In a Workbook called **PUNetIDHW1**, create each of the following three worksheets:

**Worksheet #1 (Name it Retirement)**

When you are hired for your first full-time job, you are going to have several decisions to make. One of the major decisions will be what are you going to do when it comes to setting up some kind of retirement plan. To help you figure this out, I would like you to complete the following worksheet:

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Enter Starting Salary</td>
<td>$35,000</td>
<td>Interest Rate to Retire with one million:</td>
<td>x.x%</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Enter Percent Put in Retirement</td>
<td>3.0%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Enter Interest Rate Earned</td>
<td>10%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Enter Salary Increase</td>
<td>3.0%</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

...continuing until year 45

The above worksheet allows the user the ability to enter their starting salary, what percent of their salary will be placed into a retirement plan on a yearly basis at the beginning of each year, and how much of a raise they can expect to receive each year. You will notice that the first line shows that the starting salary for the first year is $35,000 of which $1,050.00 (3% of $35,000) is put into a retirement account at the beginning of the year. The interest earned is $105 (10% of $1,050.00) which means that the total in the retirement account at the end of the year is $1,155.00 ($1,050.00 + $105.00). You are to show the rest of the worksheet for 45 more years, which is approximately how long you will be working.

Also, using **Goal Seek enter in Cell F1 the percent put into Retirement (to one decimal point) required in order to save exactly $1,000,000 by the 45 year and leave your worksheet in this state when you submit it (that is, don't change cell B2 back to 3.0%).**

A couple of things to note:
1. Remember, the starting salary goes up by the percent value in cell B4.
2. The Starting Retirement value for Year 2 includes the Ending Retirement value from Year 1 plus the additional money placed into the account at the beginning of Year 2.
Worksheet #2 (Name it Pi): https://en.wikipedia.org/wiki/Approximations_of_%CF%

There are many sequences of repetition whose sums are equal to (3.14159…), and one such formula is

\[ \pi = 4 - \frac{4}{3} + \frac{4}{5} - \frac{4}{7} + \frac{4}{9} - \frac{4}{11} \ldots \]

What we see is that this sequence consists of alternating positive and negative terms. Using Excel, compute the value of the above sequence using the first 100 terms which will be our approximation for \( \pi \). If we computed \( \pi \) using the first 3 terms we would have \( 4 - \frac{4}{3} + \frac{4}{5} \) or 3.466666667. Create a worksheet that shows the value of \( \pi \) using the first 100 terms of the above sequence.

...Continuing to row 101.

Worksheet #3 (Name it Simulation)

http://www.youtube.com/watch?v=l9ymaSzcsdY

Paramecia are unicellular microorganisms that feed on bacteria, algae, and yeasts. We are going to do a simulation involving paramecia and bacteria to see how the populations change day by day given the following formulas:

\[
\text{bacteria}_{\text{tomorrow}} = (1 + a) \times \text{bacteria}_{\text{today}} - c \times \text{bacteria}_{\text{today}} \times \text{paramecia}_{\text{today}}
\]

\[
\text{paramecia}_{\text{tomorrow}} = (1 - b) \times \text{paramecia}_{\text{today}} + c \times d \times \text{bacteria}_{\text{today}} \times \text{paramecia}_{\text{today}}
\]

where

a = 0.01 (fractional increase in bacteria population)
b = 0.005 (fractional decrease in paramecia population)
c = 0.00001 (likelihood that a paramecia will encounter and eat a bacteria)
d = 0.01 (fractional increase in paramecia population attributed to eating a bacteria)

You are to design an Excel worksheet to simulate the above problem for a period of 1000 days showing the Day, Bacteria, and Paramecia values for each day for 1000 days. Initial values for paramecia are 20 and for bacteria are 200. Allow the user the ability to enter and change values for paramecia, bacteria, a, b, c, and d at the top of the worksheet. At the bottom of the Bacteria and Paramecia columns report on the maximum and minimum number of each microorganism.
Important Notes for worksheets:

- Changing any values of a worksheet must update the entire worksheet with accurate values based on the given formulas. (worksheets one and three only)

- I must be able to drag down your last row to get additional information or answers that are more refined.

How to Submit and Grading Policies

A copy of your single Excel file (properly named) with the two worksheets (properly named) is to be placed in the CS130-01Drop Box on Grace by 2:15pm on the due date to be considered on time.

Grading will be based on:

- Correctness of your results
- Completeness of your results
- Professional look of the worksheets as described above and discussed in class
- Ability to perform a what-if analysis by changing any of the user input data with accurate results computed and displayed in the worksheet.

For each worksheet:

1. Clearly label all the data, and use the cell formatting options to make this spreadsheet easy to read and to give it a professional look.
2. Use Named Cells where appropriate.