Evil Professor Nitram Puzzles

Four mathematicians have escaped from the dungeons of the evil Professor Nitram and must cross a canyon at night on a fragile bridge. At most two people can be on the bridge at once, and there is only one flashlight (which can cross only by being carried). Kovalevskaia can cross the bridge in 10 minutes, Legendre in 5 minutes, Macaulay in 2 minutes, and Noether in 1 minute. If two people cross together, they move at the speed of the slower person. By the way, in 18 minutes, a flash flood will come roaring down the canyon and wash away the bridge (together with anyone who isn't yet safe on the other side).

Can they get across in time?

The evil Professor Nitram likes to assign tasks to his students in Math 666. Typical tasks include cleaning his office, washing his car, and feeding his pet snakes (and the evil Professor Nitram can certainly think up other tasks if there are enough students). The Registrar is on vacation, so the evil Professor Nitram has no idea how many students will enroll — assume the number is n. Each task requires a team of three students, and Professor Nitram would like to arrange the assignments so that every pair of students work together on exactly one team.

When is this arrangement possible?

Four students are caught by the evil Professor Nitram and set the following challenge. The evil Professor Nitram writes each student's name on a card, shuffles the cards, and lays them out in a neat line, face down, in another room. The group will be invited one by one in an order of their choosing to enter the other room. There, each prisoner can turn over up to 3 of the 4 cards. If she turns over the card with her name on it, they succeed at their turn, at which point she has to turn all the cards back over, leaving them in an identical state to that in which she found them, and is taken to a third room. If, however, she fails to turn over the right card, the entire group loses, and they are all strung up by their ankles for three hours. The group wins and is allowed to go free if and only if every one of the four people succeeds in choosing their card when they go into the second room.

The group have a chance to discuss their strategy before starting, and they can choose an order in which to enter the second room. However, there is no way for them to pass any message at all back to the rest of the team once they have left the room, except for whether they succeeded or not.

How can the group maximize the probability of success?

Professor Nitram is friends with a clan of goblins who live in a forest in Missouri. Some goblins are friends and some aren't. Each goblin has a house painted either red or blue. Every year, one goblin (chosen randomly; let's call him Growf) visits all of his goblin friends to admire their paint jobs. If Growf has a red house, but has more friends with blue houses than red houses, then Growf repaints his own house blue. On the other hand, if Growf has a blue house, but has more friends with red houses than blue houses, then Growf repaints his own house red. If at least half of Growf's friends have the same color house as he does, then he doesn't bother to repaint.

Does all the repainting eventually stop?