

Innovative Teaching and Learning Practices

Innovative Teaching Approaches in Object Oriented Programming in Java

Name of Faculty Member(s): Varsha R. Dange

Department: Information Technology

Course: OOP [CS2218]

Semester/Year: 23-24

2. Objective of the Practice

The main objective is to enhance students' understanding of Object Oriented Programming through interactive learning techniques and give them practical exposure by conducting Gaming Quizzes, Close Test.

Specific Objectives:

1. To improve the conceptual understanding OOP.
 2. To develop practical skills in Java programming.
 3. To apply theoretical knowledge to real-world application.
-

3. Description of the Practice

Context:

There was a growing need for students to apply theoretical knowledge in practical situations, especially in Object-Oriented Programming (OOP) with Java, where real-world applications often involve complex system designs and problem-solving. Traditional lectures were insufficient for capturing the dynamic and flexible nature of OOP concepts, leading to the introduction of innovative methods for hands-on learning and implementation.

Methodology:

- **Competitive programming platform: HackerRank, Leetcode ,Codeninja**

Working on problem statements from competitive programming platforms like HackerRank and CodeNinja for Java enables students to refine their coding skills, improve problem-solving abilities, and deepen their understanding of algorithms and data structures.

Hackerrank profile: <https://www.hackerrank.com/profile/apoorvavpendse>

Leetcode : <https://leetcode.com/u/rugved0102/>



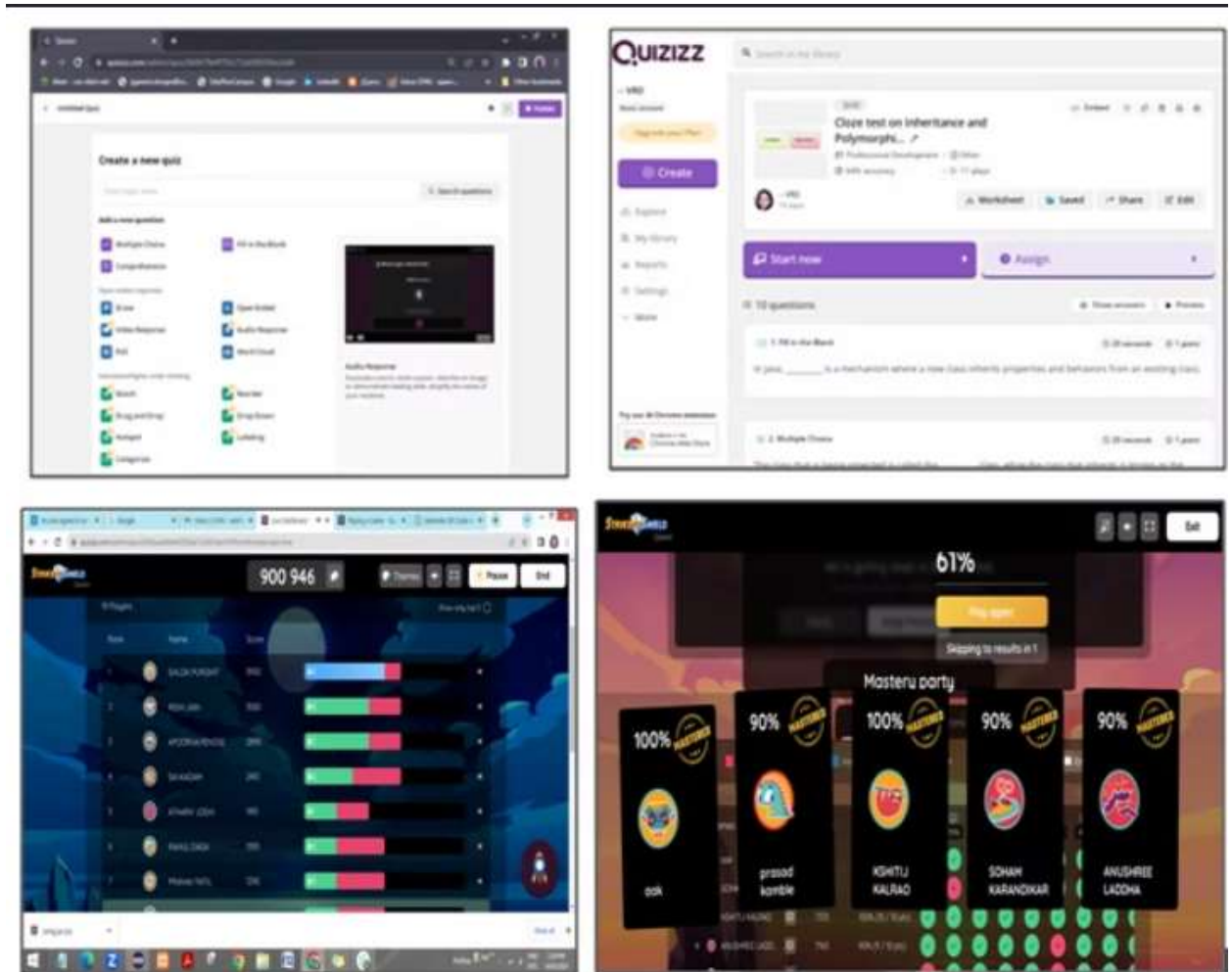
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- **Gaming Quiz based on the concept of Interface and Polymorphism :**

