

LGIC 010 & PHIL 005

Problem Set 2

Spring Term, 2014

1. (25 points) How long a list of truth-functional schemata involving only the sentence letters “ p ,” “ q ,” and “ r ” can you write down so that no two schemata on the list are equivalent and every schema on the list implies “ $(p \equiv q) \vee (p \equiv r)$ ”?

2. (25 points) How long a list of truth-functional schemata involving only the sentence letters “ p_1 ,” “ p_2 ,” \dots , “ p_9 ” can you write down so that each schema on the list implies, but is not implied by, the schema following it?

3. (25 points) We introduce the following terminology for the purpose of this problem.
 - A list of truth-functional schemata is *succinct* if and only if no two schemata on the list are equivalent.
 - A truth-functional schema *implies a list of schemata* if and only if it implies every schema on the list.
 - A truth-functional schema is a *trireme* if and only if the longest succinct list of schemata involving only the sentence letters “ p ,” “ q ,” and “ r ” it implies has length 32.

How long a list of triremes involving only the sentence letters “ p ,” “ q ,” and “ r ” can you write down so that no schema on your list implies any other schema on your list?

4. (25 points) How long a list of truth-functional schemata involving only the sentence letters “ p ” and “ q ” can you write down so that no two schemata on the list are equivalent and each schema on the list neither implies nor is implied by “ $p \vee q$ ”?