Additional Problems

Homework 6 Supplement

Time complexity of Quine McCluskey

1. For problem 4.25(c), how many comparisons were made during the execution of Quine McCluskey?

2. Let $f(x, y, z)$ be a three-variable Boolean function and let $g(w, x, y, z)$ be a four-variable Boolean function. Is it possible, for some setting of f and g that running Quine-McCluskey on g will require less comparisons than running Quine-McCluskey on f? Justify your answer.

3. What is the maximum number of comparisons that will be made by Quine McCluskey when finding the prime implicants of some three-variable Boolean function $f(x, y, z)$? What function $f(x, y, z)$ achieves this maximum? Justify your answer.

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Consider the Prime Implicant table of a *complete, 4-variable* function *before* any simplifications have been made.

1. For which $N \in \{1, \dots, 16\}$ is it possible that exactly N number of X's appear in a single row of the table? Justify your answer.

2. What is the maximum number of X's that can appear in a single column of the table? Justify your answer.