

Here is another problem a Hampden-Sydney professor gave me back in my college days.

A control panel consists of three on-off switches (X, Y, and Z) which must be changed from an initial setting to a second setting in accordance with the following rules:

Rule 1: If switch X is the only one on in the initial setting, then turn on switch Y.

Rule 2: If switches X and Y are the only ones on in the initial setting, then turn on switch Z.

Rule 3: If all three switches are on in the initial setting, then turn off switch Z.

Rule 4: For any other initial setting, turn on all switches that are off, and turn off any switches that are on.

1. If all three switches are on in the second setting, which of the following could have been the initial setting?
 - A. X on, Y on, Z on
 - B. X on, Y on, Z off
 - C. X on, Y off, Z off

2. If X is off in the second setting, which of the following must have been the initial setting?
 - A. X on, Y on, Z on
 - B. X off, Y on, Z off
 - C. X on, Y off, Z on

3. If only Y is on in the second setting, which of the following must have been the initial setting?
 - A. X on, Y off, Z on
 - B. X on, Y on, Z on
 - C. X off, Y off, Z on

