

FIND GOLD COIN

The Set Up: There are 2015 coins that all look identical. Some are gold, some are silver, some are bronze, but the majority are gold.

Your Goal: Identify a gold coin.

Operations Allowed: There is a machine that does *equality tests*: given two coins determines if they are the same type (but it does not tell you what type they are).

1. Give an algorithm that will, using the machine, find a gold coin. Try to make the number of tests small.
2. (Coins wear down!) In your last algorithm did you do a test on coin 17 like a million times? You fool! Didn't I tell you that a coin can only be involved in a test a small number of times? (The operation wears them down!) Try to do this problem keeping the number of times a single coin is tested as small as possible.