A gaming quiz based on the concepts of Interface and Polymorphism helps students reinforce their understanding of these key object-oriented programming principles in an engaging way. It encourages critical thinking,

improves problem-solving skills, and makes learning interactive and fun, which leads to better retention of the concepts.



- **Close Test on Java String :**

A cloze test on Java Strings helps students enhance their coding accuracy, reinforces their understanding of string manipulation methods, and improves their ability to solve real-world programming problems. It encourages attention to detail and strengthens their grasp of string-related concepts in Java.

- **Hands-on Projects:** Students are assigned to design and implement a Real world problem for a hypothetical company. They work in teams and present their work along with expected result..

- **Application Simulations:** IDE tools like VSCODE, Eclipse and IntelliJ for Java and Tools like MySQL Workbench and MongoDB are used for running real-time applications and experiments.

Duration:

The practice is implemented over the entire semester, with specific milestones for projects and periodic assessments for practical skills.

Resources Required: VSCODE, Eclipse Or IntelliJ

Stakeholders Involved:

- **Students:** Engage in hands-on learning and projects.
 - **Faculty:** Guide students through theoretical concepts and practical applications.
 - **Industry Partners:** Provided the time to time suggestions to the students regarding their projects.
-

4. Outcomes and Impact

Learning Outcomes:

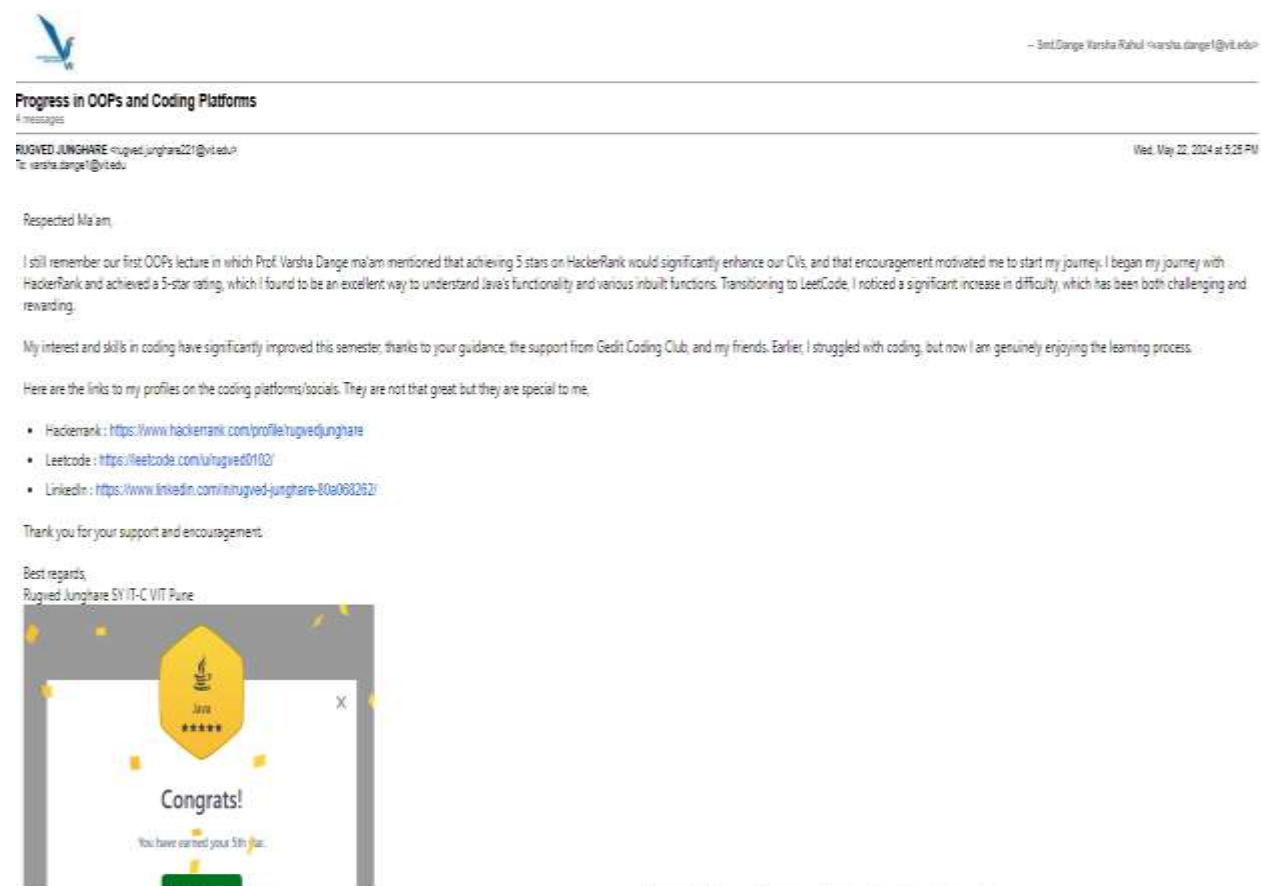
- **Better Problem-Solving Skills:** Students learn to think critically and tackle difficult problems through hands-on activities.
- **Stronger Understanding of Concepts:** Quizzes and tests help students grasp important topics like interfaces, polymorphism, and Java strings more effectively.
- **Improved Coding Skills:** Working on coding challenges on platforms like HackerRank and Leetcode makes students better and faster at writing code.
- **Ready for Job Interviews:** These activities prepare students for technical interviews by boosting their problem-solving speed and confidence in coding.
- **More Engagement:** Fun and interactive learning methods keep students interested and help them remember what they learn.
- **Growth Mindset:** The competitive environment encourages students to keep learning and improving, which is crucial for success in programming careers.

