

**Academic Year: 2023 - 2024 (Odd Semester)**

**Degree, Semester & Branch:** V Semester B.Tech –IT

**Course Code & Title:** JIT 1026 Software Testing & Automation

**Type of Activity:** Collaborative Learning

**Topic:** Automate Testing of Web Applications

**Date:** 14.11.2023

**Type of Learning:**

Collaborative Learning

**Learning Objectives:**

O1: To Familiarize with popular automated testing tools and frameworks (e.g., Selenium, Cypress, Puppeteer) used for web applications..

O2: To Learn effective strategies for planning, designing, and implementing automated tests for web applications.

O3: Understand strategies for managing test data, test environments, and handling dependencies in automated testing

O4: To improve listening and communication skills.

**Activity Description:**

Collaborative Learning is an active learning strategy.

- Initially the students were asked to form a group. Each Group having 9 Members.
- Each Group formed by Fast learners, Average Learners, Slow Learners. Classification of students such as a bright student, average students, and slow learners is based on their academic performance (bright/average/slow learner) and skill.
- The course instructor allotted questions to each group and also instructed methods to answer the questions.
- The students discussed with their team members and asked doubt to the course instructor.
- Finally, one representative from each group presented the solution to their allotted question.

## Uses of Collaborative Learning:

- Students are actively participated in each group.
- It helps the students are made to work in a team and share their ideas to others and also improve their communication skills.
- It helps to focus attention and engage students in learning.

## Justification for chosen the topic:

The Automating testing for web applications is one of the important topic, and repeatedly asked in university question. Automating testing for web applications is essential for achieving faster time-to-market, improving software quality, reducing costs, and supporting agile development practices. It aligns with modern software engineering principles and enables teams to deliver high-performing, reliable applications that meet user expectations. Embracing automated testing not only enhances efficiency and effectiveness but also positions organizations to innovate and adapt swiftly in a competitive market landscape. Thus, focusing on automating testing of web applications is not only practical but also essential for ensuring the success and sustainability of software projects in today's digital age.

This activity makes the students to get a sound knowledge in this concept. Students gain knowledge about generating a target code for an intermediate code and share their ideas with their classmates that improve creative thinking and oral communication skills.

## Think-Pair-Share with Automating Testing of Web Applications

### Introduction

Think-Pair-Share is a collaborative learning strategy that encourages active participation and engagement among learners. When applied to the topic of automating testing for web applications, it can enhance understanding, problem-solving skills, and retention of knowledge. Here's how Think-Pair-Share can be implemented effectively:

### Implementation Steps

#### 1. Think (Individual Thinking)

- **Activity:** Provide learners with a specific scenario or problem related to automating testing for web applications. For example, present a challenge in selecting the appropriate automated testing tool for a particular type of web application.
- **Instructions:** Ask learners to individually think about the scenario, consider possible solutions, and jot down their ideas, strategies, or questions.
- **Timeframe:** Allocate 5-10 minutes for this individual reflection and brainstorming phase.

## 2. Pair (Pair Discussion)

- **Activity:** Pair learners with a partner to discuss their thoughts, ideas, and solutions generated during the thinking phase.
- **Instructions:** Encourage pairs to share their individual perspectives, compare solutions, and discuss the advantages and disadvantages of different approaches to automating testing.
- **Guidance:** Provide guiding questions to stimulate discussion, such as:
  - What automated testing tools have you used before, and what were the outcomes?
  - How would you approach automating regression testing for a complex web application?
  - What factors would you consider when selecting a framework for UI testing?
- **Timeframe:** Allow 10-15 minutes for pairs to engage in meaningful discussion and exchange insights.

## 3. Share (Group Discussion)

- **Activity:** Bring the discussion to a larger group setting where pairs share their findings, insights, and conclusions from the pair discussion phase.
- **Instructions:** Facilitate a group discussion where each pair presents their thoughts, solutions, and any new perspectives gained through collaboration.
- **Facilitation:** Encourage active participation from all learners, ask probing questions to deepen understanding, and facilitate debate on different approaches to automating testing.
- **Key Points:** Summarize key takeaways from the group discussion, highlight common challenges or misconceptions, and reinforce important concepts related to automated testing.

## 4. Reflection and Application

- **Activity:** Conclude the session with a reflection exercise to consolidate learning and encourage application of concepts.
- **Instructions:** Ask learners to individually reflect on how they can apply the insights gained from Think-Pair-Share to improve their approach to automating testing in their current or future projects.
- **Feedback:** Invite learners to share their reflections or action plans with the group, fostering accountability and commitment to implementing new strategies.

