AN AID TO VENN DIAGRAMS

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The following technique has proven effective in helping beginning logic students locate the sections of a three-circled Venn Diagram in which they are to represent a categorical sentence. Very often theses students are unable to identify the parts of the diagram they are to shade or bar. (My practice is to shade sections for universals and for particulars to draw bars across borders—lines between sections—unless one of the sections is already shaded, in which case an x is to be placed in the unshaded section.)

Given any categorical sentence, begin by writing the four numbers of its subject circles regions, followed by the predicate circle's region numbers. Cross out the two numbers that have been written twice (in effect, marking the intersection of the circles). Circle the numbers of the subject circle that have not been crossed (thereby distinguishing the sections of it that are not within the predicate circle).

Proceed to diagram the sentence according to the following rules:

A. If of type A, shade the regions whose numbers are circles.

E. If of type E, shade the regions whose numbers are crossed.

I. If of type I, draw a bar across the border of the regions whose numbers are crossed unless one them is shaded, in which case place an x in the unshaded region.

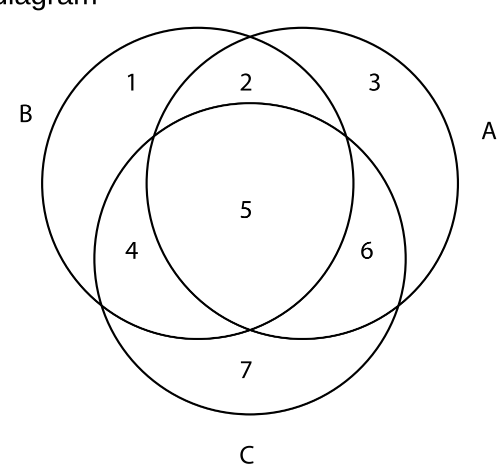
O. If of type of O, draw a bar across the border of the regions whose numbers are circles unless one of them is shaded, in which case place an x in the unshaded region.

Applying this procedure to proof construction is straightforward. One is to diagram as above the premises of the argument and then look to see whether or not the conclusion is also represented. The argument is valid if it is. Again, if one is unable to make this determination one may appeal to the above method to see how the diagram would look had the premises provided the conclusion.

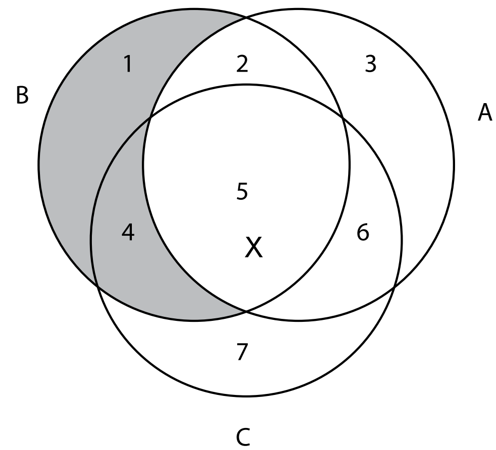
Here is an example of how it works. Consider Darii:

1. All B is A
2. Some C is B
3. ∴ Some C is A.

Given the following Venn diagram



1's subject circles region numbers are 1, 2, 4, and 5; its predicate circles are 2, 3, 5, and 6. Thus, 2 and 5 should be crossed while 1 and 4 are circled. 1 is an A-type sentence; so, by rule A, regions 1 and 4 should be shaded. 2's subject circles region numbers are 4, 5, 6, and 7; its predicate circles are 1, 2, 4, and 5. Thus, 4 and 5 should be crossed while 6 and 7 are circled. 2 is an I-type sentence so an x should be placed in 5 (since 4 is already shaded). The completed diagram should look like this:



The subject circle of Darii's conclusion has as its region numbers 4, 5, 6, and 7; its predicate circle has 2, 3, 5, and 6. Thus, 5 and 6 should be crossed while 4 and 7 are circled. 3 is an I-type sentence, so, by I, it would be represented on the diagram by an x in either 5 or 6. The diagram of the premises has provided this representation, indicating that the argument's conclusion is contained in its premises. Darii is thus shown to be valid.

The beauty of a Venn Diagram proof lies in its picturing of validity or invalidity, as the case may be. A step-by-step procedure for constructing such a picture comes as a relief to beginning students, allowing their instructor to proceed with points of logic (to her relief).

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