Spring 2019

Barge Problem 1

Over winter break, Ann, Blake, and Carl are bored, so they decide to make a deck of 2019 cards numbered 1 through 2019. Each of them gets 673 of these cards, split up as follows:

<table>
<thead>
<tr>
<th>Person</th>
<th>Card numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ann</td>
<td>1, 2, \ldots, 673</td>
</tr>
<tr>
<td>Blake</td>
<td>674, 675, \ldots, 1346</td>
</tr>
<tr>
<td>Carl</td>
<td>1347, 1348, \ldots, 2019</td>
</tr>
</tbody>
</table>

They play a cooperative game with these cards as follows: Each player plays a card, taking turns, in the order $A \rightarrow B \rightarrow C \rightarrow A \rightarrow B \rightarrow C \rightarrow \cdots$. The game ends when the sum of all the cards played is a multiple of 3. Their goal is to have the game last as long as possible. If they cooperate, how many cards will be played in the longest possible game? Explain the strategy that achieves this goal.

Barge Prizes

- First Prize $1000
- Second Prize $750
- Third Prize $500

1. Form a team with other Lafayette students. Each team must have 3, 4 or 5 members.
2. The weekly problem will be posted online https://math.lafayette.edu/teambarge/ and in the Math Dept. There will be 8 problems during the semester.
3. Get your solution to Gary Gordon by Friday, Feb. 15. You can either turn in a hard copy or send your solution by email to gordong@lafayette.edu.
4. Don’t Quit! Keep turning in problems, even if you’re not 100% sure of your solution.

Due Date: Friday, Feb. 15.