



# RAMCO INSTITUTE OF TECHNOLOGY

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## Department of Computer Science and Engineering

Academic Year 2022 – 2023 (Even Semester)

**Degree, Semester & Branch:** IV Semester B.E. CSE

**Course Code & Title:** CS3452 Theory of Computation

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

### Innovative Practice Description

**Unit / Topic:** Unit I / Problems in Conversion of NFA into DFA and minimization of FA

**Course Outcome:** CO 1

**Topic Learning Outcome:** TLO 3 & 4

**Activity Chosen:** Video Lecture and Learning by Doing

#### Justification:

- Learning by Doing is an educational approach to problem-based learning. Conversion of NFA into DFA is the important topic in unit 1 and students need to have clear idea for the conversion. To make the students more familiar in the conversion the practice problems were given in the class. The students solved themselves and discuss the same to in front of the class.
- 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 10 days before the actual lecture, 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:

- The students were informed about the event, and a video lecture was posted 10 days in advance so that they could contribute enough time to learning the subject.
- Instructor explained the important of Learning by Doing to the students and informed the students about it is an educational approach to problem-based learning.
- A student was chosen at random to solve the problem on the board using any of the teaching aids.
- Jayasri P of this class solved the Conversion of NFA to DFA and explained the step by step solution to entire class.
- Balaji S and Vishnu A solved the problem of minimizing the given DFA using the Table filling algorithm.

- First, Vishnu A explained how DFA has been simplified by eliminating unreachable and dead states. Then, on the white board, the construction of an equivalence table for the given DFA was explained.
- Finally, the instructor consolidated the information that was discussed in this activity.
- This assisted the students to learn self and answering questions about the topic with ease.

**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
<b>Justification for correlation</b>	To apply basic Knowledge on Finite automata in mathematical modeling.	To analyze complex engineering problems using automata models	To design Finite Automata (FA)	To design the appropriate DFA and Minimized DFA for the given DFA	To work as an individual	To Communicate effectively on complex engineering activities	To design the FA, students will be able to develop various software components

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



**Figure 1: Discussion of NFA to DFA conversion by Jayasri P**



*Figure 2: Solution to Minimization of DFA by Balaji S & Vishnu A*

**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.
- Students spent their time in self-learning.
- 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. tips/developing-assignments/cross-discipline-skills/teaching-problem-solving-skills
2. <https://k12.thoughtfullearning.com/blogpost/teaching-innovation-and-problem-solving>
3. [https://www.ritrjpm.ac.in/images/computer-science/35.CS8501\\_Learningbydoing.pdf](https://www.ritrjpm.ac.in/images/computer-science/35.CS8501_Learningbydoing.pdf)
4. <https://flearningstudio.com/pros-and-cons-of-animated-educational-videos/>
5. <https://uwaterloo.ca/centre-for-teaching-excellence/teaching-resources/teaching>