**Assignment 3**

This assignment is based on the Chapter Programming Exercise 5-7, but is not exactly the same. Your solution will involve multiple loops, not one.

Assume that you are paid on the basis of one cent the first day, two cents the second day, four cents the third day, with the daily amount continuing to double in this way. Design an algorithm and use it to write a Python program that uses loops to calculate the amount of money a person would earn over a period of time (maximum period one year) if paid in this way. The program should be implemented with a 'pre-tested loop' terminated by a sentinel like 0 or [Enter] to a "How many days?" type prompt (i.e. do NOT control the loop by asking something like "Do you want to do another calculation?" or "Do you want to quit?" etc). Now that you have learnt about loops, you can start to add "bomb-proofing" to your programs to prevent the entry of a lot of ***"invalid"*** data by a user.  So for this assignment the user's response should be validated to ensure that the value entered falls between 1 and 366 days inclusive. (If it doesn't, the user should be requested to enter the value again...and if it's wrong again the second time, or the third time etc., keep on asking for an acceptable value.) Output (for each pass through the main loop) should consist of a two column table aligned neatly with the heading '**Day**' over the first column and '**Today's salary**' over the second column. At the bottom of the table the total salary should be displayed. All monetary values should be displayed  as properly formatted dollar amounts, not cents (for example $17.50 not 1750 cents).

**Notes:**

* The algorithm should be written in pseudocode (structured English).
* Use one or more functions where sensible to do so and comment your program thoroughly throughout.
* Specify 2 sets of test data that will demonstrate the operation of your program when supplied 'normal' test data. One of those sets should be selected to demonstrate how much better it would be for you to work in July (31 days) rather than in June (30 days)!
* Select another 2 sets of test data that will demonstrate the operation of your program when supplied 'abnormal' user inputs.

Run your program using the test data you have selected and save the output it produces in a single text  
file.

**Submit:**

1. Your algorithm and test data table.
2. Source code for your Python implementation.
3. Output test file demonstrating the results of using the test data.

It is important that the output listings are not edited in any way.

**Rationale**

Reinforce topic material related to iteration.

Reinforce topic material related to value returning functions.

**Marking criteria**

| **Marking Criteria for Assignment 3** | **Weight** |
| --- | --- |
| Sensible and complete algorithm written in pseudocode (structured English). | 10% |
| Sensible test data, with well thought out reasons for selection and reasonable expected results | 20% |
| Python program implements algorithm, with correct syntax, is well presented, is fully documented and it executes properly. | 30% |
| Correct implementation of the various loops, with appropriate termination methods. | 20% |
| Output correct and presented unedited in text file. | 20% |

 Negative marks can be awarded for failure to follow the instructions given.

**Presentation**

The same presentation instructions apply for Assignment 3 as did for Assignment 1.

**Requirements**

The same submission requirements apply for Assignment 3 as did in Assignment 1.