These outcomes are measured through project evaluations, lab exams, and practical demonstrations of Java Programming.

Student Feedback:

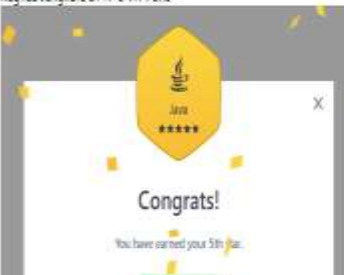
- **Engaging Learning:** Many students found the activities fun and engaging, which made learning more enjoyable.
- **Real-World Application:** Students appreciated how these activities helped them apply theoretical knowledge to practical situations.
- **Confidence Boost:** Participants reported feeling more confident in their coding skills and problem-solving abilities after completing the tasks.
- **Collaborative Learning:** Some students enjoyed working in teams during competitive programming, fostering collaboration and teamwork.

Student's Feedback :



The screenshot shows an email interface. At the top left is a logo of a bird in flight. At the top right, the sender is identified as "Smt. Dange Varsha Rahul" with the email address "varsha.dange1@vit.edu". The subject of the email is "Progress in OOPs and Coding Platforms". The recipient is "RUGVED JUNGHARE" with email "rugved.junghare221@vit.edu" and phone "91-98888-10000". The date and time are "Wed, May 22, 2024 at 5:28 PM".

The body of the email starts with "Respected Ma'am," followed by a paragraph expressing gratitude for the OOPs lecture and the motivation to start a coding journey on HackerRank, which led to a 5-star rating. It mentions the transition to LeetCode and the challenge and reward of that process. The sender lists their profiles on HackerRank, LeetCode, and LinkedIn with their respective URLs. The email concludes with "Thank you for your support and encouragement." and "Best regards, Rugved Junghare SY IT-C VIT Pune".



The bottom part of the screenshot shows a screenshot of a HackerRank achievement badge. The badge is yellow with a black border and features the HackerRank logo at the top. Below the logo, it says "Java" and "*****". In the center, it says "Congrats!" and at the bottom, "You have earned your 5th star!".



Hackerrank, leetcode progress

2 messages

APOORVA PENDSE <apoorva.pendse221@vit.edu>
To: varsha.dange1@vit.edu

Tue, May 21, 2024 at 12:03 PM

I started solving leetcode and hackerrank as per the advice given by varsha dange Ma'am which has positively impacted my problem solving skills as well as my general familiarity with Java, the Collection Framework as well OOP concepts.

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Leetcode profile: <https://leetcode.com/u/apoorvapendse/>



Impact on Learning:

- Enhanced engagement and interest in the subject.
- Improved performance in practical assignments compared to previous semesters.
- Greater understanding of the concepts .

