Final Exam Review

Your Final exam is 10-11:50 AM on Thursday, December 16, in our normal classroom. The Final exam will be closed-book and notes, except for three 8.5" x 11" sheets of paper containing any notes that you want. (Yes, you can use both the front and back of this piece of paper.) The test will be comprehensive and cover Chapters 1-10, but the majority of the points will be from Chapters 7-10. The following topics from Chapter 7-10 (and maybe more) with be covered:

Chapter 7. Simple Graphics and Image Processing

- General concept of object-based programming (writing programs that use classes that somebody else has written), e.g., Turtle graphics and Images packages
- Simple graphics concepts: coordinate system, pixels, RGB color system, fractals
- Turtle Graphics methods and usage to draw simple shapes
- Image concepts: analog vs. digital information, sampling and digitizing images, file formats, lossless vs. lossy compression, image manipulation operations
- `images` Module methods and usage to perform image manipulation operations
- nested looping pattern for traversing a grid

Chapter 8. Design with Classes

- General concept of class abstraction to model "real-world" objects and their usage in object-oriented programming, encapsulation, inheritance, and polymorphism
- Class definition: instance variable (start with underscore) and methods including __init__, standard operator overloading (e.g., __add__, __cmp__, __str__, etc.), class variables
- Method definition: header and body, parameters including self, lifetime of local variable vs. instance variable
- pickling to save objects to files
- garbage collection of unreferenced objects
- try-except statement for exception handling
- Reusing code via inheritance, subclass, parent class, polymorphism

Chapter 9. Graphical User Interfaces (GUIs)

- General concepts and terminology of Graphical User Interfaces (GUIs): terminal-based(command-line) vs. event-driven programming via GUIs, mainloop, callback function/event handler, model/view/controller (MVC) pattern
- Using the Tkinter and tkMessageBox module widgets: Frame, Label, Button, Entry, Listbox, Radiobutton, Checkbutton, Menu, Menubutton, Canvas, Scrollbar, Text and the their options (text=, command=, textvariable=, label=, variable=, height=, width=, etc.)
- Layout managerment methods: `.grid`, and grid attributes
- Nested frames to organize components on the screen
- Data Containers/Control variables: `StringVar, IntVar, DoubleVar` and their methods `.get()` and `.set(newValue)`
- Other GUI Resources: colors, text attributes, sizing main window
- mouse and keyboard events: bind method

Chapter 10. Multithreading (ONLY Section 10.1)

General concept of what threads do and how they are manipulated in an application, states in the life of a thread

- threading module's Thread methods: run, start, getName, setName, isAlive
- threading module's Condition methods: acquire, release, wait, notify, notifyAll
- time module .sleep method
- General concepts of synchronization problems, e.g., producer-consumer relationship