
Logic Puzzle 1

Whom to invite for the party:

- ▶ If you invite John, you must invite Paul.
- ▶ You must invite either Paul or Mary, but not both.
- ▶ You must invite either John or Mary or both.
- ▶ If you invite Mary, you must also invite John.

Solution with Truth Table

invite John	invite Paul	invite Mary
false	false	false
true	false	false
false	true	false
false	false	true
true	true	false
true	false	true
false	true	true
true	true	true

If you invite John, you must invite Paul.

invite John	invite Paul	invite Mary
false	false	false
true	false	false
false	true	false
false	false	true
true	true	false
true	false	true
false	true	true
true	true	true

You must invite either Paul or Mary, but not both.

invite John	invite Paul	invite Mary
false	false	false
true	false	false
false	true	false
false	false	true
true	true	false
true	false	true
false	true	true
true	true	true

You must invite either John or Mary or both.

invite John	invite Paul	invite Mary
false	false	false
true	false	false
false	true	false
false	false	true
true	true	false
true	false	true
false	true	true
true	true	true

If you invite Mary, you must also invite John.

invite John	invite Paul	invite Mary
false	false	false
true	false	false
false	true	false
false	false	true
true	true	false
true	false	true
false	true	true
true	true	true

The only possible solution is to invite John and Paul, but not Mary.

Logic Puzzle 2

Here's another party:

- ▶ You should not (not invite Charlie or not invite Susan).
- ▶ If you don't invite Diana, Mary will not come either.
- ▶ If you invite Susan, you should not invite (Paul or John).
- ▶ You should not invite Charlie or not invite Diana.

Logic Puzzle 2: Solution

In this case a truth table would have to be quite large because so many people are involved.

It is probably easier to apply De Morgan's law:

De Morgan's Law:

You should not (not invite Charlie or not invite Susan).

Is the same as

You should invite Charlie and invite Susan.

De Morgan's Law:

You should not invite Charlie or not invite Diana.

Is the same as

You should not invite (Charlie and Diana).

Therefore:

- ▶ You should invite Charlie and invite Susan.
- ▶ If you don't invite Diana, Mary will not come either.
- ▶ If you invite Susan, you should not invite (Paul or John).
- ▶ You should not invite (Charlie and Diana).

The first, fourth and second lines imply that implies Charlie must come; Diana cannot come; Mary cannot come.

The first and third lines imply that you should invite Susan, but not Paul and not John.