# P11A - Random Numbers and Half-life

It is sometimes useful to use random numbers, either to simulate randomness in physical processes or as part of an algorithm to solve a case with no apparant randomness (see Milen midterm project).

1. Generate 1000 coin flips. Have your program print the number of heads.

2. Consider a radioactive element with a half life of 12 days.
   (a) Compute, by hand, the chances that an individual atom will decay in 1 day?
   (b) Suppose you start with 1000 atoms. How many would you expect to be around after 1 day?
   (c) Write a cpp program to simulate these 1000 atoms being left out in the sun for 1 day. How many are left?
   (d) Simulate this 100000 times. For what percentage of these runs were there more than 940 atoms remaining?

3. Think about the extra credit question on the past quiz.

Submit your cpp files. Due Friday May 3rd.