



A Lesson Plan for Teaching Boolean Expressions Minimisation

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ABSTRACT

In this poster we present a two-hour lesson plan, which can be used in teaching and learning minimisation of Boolean expressions in a practical way. The lesson plan incorporates a variety of learning activities including hands-on, brainstorming, lecturing, and worksheets. The hands-on activity is based on the use of a software package named Quine-McCluskey (Q-M) implementation. The plan is due to be tested and evaluated.

1. INTRODUCTION

In this poster we present a detailed lesson plan (two-hour session), which can be used in teaching and learning minimisation of Boolean expressions in a more practical way.

Q-M algorithm is an attractive solution for simplifying complex Boolean expressions because it can handle variables of any length. The Q-M algorithm has been implemented in C language under MS Windows which can be used as a teaching and learning tool for both students and lecturers for simplifying as well as verifying (interactively and visually) results of Boolean expressions minimisation (Sarkar and *et al.* 2001). The learning outcomes focus on learning Q-M algorithm as well as use of software tool for verifying results of Boolean expression minimisation. The lesson plan incorporates a number of resources and classroom activities including revision of Boolean expressions, brainstorming, teaching, example, worksheet, demonstration of software package and use of the package to verify the worksheet exercises. The learning outcome is presented first, then resources for the lesson plan are outlined. Classroom activities are described followed by a brief conclusion.

2. LEARNING OUTCOMES

By the end of this session students will be able

Outline steps in minimisation of Boolean expressions using Q-M algorithm; Use software tool to verify minimisation of complex Boolean expressions.

3. RESOURCES

The following resources are required to execute the lesson plan:

Data Show; Computer Laboratory; Whiteboard; Software Package; Worksheets.

4. LESSON PLAN

The following activities can be conducted in the classroom to teach minimisation of Boolean expressions effectively.

10 min. - Revision of Boolean expressions; 5 min. - Brain storming (ask the class what they know about Boolean expressions, minimisation, etc.); 15 min. - Explain Q-M algorithm; 5 min. - Q-M software demonstration; 15 min. - Solve workout/example problem; 10 min. - Break; 20 min. - Worksheet Exercises (ask the class to work in pairs and solve worksheet exercises); 20 min. - Use software package and verify results of minimisation (worksheet exercises); 10 min. - Conclusion and checking learning outcomes.

5. CONCLUSION

It is believed that the incorporation of the theoretical solution with practical verification has a significant impact on the enhancement of student learning. However, the lesson plan has yet to be tested, so the final conclusions about the effectiveness of the lesson will follow from class evaluations both by students and tutors.

REFERENCES

Sarkar, N., Petrus, K., and Hossain, H. (2001). "Software Implementation of the Quine-McCluskey Algorithm for Logic Gate Minimisation." 14th National Advisory Committee on Computing Qualifications Annual Conference, Napier.

