Purpose

Smart Sparrow gives a task to all applicants for the US Learning Design Studio so that we can standardize our evaluation of candidates and give a representative, while contrived, example of the work you would do in the studio. This task illustrates one of Smart Sparrow's values: creating immersive educational experiences that allow our students to learn in a variety of ways, including using interactive simulations to facilitate learning through exploration. We would like you to implement the following task in a way that is representative of how you work, including development practices and coding ability.

Introduction

Your task is to create a simple application that will help students to gain an understanding of radioactive decay using the following requirements and wireframe. The wireframe should be used as a guide, giving you some freedom in the design.

The final amount (N') of a sample with initial amount N that decays for a specified time (t) with a specified half-life (h) can be determined with the following equation:

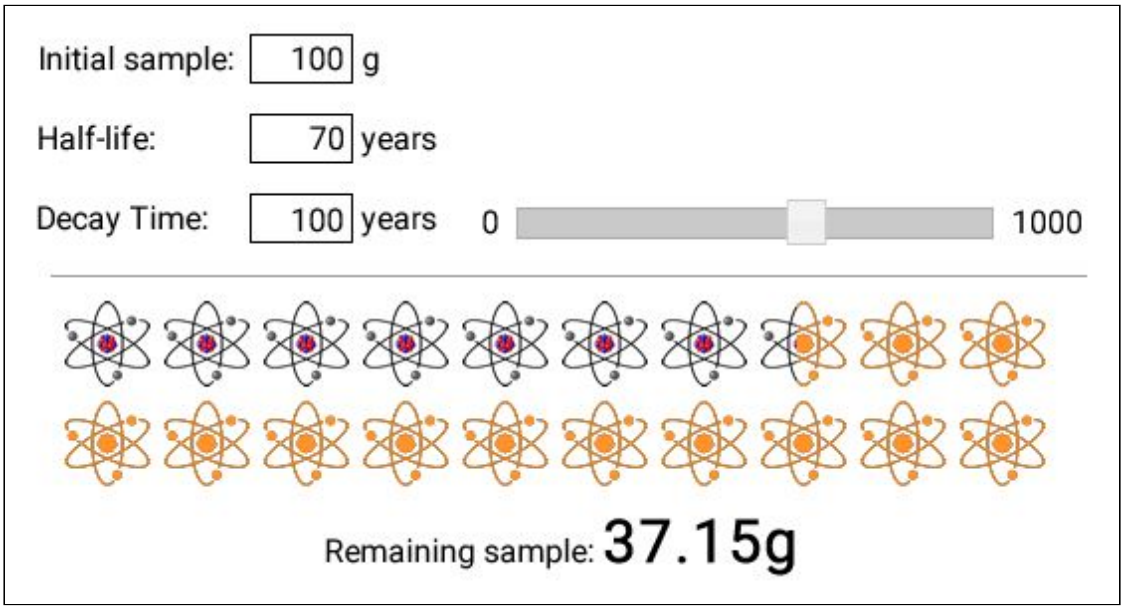
$$N' = N * e^{(-\ln(2) * t / h)}$$

[ln(2) is the natural log, or log base e, of 2]

While we do not limit the amount of time you spend on the task, we suggest you spend no more than 4 hours on it which may mean you do not implement every feature.

Requirements

Wireframe (with example data):



1. There should be 3 number inputs (validation optional)
    a. Initial sample amount: 0-100 grams
    b. Half-life: ranges from 50-100 years
    c. Time spent decaying: ranges from 0 to 1000 years.
2. There should be one slider bar that changes the decaying time, but it should use a logarithmic scale so the slider has higher resolution in the low end (for example, the ranges 0-10, 10-100, and 100-1000 have roughly equal space). The value on the slider and the time input should be linked together, so that changing one updates the other.
3. Using the atom graphic, show the initial and final amount of sample after the specified time where each atom graphic represents 5 grams of substance.
4. The final amount of the sample is shown numerically.