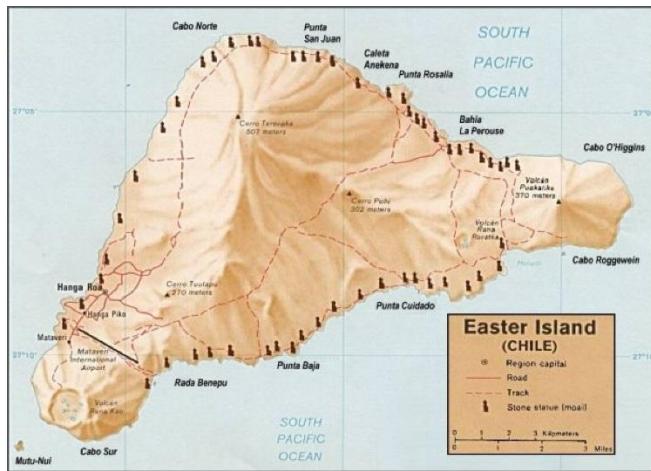


Easter Island

After an epic voyage across the Pacific, the Polynesian catamarans arrived on Rapa Nui (Easter Island) approximately 1500 years ago. The Island was a paradise of palm trees and clear lakes in the craters of extinct volcanoes.

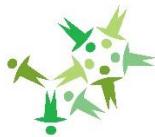


Rapa Nui starts out with about 60 square miles of palm trees and 1 Polynesian band of people. Each 100 years you may allocate a focus activity for each of the bands. Each band may focus on only one activity:

1. *Building fishing boats.* These will feed 1 band for the next two turns (200 years). The population will expand or contract accordingly. For example, if you created 3 boats on the 6th turn and 2 boats on the 7th turn, you will have $3+2 = 5$ bands on the 8th turn. Building fishing boats for a century requires cutting down one square mile of palm trees.
2. *Erecting Moai.* The Polynesians believed that they would be granted blessings from their ancestors by building Moai (3 to 12 meter tall statues). The Moai were carved out of volcanic rock and rolled on timber to ceremonial platforms throughout Rapa Nui. Erecting a Moai for a century requires cutting down one square mile of palm trees.



3. *Sing, dance and hug the trees.* The palm tree forests regenerate. Add one square mile of palm trees.



Example:

Years after arriving	Number of People (add two previous centuries of boats built)	Number of Boats Built	Number of Erected Moai	Number Singing, Dancing & protecting	Number of square miles of trees after actions
0	1	1	0	0	59
100	1	1	0	0	58
200	2	1	1	0	56
300	2	2	0	0	54
400	3	3	0	0	51
500	5	3	2	0	46
600	6	3	2	1	42
700	6	2	2	2	40
800	5	3	1	1	37

- Assuming that options 2 and 3 are never chosen, what is the pattern of population growth?
- Assuming the third option is never chosen, how many Moai can be created before the supply of wood runs out?

History:

- In real life, the population rose to about 10,000 then crashed due to starvation.
- 887 was the actual number of Moai found.
- The Dutch explorer, Jacob Roggeveen, was the first visitor to Rapa Nui in more than 1000 years. His ship landed on Easter Sunday, 1722, and gave the Island its more common name, "Easter Island".

Extensions:

- What is the largest sustainable Moai production?
- What is the largest sustainable human population without Moai production?
- Try creating an Easter Island game in which players score points for the number of Moai they create. Competition can sometimes lead to "optimal" solutions that destroy the participants. Can you find other examples in history?

The Math in This Problem:

In this investigation, students will observe statistical trends and patterns from the provided data. Using the given information, mathematical analysis can be executed, chiefly studying the relationships, correlations, and dependence evident in this statistics-related puzzle.

