PHYSICAL MODELING IN MATLAB

EXERCISE 3.5

This exercise has two parts:

a. Write a script called fibonacci2a that uses a for loop to compute the first 10 elements of the Fibonacci sequence. The 10^{th} element should be assigned to *ans*.

   The MATLAB script *fibonacci2a* contains:

```
% Exercise 3.5 - script fibonacci2 part a
%
% This script will compute the first ten elements of the Fibonacci
% series, returning the tenth element in ans.
%
% The two initial conditions (f1 and f2) are expected to have been
% already set before running this script
%
% prev1 holds the immediately previous element
% prev2 holds the second previous element
%
% initialize prev1 and prev2
prev1 = f2;
prev2 = f1;
% loop for the remaining elements
for i = 3:10
    % compute the next element in the series
    f     = prev1 + prev2;
    prev2 = prev1;
    % prev1 will now hold the element just computed to be used
    % next time through the loop
    prev1 = f;
end
ans = f
```

   To run:

```
>> % set the initial conditions
>> f1 = 1;
>> f2 = 1;
>> % call the script to compute the first ten elements of the sequence
>> fibonacci2a
```

b. Generalize the script, calling it *fibonacci2b*, so that it computes the n^{th} element for any value of n. Assume $n > 2$. n will be set before running the script.

   The MATLAB script *fibonacci2b* contains:

```
% Exercise 3.5 - script fibonacci2 part b
%
% This script will compute the nth element of the Fibonacci
% series, returning the nth element in ans.
%
% The two initial conditions (f1 and f2) are expected to have been
```

```
% already set before running this script
%
% prev1 holds the immediately previous element
% prev2 holds the second previous element
%
% initialize prev1 and prev2
prev1 = f2;
prev2 = f1;
% loop to compute the nth element
for i = 3:n
    % compute the next element in the series
    f     = prev1 + prev2;
    % prev2 will now hold what was the last element
    prev2 = prev1;
    % prev1 will now hold the element just computed to be used
    % next time through the loop
    prev1 = f;
end
ans = f
```

To run:

```
>> % set the initial conditions
>> f1 = 1;
>> f2 = 1;
>> % initialize n to some value
>> n = 10;
>> % call the script to compute the first n elements of the sequence
>> fibonacci2a
```