Posted: Monday, November 11, 2019

Deadline: **11:59 PM on Sunday, November 17, 2019**

Rules (please read):

- The contest is open to everyone.
- Individuals or teams of at most three members may submit solutions.
- Do not discuss the problem with anyone other than members of your team.
- You may use any source, written or electronic, but all sources must be properly cited.
- You may use any computational tools.
- Your solution will be graded on a 0–4 point scale.
- All your assertions must be completely and fully justified. At the same time, you should aim to be as concise as possible; avoid overly lengthy arguments and unnecessary components. Your grade will be based on both mathematical accuracy and clarity of presentation.
- Either send your solution to bbajnok@gettysburg.edu or put it in Béla's departmental mailbox by the above deadline.
- Consistently successful participants will receive the *Paul Mugabi Mathematics Problem Solving Award*.

A million tokens

Consider a sequence of tokens numbered $1, 2, 3, \ldots, 1000000$. Each token has one side colored orange and the other side colored blue. Originally, each token has its orange side facing upward. At time $t = 1$, you turn each token upside down (and thus each token will have its blue side facing upward). Then, at time $t = 2$, you turn every second token upside down (and therefore, tokens numbered 2, 4, 6, etc. will have their orange side facing up) . At time $t = 3$, you turn every third token, and so on, until time $t = 1000000$, when you turn every 1000000th (that is, the last) token upside down. How many tokens will have their orange side facing up at the end?