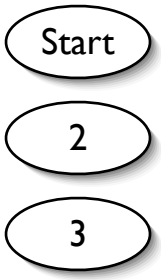
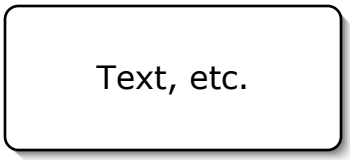
Legend:

State markers:

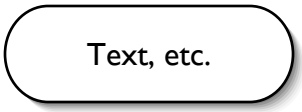


Main user visible content and interface:



Radio Button:

Button:



Correct move:

Incorrect move:

Incomplete move:

Navigational move:

Feedback content:

Start

Indicate whether the following argument is valid or invalid.

Start by classifying each row of the truth-table for the argument as either providing a counterexample, or not, using the buttons to the right of the table. Once all rows have been classified, click the appropriate button below to indicate whether or not the argument is valid.

$$\frac{P \leftrightarrow Q \qquad Q \leftrightarrow (R \rightarrow S)}{\therefore\ P \leftrightarrow (R \rightarrow S)}$$

P	Q	R	S	P ↔ Q	Q ↔ (R → S)	P ↔ (R → S)	Is this row a Counterexample?
t	t	t	t	t	t	t	○ Yes ○ No
t	t	t	f	t	f	f	○ Yes ○ No
t	t	f	t	t	t	t	○ Yes ○ No
t	t	f	f	t	t	t	○ Yes ○ No
t	f	t	t	f	f	t	○ Yes ○ No
t	f	t	f	f	t	f	○ Yes ○ No
t	f	f	t	f	f	t	○ Yes ○ No
t	f	f	f	f	f	t	○ Yes ○ No
f	t	t	t	f	t	f	○ Yes ○ No
f	t	t	f	f	f	t	○ Yes ○ No
f	t	f	t	f	t	f	○ Yes ○ No
f	t	f	f	f	t	f	○ Yes ○ No
f	f	t	t	t	f	f	○ Yes ○ No
f	f	t	f	t	t	t	○ Yes ○ No
f	f	f	t	t	f	f	○ Yes ○ No
f	f	f	f	t	f	f	○ Yes ○ No

Valid Invalid Hint

Valid → 2

Invalid → 3

The argument above is valid, and hence has no counterexamples.
All rows should be marked "no" to be correct.

2

Not all rows classified

You haven't classified all the rows in the truth-table yet.

All rows classified, some incorrectly

A truth-value assignment constitutes a counterexample to an argument only if that assignment makes all the premises true and the conclusion false. Any assignment on which a premise is false or on which the conclusion is true is thus not a counterexample. Check your classification of each row carefully, since you have misclassified at least one row.

All rows classified correctly

Argument is invalid

An invalid argument must have at least one counterexample.

Argument is valid

That's right.

3

Not all rows classified

You haven't classified all the rows in the truth-table yet.

All rows classified, some incorrectly

A truth-value assignment constitutes a counterexample to an argument only if that assignment makes all the premises true and the conclusion false. Any assignment on which a premise is false or on which the conclusion is true is thus not a counterexample. Check your classification of each row carefully, since you have misclassified at least one row.