## Benefits of Implementing Think-Pair-Share

- **Enhanced Understanding:** Promotes deeper understanding of automated testing principles and strategies through collaborative discussion.
- **Critical Thinking:** Encourages critical thinking and problem-solving skills by exploring different viewpoints and evaluating solutions.
- **Engagement:** Increases learner engagement and participation by actively involving them in the learning process.

- **Retention:** Improves retention of knowledge by providing opportunities for learners to articulate and discuss concepts with peers.

## Conclusion

By integrating Think-Pair-Share with the topic of automating testing for web applications, educators and trainers can create a dynamic and interactive learning experience. This approach not only enhances understanding and critical thinking but also prepares learners to apply their knowledge effectively in real-world scenarios. It fosters a collaborative learning environment where learners can learn from each other's experiences and perspectives, ultimately strengthening their skills in automating testing for web applications.

- The students were asked to discuss their group members and asked some doubts from the course instructor as shown in Figure 1-2.
- Finally, the one representatives from team1 (Gomathi iii Year) shown in Figure 3-5. From team2 Kavinaya(iii year) presented their concepts and participated in the discussion.



Figure 1



Figure 2



Figure 3



Figure 4



Figure 5

**Outcomes:**

- This activity increased attentiveness in the class and also improves the students' skill of critical analysis of the topics.
- This activity made the students to understand the topic clearly.

**Relevance to POs**

Course outcome	PO1	PO2	PO3	PO4	PO5	PO6	P07	P08	PO9	P10	P11	P12
04	3	3	3					3	2	2		3

**Reflective Critique:**

**Challenges**

- Some students are not interested to participate in the activity.
- Students found the activity helpful to get clarity on the topic especially when they combine and discuss.

**Initiatives to address the problem:**

- Several university questions were shown and discussed to the students about the weightage for simple code generation.
- Make the students to know the impact and importance of sharing their views and understanding related to the topic and made them involve in the activity.

## Post-implementation

- Students were actively participated in this activity.
- From this activity, the students can get more clarity in the Simple code Generation by discussing and sharing their views with the other students in the class.
- The various representations of the Simple code Generation were again explained for their better understanding.

## References:

### Books

1. **"Selenium WebDriver Recipes in Python: The problem-solving guide to Selenium WebDriver in Python"** by Zhimin Zhan
  - Focuses on practical solutions and recipes for using Selenium WebDriver in Python for automated web testing.
2. **"Test Automation using Selenium WebDriver with Java: Step by Step Guide"** by Mr. Navneesh Garg
  - A comprehensive guide on using Selenium WebDriver with Java for automating web application testing.
3. **"Automated Software Testing: Introduction, Management, and Performance"** by Elfriede Dustin, Jeff Rashka, and John Paul
  - Covers automated testing principles, strategies, and tools, including considerations specific to web applications.

### Articles and Journals

1. **Selenium Official Documentation**
  - Provides comprehensive documentation, guides, and API references for Selenium WebDriver, a widely used tool for web automation.
  - SeleniumHQ
2. **Cypress Documentation**
  - Offers documentation and guides for Cypress, a modern JavaScript-based testing framework for web applications.
  - [Cypress Documentation

### 3. Test Automation University

- Offers free courses on various aspects of test automation, including web testing with tools like Selenium and Cypress.
- Test Automation University

### 4. Martin Fowler's Blog on Continuous Integration and Testing

- Provides articles and insights into best practices for automated testing, continuous integration, and testing strategies.
- Martin Fowler's Blog

## Online Resources

### Guru99 Selenium Tutorial

- Provides tutorials, articles, and videos on Selenium WebDriver and test automation techniques for web applications.
- Guru99 Selenium Tutorial

### 2. LambdaTest Blog

- Offers articles and guides on cross-browser testing, Selenium automation, and best practices for web application testing.
- LambdaTest Blog

### 3. AppliTools Blog

- Covers topics related to visual testing, UI automation, and best practices for modern web testing.
- AppliTools Blog

## Academic Papers and Research

### 1. IEEE Xplore Digital Library

- Provides access to research papers and articles on automated testing, software quality assurance, and related topics.
- [IEEE Xplore](#)

### 2. ACM Digital Library

- Offers research articles and papers on software engineering, including automated testing techniques and methodologies.
- ACM Digital Library

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