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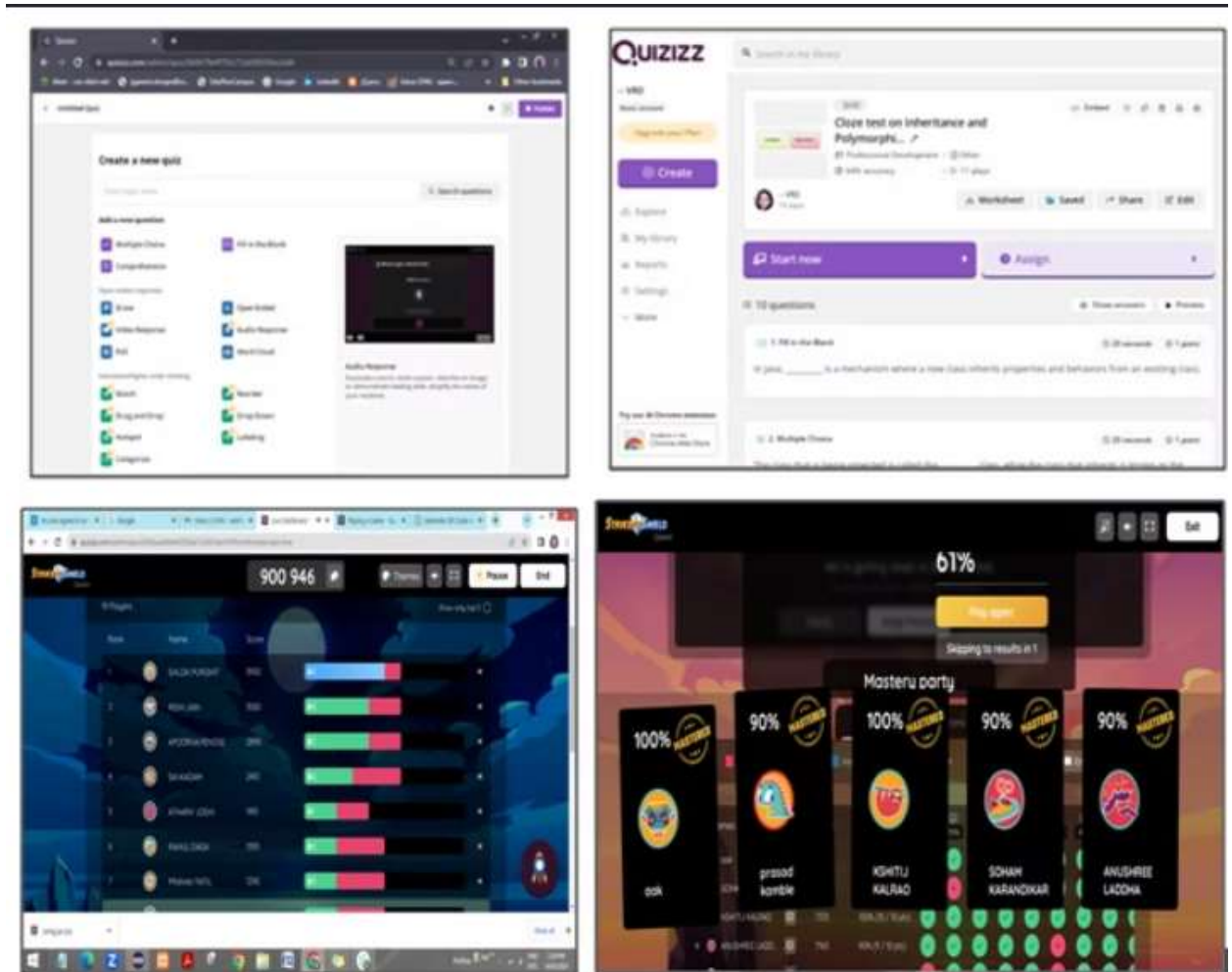
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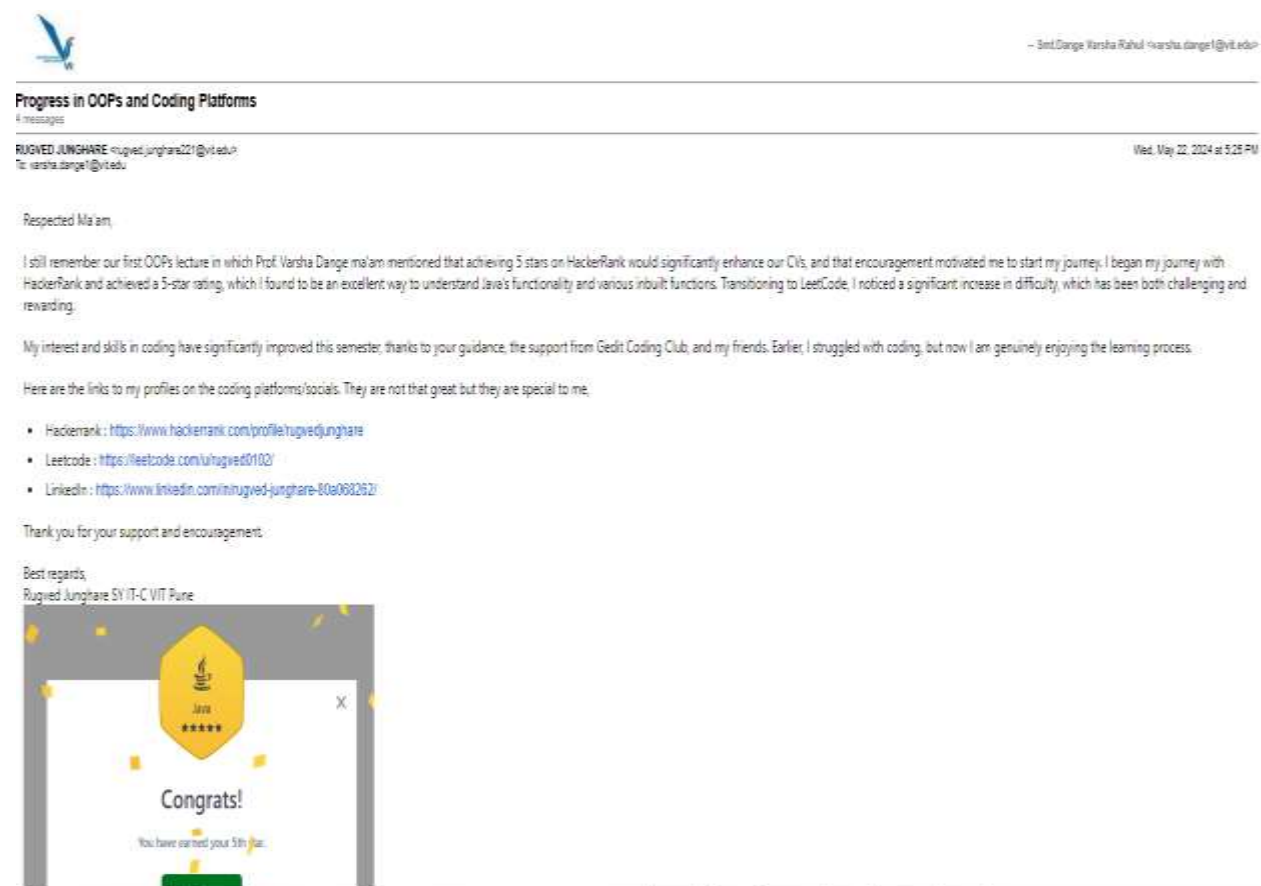
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 - Smt.Dange Varsha Rahul -varsha.dange1@vit.edu

