UMBC
AN HONORS UNIVERSITY IN MARYLAND

CMSC 201 Fall 2016

GRS Worksheet – Week 2 – Counting in Binary

The Setup:

Pair up (or triple up) with another student at your table. The TA will provide you with binary dot cards; set aside any with more than 16 dots for now. Arrange the remaining cards face up on your table in a line, with the "one" dot card on the far right, and each card increasing in dots to the left (up to 16).

Flip Flopping:

You can use these cards to make numbers by turning some of them face down – this would be a "0" in binary. (A card that is face up is a "1" in binary.) Start by turning all of the cards over, and then use them to count up from zero to 21. Fill out the chart on the back of this worksheet as you go, with "0" or "1" in each column. Pay attention to how often each card flips over.

Meaningful Patterns:

What did you notice about the card flips when you counted from zero to 21? Discuss it in pairs, and then with your table. You can discuss it with another table if necessary.

The Larger Picture:

Put the three cards you set aside earlier back in the line with the other cards. Leave a larger space between the cards with 16 and 8 dots. This space doesn't change the meaning at all; your TA will explain its purpose.

Flip the cards over according to the binary numbers below, and use the cards to help you and your partner calculate the decimal equivalent:

1010 1010	_____	**0010 1101**	_____
1111 1111	_____	**1000 1000**	_____

Try to use the cards to convert these decimal numbers to binary as well. Work with your partner or your table if you don't remember how to do this.

201	_____	**97**	_____
150	_____	**37**	_____

One partner should record, and the other should flip the cards. Trade halfway through so that you both get a chance to do each part.

Decimal number	16 dots	8 dots	4 dots	2 dots	1 dot
0					
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					