23 PCIT 304 Discrete Mathematics

Date: 26/08/2024

Activity Title: "Logic in Action: Automating Decisions"

Objective:

The purpose of this activity was to engage second-year engineering students in the application of propositional logic to real-world scenarios. By analyzing and constructing logical expressions based on given conditions, students enhanced their critical thinking and problem-solving skills while understanding the importance of logic in computer systems.

Overview of Activities:

1. **Introduction to Propositional Logic**:
   - A brief lecture on the principles of propositional logic, including logical operators (AND, OR, NOT) and how they can be used to model decision-making processes.
2. **Example Scenarios**:
   - Two scenarios were presented to the students, each accompanied by a logical expression. Students were encouraged to analyze these scenarios and understand how logical conditions can lead to specific outcomes.
   - **Example 1: Automated Email Filtering System**
     - **Scenario**: An email is marked as spam based on certain conditions related to the sender, subject, and attachments.
     - **Logical Expression**: $S = (\neg C \wedge K) \vee (A \wedge \neg V)$
     - **Discussion Points**:
       - Breakdown of each variable and condition.
       - Real-world implications of spam filtering systems.
   - **Example 2: Cloud Storage Synchronization**
     - **Scenario**: A file is synchronized based on modification status and user settings.
     - **Logical Expression**: $S = (M \wedge \neg R) \vee A$
     - **Discussion Points**:
       - Importance of synchronization in data management.
       - How the logical expression reflects user preferences and system states.
3. **Group Activity**:
   - Students were divided into small groups and tasked with designing their own systems using propositional logic. Each group created a scenario, defined variables, and formulated a logical expression.
   - Groups presented their scenarios and logical expressions to the class, fostering collaborative learning and peer feedback.
4. **Conclusion**:

○ A wrap-up discussion emphasized the relevance of propositional logic in engineering and computer science, encouraging students to think about how logic underpins software design and system architecture.

Impact:

- Students demonstrated an improved understanding of propositional logic and its applications.
- The collaborative group work facilitated teamwork and enhanced communication skills.
- Presentations fostered public speaking and critical thinking as students evaluated each other's work.

Photos:
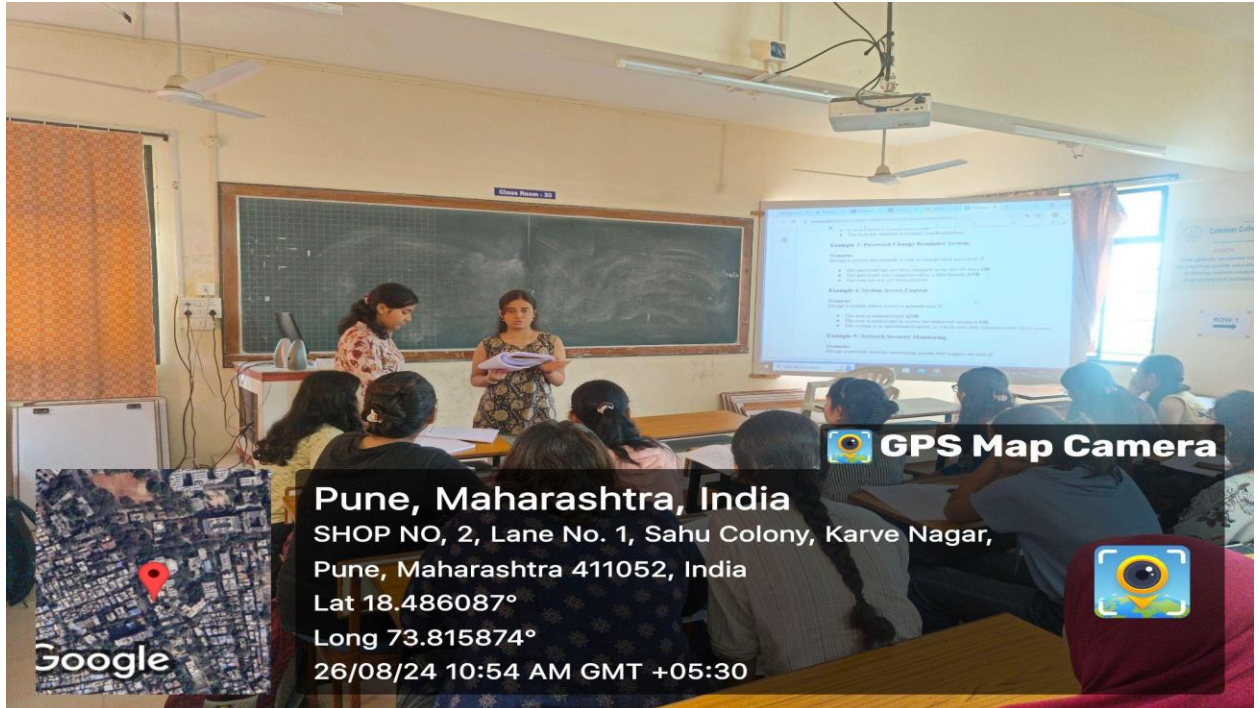
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