Let’s talk about the Best Practices!

- Give respectful and constructive feedback
- Connect with the Code Author if necessary
- Always explain why the code change / implementation is rejected
- Use an IDE (Eclipse , Intellij IDEA) for reviewing
- Avoid big comment thread for discussing issues



Who are practicing Pair-Programming & Code Review?

amazon
JET BRAINS
ratepay

And many others….

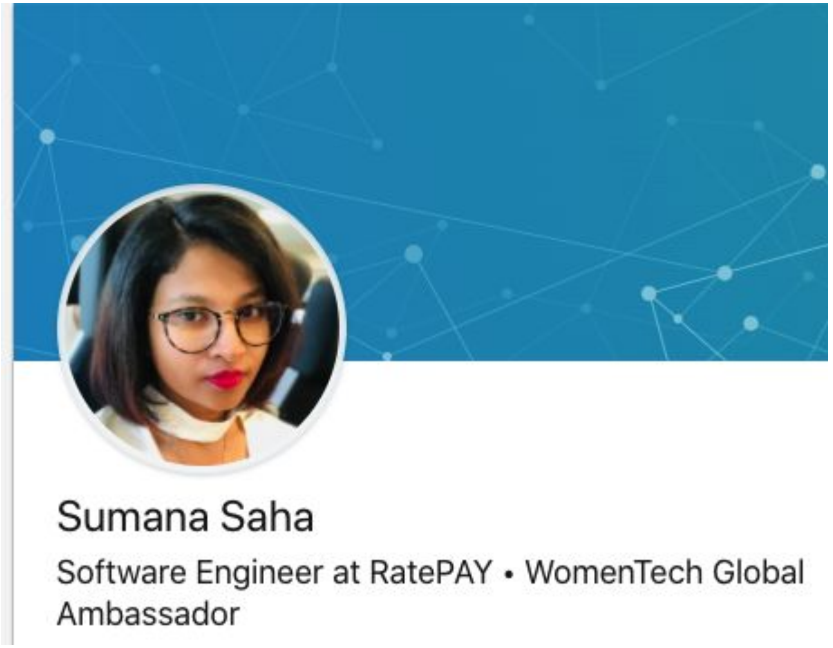
Takeaway!

Collaborate with team members. Do not compete, it is not a HACKATHON!

Useful resources

- https://martinfowler.com/articles/on-pair-programming.html
- https://www.michaelagreiler.com/code-review-book/
- https://learning.oreilly.com/library/view/clean-code/9780136083238/

For future connections :
https://www.linkedin.com/in/sumana-saha-30148664/



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Let’s try to discuss the questions in your mind?

- Thank you