The teacher gives each team a deck of cards. For a regular card deck you can use face-up/face-down to represent 0/1. A satisfactory outcome for this activity is that the team can successfully demonstrate the trick to the class. That means, someone will lay out a 5x5 array of cards randomly. Then a member of the team will layout the 6th row and column and will successfully identify the flipped card when some from the class secretly flips a single card.

1. (**POGIL**) Describe an algorithm for identifying the card that was flipped.

**Answer**

|  |
| --- |
| Repeat through all columns: {  IF (AmountOf1sinColumn = odd) {  Then IF (AmountOf1sinRow = odd) {  FlippedCard == True  }  }  } |

2. (**POGIL**) The card "trick" shows that it is always possible to identify the card that was flipped as long as only one card was flipped. Would it be possible always to determine if an error occurred if two were flipped?

**Answer**

|  |
| --- |
| It is not possible to detect if two bits were flipped using this algorithm because if you flip two bits in the same column or row it will not be able to determine what to change and if you flip two different bits in different columns and rows it will think four bits have been flipped because there will be four columns and rows (2 each) that will change in order to detect the error and these will intersect with each other, creating the illusion there is four. |