Progress in OOPs and Coding Platforms
4 messages

RUGVED JUNGHARE <rugved.junghare221@vit.edu>
To: varsha.dange1@vit.edu Wed, May 22, 2024 at 5:28 PM

Respected Ma'am,

I still remember our first OOPs lecture in which Prof. Varsha Dange ma'am mentioned that achieving 5 stars on HackerRank would significantly enhance our CVs, and that encouragement motivated me to start my journey. I began my journey with HackerRank and achieved a 5-star rating, which I found to be an excellent way to understand Java's functionality and various inbuilt functions. Transitioning to LeetCode, I noticed a significant increase in difficulty, which has been both challenging and rewarding.


My interest and skills in coding have significantly improved this semester, thanks to your guidance, the support from Gedit Coding Club, and my friends. Earlier, I struggled with coding, but now I am genuinely enjoying the learning process.

Here are the links to my profiles on the coding platforms/socials. They are not that great but they are special to me.

- HackerRank : <https://www.hackerrank.com/profile/rugvedjunghare>
- LeetCode : <https://leetcode.com/u/rugved0102/>
- LinkedIn : <https://www.linkedin.com/in/rugved-junghare-60a068262/>

Thank you for your support and encouragement.

Best regards,
Rugved Junghare SY-IT-C-VIT Pune





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Peer review Feedback Link -

<https://docs.google.com/forms/d/1NFcPCiPLEMniwJZqiiG7q8YsUnyeaVCXOdaNw3Ydw5g/edit>