Physics 341 Sage Assignment 5

S1. In this assignment, the goal is to plot the position vs. time of two coupled oscillators, that we derived in the lecture.

As we saw then, the positions are

$$x_1(t) = A\cos\omega_1 t + B\cos\omega_2 t$$
$$x_2(t) = A\cos\omega_1 t - B\cos\omega_2 t$$

where A and B depend on the initial conditions. Also, the case we studied was a weak coupling between the oscillators, which means that ω_2 is only slightly larger than ω_1.

For the purposes of plotting, therefore, we want to choose A and B to represent the scenario where oscillator 1 is pulled out a distance (which we will set equal to 1) and released from rest, while the other oscillator is stationary at $x_2 = 0$ initially. We will also choose the period of oscillation of x_1 to be 1, and $\omega_2 = 1.1\omega_1$.

Given these conditions, your task is to produce a plot of $x_1(t)$ and $x_2(t)$ on the same graph (but coloured differently, so the two oscillators can be distinguished).