The Perfectly Logical Pirates

Solution

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Keep 9,951 coins. Give one coin each to pirates $3, 5, 7, \ldots, 99$. Give everyone else zero.

Pirate 1 is the strongest. Their own vote plus the votes of those 49 paid pirates give exactly 50 votes out of 100, which is enough.

To see why those pirates accept, work backward. Each pirate first prefers staying aboard, then prefers more gold. When both outcomes are the same, they vote against the proposal. A pirate votes for a proposal precisely when they prefer it to what follows rejection.

With only pirates 99 and 100 left, pirate 99 keeps everything. Their own vote supplies the required 50%, so pirate 100 receives zero.

With pirates 98, 99, and 100, pirate 98 needs one other vote. Pirate 100 would get zero after rejection, so an offer of one coin buys their vote. Pirate 99 would get everything after rejection and is too expensive to buy.

With pirates 97–100, pirate 97 needs one other vote. Pirate 99 would get zero under pirate 98's plan, so pirate 97 gives pirate 99 one coin.

The pattern continues: at each stage, buy the votes of pirates who would otherwise receive zero. One coin is enough for each of them; zero is not enough, because an indifferent pirate votes against the proposal.

Under pirate 2's plan for the remaining 99 pirates, pirates $3, 5, \ldots, 99$ receive zero. These are the 49 votes pirate 1 can buy for one coin each. Thus the cost is 49 coins and pirate 1 keeps $10{,}000 - 49 = 9{,}951$.

This is optimal under the stated voting rule. Pirate 1 needs 49 votes besides their own. All other pirates would remain aboard if pirate 1 were thrown overboard, so each of those votes costs at least one additional coin.

History and sources: companion history PDF.