# A DIAGRAMMATIC TREATMENT OF SYLLOGISTIC

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In this paper a method of diagramming subject-predicate propositions, using directed graphs, is presented. By means of the diagrams, all logical consequences of an arbitrary finite set of propositions (of the appropriate form) can be read off. A simple calculation yields the number of valid moods of the n-termed syllogism (sorites).

1. Throughout, we are concerned only with propositions of the forms A, E, I and O, without complex, negative, or empty terms. Each proposition is construed as asserting a relation between two entities of the same type. Thus—if the terms are taken to represent (non-void) *classes*—Aab says that a is a subclass of b, Eab that a and b are disjoint, Iab that a and b have a common subclass, and Oab that a has a subclass which is disjoint from b. The class-interpretation is not essential, however; all that is strictly required is that the entities in question (i.e. whatever is denoted by the terms) should form a quasi-ordered set without zero.

Let R be a finite set of propositions, T the set of terms occurring in propositions of R. R may be represented by a directed graph (with slight additions), as follows. For each term in T, a point is taken as vertex of the graph (with distinct vertices assigned to distinct terms); the vertex assigned to a term a will be described simply as "the vertex a." To each such vertex is attached a loop, i.e. an arc leading from the vertex to itself. Consider now a proposition belonging to R. If the proposition is Aab, we insert in the graph an arc leading from the vertex b to the vertex a. If the proposition is Eab, we insert an 'interrupted arc' between the vertices a, b:
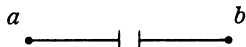
For Iab, we introduce a new vertex x, together with arcs leading from a to x and from b to x. Lastly, if the proposition is Oab, we introduce a new vertex x, a (directed) arc leading from a to x, and an interrupted arc between x and b. This procedure is repeated for each proposition of R in turn, subject to the restriction that all the new vertices introduced in