All rows classified correctly

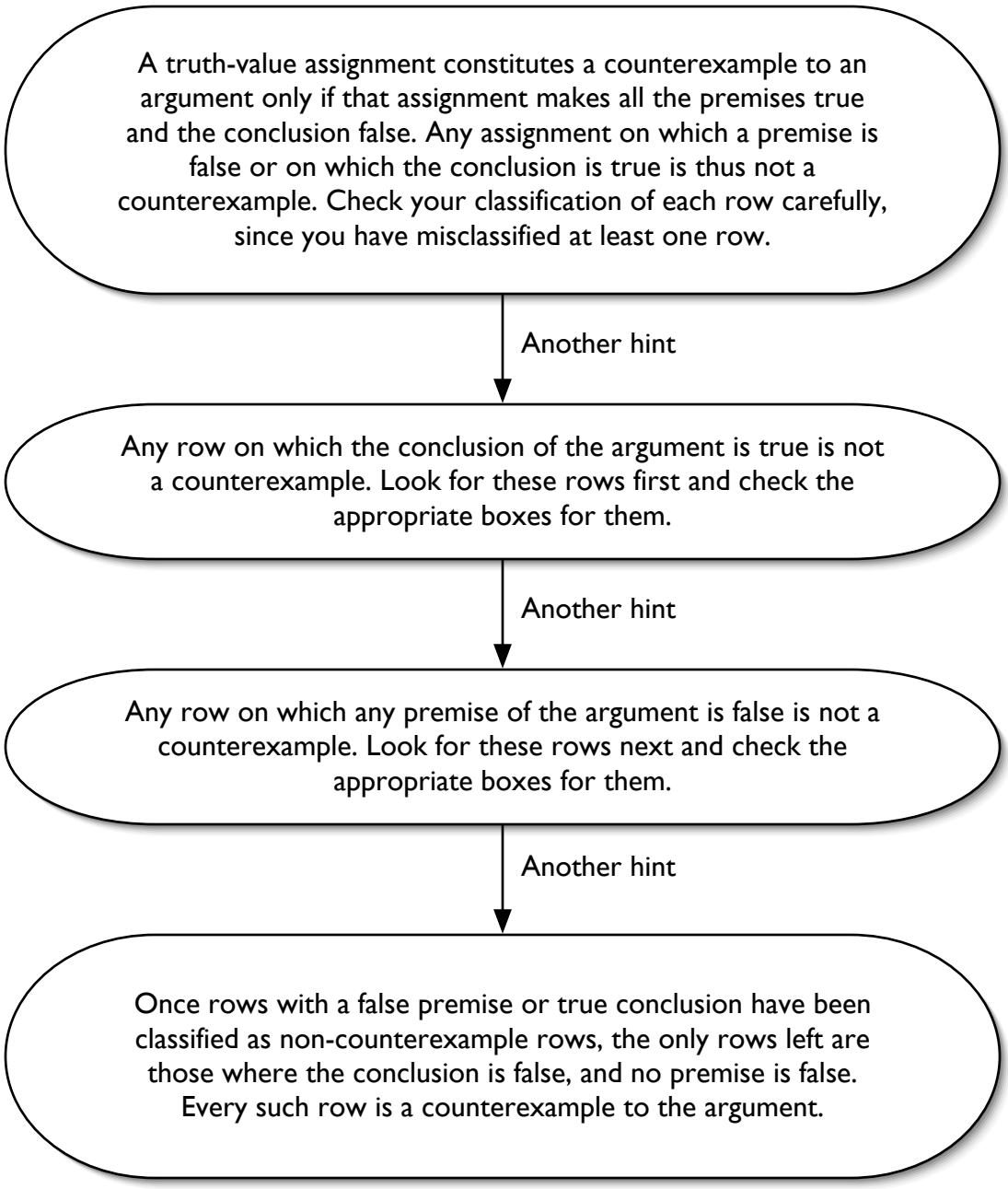
Argument is valid

A valid argument doesn't have any counterexamples.

Argument is invalid

That's right.

Hint


A truth-value assignment constitutes a counterexample to an argument only if that assignment makes all the premises true and the conclusion false. Any assignment on which a premise is false or on which the conclusion is true is thus not a counterexample. Check your classification of each row carefully, since you have misclassified at least one row.
Another hint
Any row on which the conclusion of the argument is true is not a counterexample. Look for these rows first and check the appropriate boxes for them.
Another hint
Any row on which any premise of the argument is false is not a counterexample. Look for these rows next and check the appropriate boxes for them.
Another hint
Once rows with a false premise or true conclusion have been classified as non-counterexample rows, the only rows left are those where the conclusion is false, and no premise is false. Every such row is a counterexample to the argument.