Math 4371 The Rock Game 6 September 2011

Open the web page http://hobbes.la.asu.edu/java/rocks/rocks.html

Complete the following steps:

1. Play the game a few times using 15 as the starting number. Can you beat the computer? Try to figure out the computer's strategy. How does the machine decide how many to remove?

2. If you have trouble, try using 12 as the starting number. Keep trying until you win.

3. How were you able to win?

4. Can you beat the machine using 17 as the starting number? What about 16?

5. Are there some starting numbers for which the computer always wins? How does it do this?

6. Are there some starting numbers for which you know how to always win? (Think about turning the computer's strategy against it.)

What is really going on here? Try to express your answer in terms of the operation m mod n. How would your answer change if the game allowed removing only 1 or 2 rocks at a time? What if you could remove 1, 2, 3 or 4 rocks at a time? What if you could remove between 1 and n rocks at a time? Write up a short report explaining your answers.