Method of Markers

Unit 3 – Fair Division
Method of Markers

Preliminaries: The items are arranged randomly into an array (a line). Label the items 1, 2, 3, 4, 5, …

Step 1: (__________) Each player independently divides the array into N segments by placing N-1 markers along the array.

Step 2: (________________) Scan the array from left to right until the first first marker is located. The player owning that marker goes first and gets the first segment in his bid. Remove that players markers because he got his share.

Step 3: Continue scanning the array from left to right until the first second marker is located. This player will receive the second segment of her bid.

Step 4: Repeat the process until each player has a segment of the array.

Step 5: (________________________) The players get to go in some random order and pick one item at a time until all the surplus items are given out.
What should we do with the leftover candy?

Draw straws and take turns picking the leftover pieces
• I need to have groups of four and one group of 5.
• Each group needs one bag of candy.
• I want one member of the group to pull out one piece of candy at a time (without looking) and place it on the table.
• Repeat the process so that you make a line with the candy.
• After lining up the candy, assign each player a letter (Player A, Player B, Player C, Player D)
• When all the candy is lined up, I want you to label each piece. 1, 2, 3, 4, ……..
• Now, on a piece of paper sketch what you see. (at the very least, write down the labels)
• On that same sheet of paper, divide the line of candy into 4 separate links. (see below)
• Each divide should mark a section that you think is equal to the other pieces.
• When everyone has divided the line of candy in a way that they see fair, take your markers and place them on the line of candy as you drew them in on your paper.
• Now the fun begins…
Allocations

- Scan the line of candy from left to right until the *first marker* comes up. Which ever player’s marker comes first, then they get the first section of their bid.
- Remove that players markers
- Now, continue scanning from left to right looking for the *first second marker*. 
Allocations

Continue the process until each player has a section of candy.
If there is any surplus, randomly decide which players should choose first.
Keep picking pieces one at a time until all the pieces are gone.
Homework

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