Department of Computer Science and Engineering

Academic Year 2024 – 2025 (Even Semester)

Degree, Semester & Branch: IV Semester B.E. CSE-A

Course Code & Title: CS3452 Theory of Computation

Name of the Faculty member (s): Mrs.S.Manjula

Innovative Practice Description

Unit / Topic: Unit I / Minimization of DFAs

Course Outcome: CO 1

Topic Learning Outcome: TLO 4

Activity Chosen: Peer-Led Learning Approach

Justification:

- Peer-led learning is a teaching method where students learn by teaching and helping each other. It encourages teamwork, improves understanding, and boosts confidence in a subject. By explaining topics to their peers, students strengthen their own knowledge, develop communication skills, and gain deeper insights. In this approach, the teacher acts as a guide, supporting students while allowing them to explore and discuss ideas independently.
- Minimization of Finite Automata is important because larger automata cost more. Furthermore, different authors approach the issue of reducing the number of states in different ways. As a result, this topic is critical, and many people will make mistakes in solving it. To address the issue, a video lecture was created and posted on the department's YouTube channel, and the students were instructed to watch the video (https://youtu.be/IqoGcGk2m5o). It helps students in making concepts more interesting and motivating them to learn more about a specific topic.
- **Time Allotted for the Activity:** 50 minutes

Details of the Implementation:

- **Pre-Learning Activity:**

  A video lecture on DFA minimization was uploaded to the department's YouTube channel (https://youtu.be/IqoGcGk2m5o). Students were instructed to watch the video in advance to gain preliminary knowledge and come prepared for discussions.
- **Classroom Activity:**

  The session began with an introduction to Peer-led learning, emphasizing its importance in problem-based learning. The instructor highlighted that students would take an active role in solving problems and explaining concepts to their peers.

- **Student-Led Problem Solving:**
  - Students S.M.Diliban (953623104027) and N.Harish (953623104035) collaboratively solved a DFA minimization problem using the Table-Filling Algorithm.
  - S.M.Diliban first explained how DFA simplification is achieved by removing unreachable and dead states.
  - He then constructed an equivalence table on the whiteboard, guiding his peers through the process.
  - N. Harish solved the problem by identifying all pairs and explaining when to mark and when not to mark.
- **Consolidation of Learning:**

  After the student presentations, the instructor summarized key concepts, addressed misconceptions, and provided additional insights. Peer discussions helped reinforce difficult concepts, making learning more engaging and effective.

CO – PO / PSO mapping:

CO	PO1	PO2	PO3	PO4	PO9	PO10	PSO1
CO 1	2	2	2	1	1	1	1

(1 – Low 2 – Moderate 3 – High)

PO / PSO mapped:

Innovative practice	PO1	PO2	PO3	PO4	PO9	PO10	PSO1
	2	2	2	1	1	1	1
Justification for correlation	Applied basic knowledge of Finite Automata in mathematical modeling	Analyzed complex engineering problems using automata models.	Designed Finite Automata (FA).	Developed the appropriate DFA and Minimized DFA for the given DFA.	Worked as an individual.	Communicated effectively on complex engineering activities.	To design the FA, students will be able to develop various software components in the future.

- **Images / Screenshot of the practice:**

Figure 1: Discussion of Minimization of DFA by S.M.Diliban (953623104027) & N.Harish (953623104035)

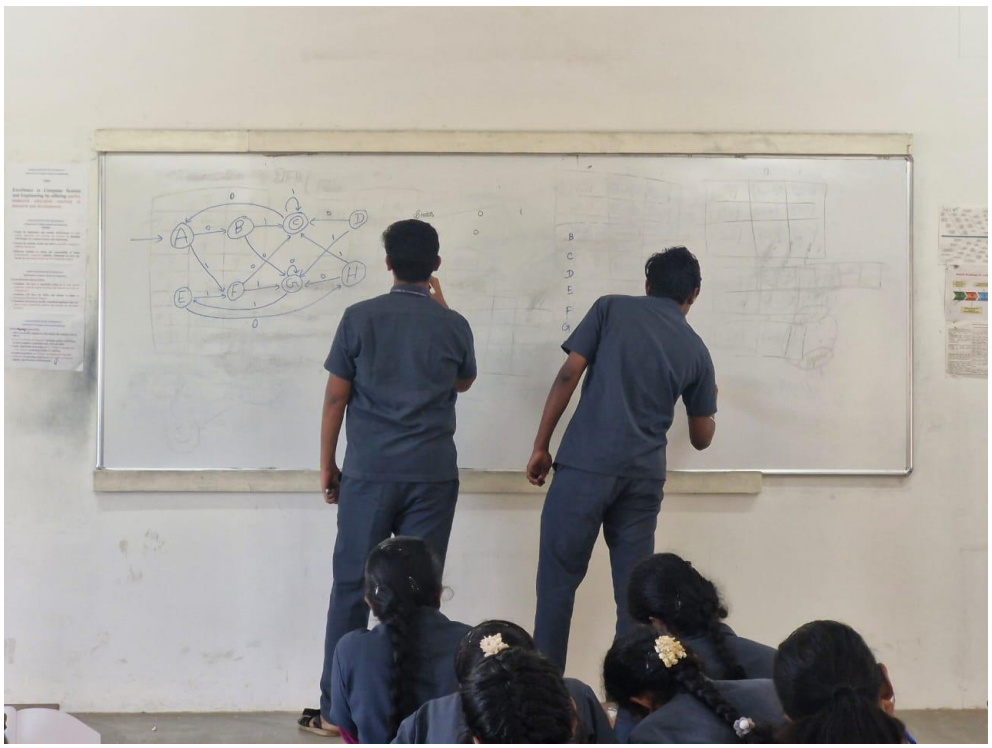

Figure 2: Solution to Minimization of DFA by S.M.Diliban (953623104027) & N.Harish (953623104035)

Reflective Critique:

- ***Feedback of practice from students and other stakeholders:***

  o Students said that the activity was useful for finding out how well they understood the idea.

  o The majority of the students thought that this activity gave them knowledge in handling the minimization problem.

  o Students indicated to the teacher that the exercise encourages students to study independently, clear up any questions, and share ideas with their classmates.

- ***Benefit of the practice:***

  - This activity helped the student to analyze their performance of problem solving with others and it also induces the student to do problem daily.
  - The approach fostered self-directed learning, ensuring that students took ownership of their learning process.
  - This activity encouraged the students to share their knowledge with others.
  - From this activity, the students can get more clarity in the particular topic.

- ***Challenges faced in implementation:***

  - With the exception of a few students, the majority of the students actively participated.
  - Effectively motivate students who are not participating in the activity by addressing the benefits of self-learning.

References:

1. https://www.ishcmc.com/news-and-blog/peer-led-learning/
2. tips/developing-assignments/cross-discipline-skills/teaching-problem-solving-skills
3. https://k12.thoughtfullearning.com/blogpost/teaching-innovation-and-problem-solving
4. https://www.ritrjpm.ac.in/images/computer-science/35.CS8501_Learningbydoing.pdf
5. https://flearningstudio.com/pros-and-cons-of-animated-educational-videos/
6. https://uwaterloo.ca/centre-for-teaching-excellence/teaching-resources/teaching