WORKSHEET ON PROPORTIONAL ALLOCATIONS SOLUTIONS

PROBLEM ONE

	I_1	I_2	I_3	I_4	I_5	I_6
A						
B						

Fill in this table such with natural numbers such that:

- The numbers in a row add up to 12.
- If A knows B's valuation then, in cut and choose, she can cut the cake so that she will do much better than 6 (which is half).

PROBLEM TWO

	I_1	I_2	I_3	I_4	I_5	I_6
A						
B						
C						

Fill in this table such with natural numbers such that:

- The numbers in a row add up to 12.
- There is a way that if A cheats in the lone divider protocol, she will do worse than if she didn't.

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PROBLEM THREE

	I_1	I_2	I_3	I_4	I_5	I_6
A						
B						
C						

Fill in this table such with natural numbers such that:

- The numbers in a row add up to 12.
- There is a way that if A cheats in the Trim protocol, she will do worse than if she didn't.

PROBLEM FOUR
Generalize the Lone Chooser Algorithm to 4 players

PROBLEM FIVE
Do the last case of the Divide and Conquer Algorithm that I omitted.

PROBLEM SIX Recall that for the DC algorithm we have:
Let $C(n)$ be the number of cuts used for DC with n players.
$C(2) = 1$
$C(3) = 3$
If $n \geq 4$ and n is even then $C(n) = 2C(\frac{n}{2}) + n - 1$.
If $n \geq 5$ and n is odd then $C(n) = C((n-1)/2) + C((n+1)/2) + n - 1$.
Hence
$C(2^m) = 2C(2^{m-1}) + 2^m - 1$.
For each of math we take a slightly worse bound:
$C(2^m) = 2C(2^{m-1}) + 2^m$.
Derive what $C(2^m)$ is. Letting $n = 2^m$ derive a bount on rough $C(n)$ is for n a power of 2.