Weekly Challenge 01: LaTeX practice and logic puzzles

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CS/MATH 113 Discrete Mathematics
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1. **Everythings on the table**
   Draw the truth table of the implication operator.

2. **Math is fun ahh**
   In your past mathematical courses you have come across various mathematical theorems. Formally state a mathematical theorem that you like. Also briefly talk about why you chose this theorem and what you like about this theorem.

3. **How about them apples?**

   The replicator aboard USS Enterprise has developed a fault—synthesized apples have insufficient nutrition but are otherwise identical to regular apples. Doctor Beverly Crusher is on the case. Scanning a bunch of apples, her tricorder can indicate if the bunch contains any faulty apples, but it cannot identify them.

   Dr. Crusher is investigating a bunch of 12 apples out of which, 1 is known to be faulty. Describe how she can identify the faulty apple in no more than 4 tricorder scans. Furthermore, what is the minimum number of scans that Dr. Crusher needs to perform in order to guarantee finding the single faulty apple in a bunch of size n? Justify your answer.