In ‘Students’ understandings of logical implication’. *Educational Studies in Mathematics*, (2002) 51, 3, 193-223.

fig 1 Question LA1:

In 'Students' understandings of logical implication'. *Educational Studies in Mathematics*, (2002) 51, 3, 193-223.

L1 Joe and Fred are thinking about the pair of numbers 3 and 1 1.

They notice that the SUM (3 + 11) is EVEN.

They notice that the PRODUCT (3 × 11) is ODD.

Joe says: If the SUM of two whole numbers is EVEN, their PRODUCT is ODD.

Fred says: If the PRODUCT of two whole numbers is ODD, their SUM is EVEN.

a) Are Joe's and Fred's statements saying the same thing? . . . . . .

b) The PRODUCT of two whole numbers is 1271.

Suppose Fred is right.

Which one of these must also be right? Tick (▤) one box.

☐ You can be sure that the SUM of the two numbers is EVEN.

☐ You can be sure that the SUM of the two numbers is ODD.

☐ You can't be sure whether the SUM is ODD or EVEN until you know what the two numbers are.

c) Is Joe's statement true? . . . . . .

Explain your answer .

d) Is Fred's statement true? . . . . . .

Explain your answer .

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fig 2 schematic diagram:

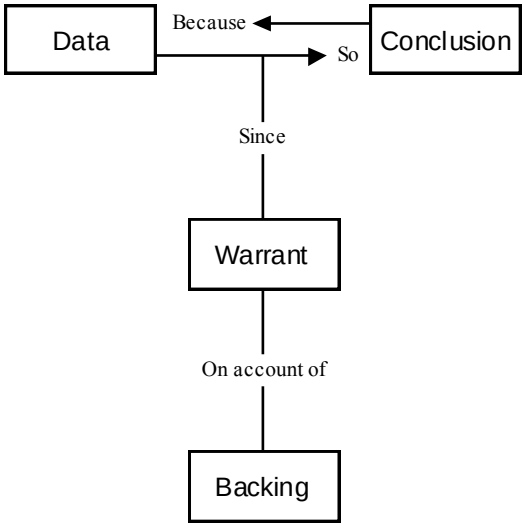

fig 3 type A:

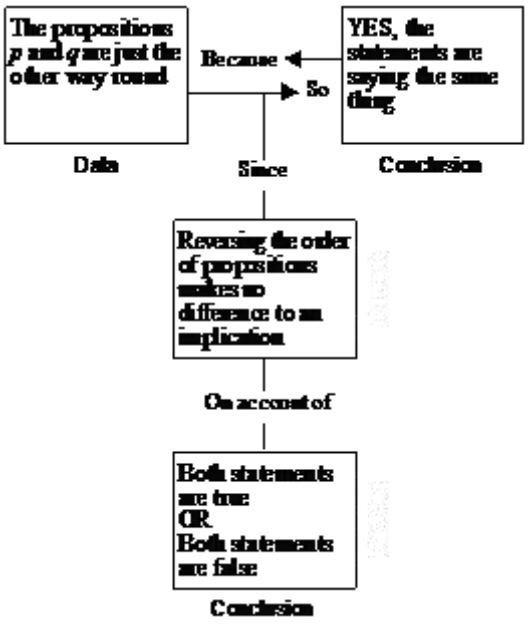

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fig 4 type B:

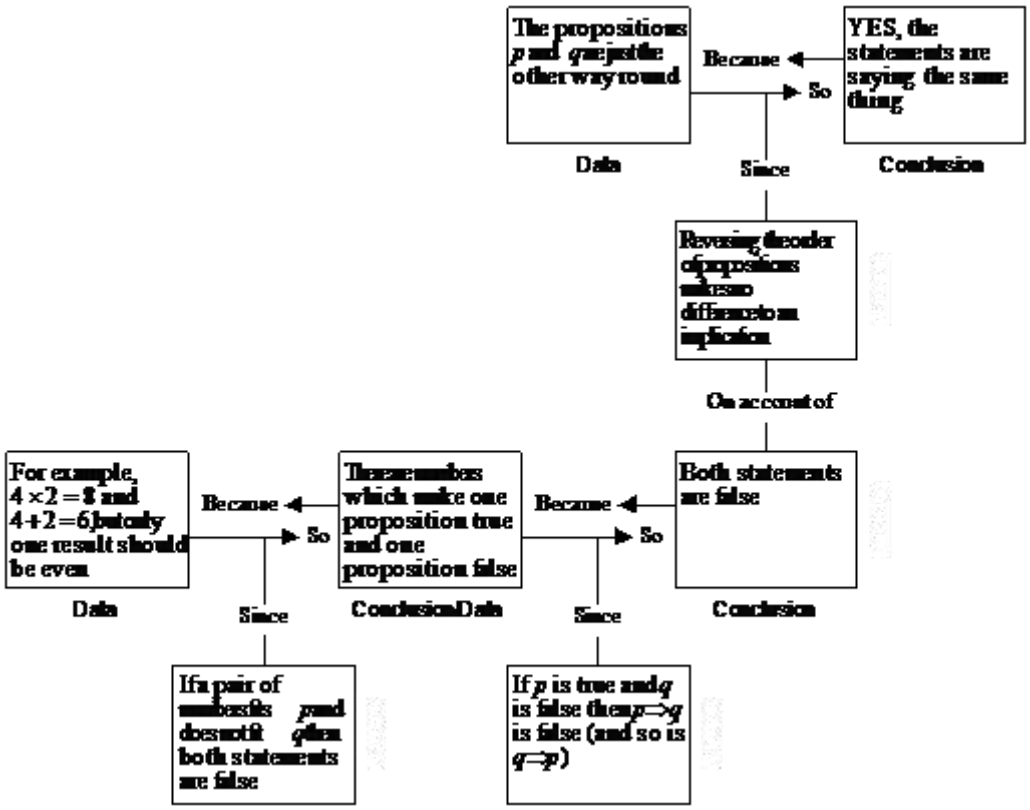

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fig 5 type C:

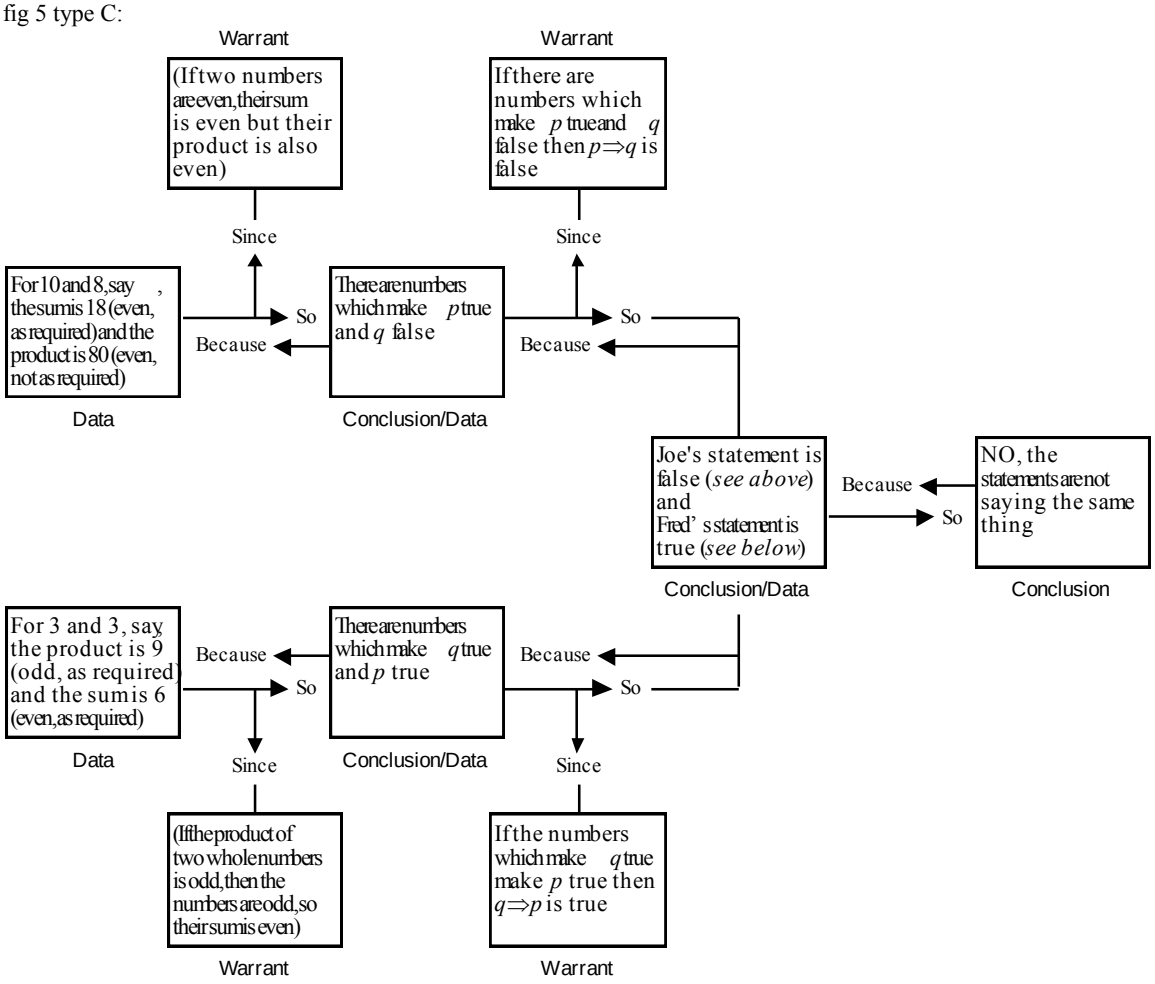
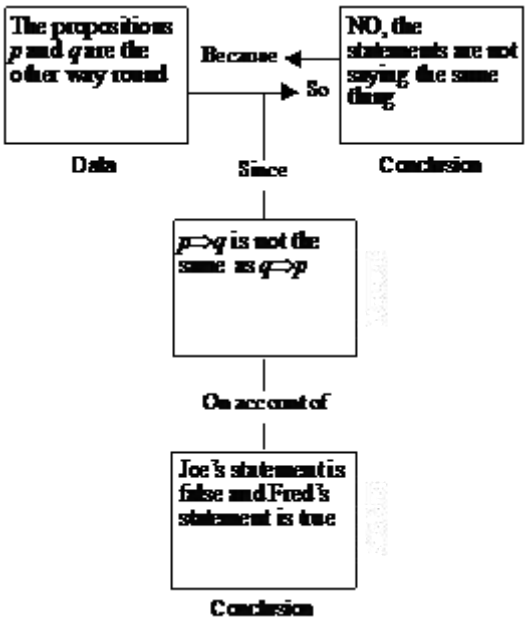


fig 6 type D:



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