**Final project (10%) – I recommend teams of two students**

You must choose a scientific problem to solve using Python programs. You must present the problem, your coded solution, and your results.

**You must create**

1. 2% - 1 paragraph describing your project + title
2. 5% - software that you will upload in Woodle
   1. include comments + your name(s) at the top of the file
   2. organize it well by using functions
   3. part of code must be written by you (not only code from the textbook, for example)
   4. DO NOT COPY CODE FROM INTERENT – if you use some resource, you must cite it!!!!
3. 3% - 4 ppt slides you will present in class (~2 minutes); upload it in Woodle
   1. 1 slide title, name, class
   2. 1slide to present the problem
   3. 1 slide to present the solution (code or diagram or a few bullets) – BE CLEAR WHAT IS YOUR MAIN CONTRIBUTION!
   4. 1 slide with results (pictures, graphs, numbers, etc.)
   5. you may demo your software (not mandatory)

**Graded on**

1. Timely and correct submissions.
2. Working software + have some original code, besides the start up code from the book.
3. Grammar, content, correct formatting, correct referencing.

**Possible ideas (ideas in bold were not covered in class) -** Look at the end of chapters for interesting problems!!!

1. Turtle application – ch.1
2. Finch robot
3. Fractals – ch.9  
   Ex. Create a menu that asks you to draw sierpinsky triangle, rectangle, square, etc.; Use recursion to create snowflakes, ferns-like shapes, or other interesting patterns
4. Solar system – ch.10

Ex. Make it to be real solar system; add a moon to the earth;

1. Image processing – ch.6  
   Ex. Create an image/landscape using cImage.py class; Import an image of yourself and change its background; Extend edge detection ex. from book; flip the image;etc.
2. Encryption/Decryption application – ch.3 and **ch.8 (use regular expressions to crack a code or to find genes in a DNA string; did not cover this in class)**

Ex. Implement another encryption/ decryption algorithms that is not in the textbook

1. Compute and plot some statistics for data downloaded from web – ch.4
2. **Data mining, clustering – ch.7**
3. **Predator-pray simulation – ch.11**
4. **Video game – ch.13**
5. Rock, scissors, paper game (use Tkinter to draw 3 corresponding buttons)
6. Lottery ticket simulation
7. Blackjack, poker, hangman (use cImage to draw head, neck, ..), tic-tac-toe, landscape, photo collage

**References**

Turtle

Appendix C

<http://docs.python.org/2/library/turtle.html>

Python

Appendix B

<http://docs.python.org/2/library/>