2017 Summer: COMP-SCI 5590 - Special Topics

Python Programming

Tutorial 5

Course Plan

- Classes are one of the important concepts of python. Everything in Python is an Object. We learnt as part of this how to build a class. Classes enables us to encapsulate data, restrict scope of data members and functions. They helps us in reusability by inheritance. We can define various level of data encapsulation like private, protected and public.
- Introduction to machine learning using Numpy package which is core of machine learning

In-Class Exercise

1. Create a class Employee and then do the following
- Create a data member to count number of employees
- Create a constructor to initialize name and salary
- Create a function to calculate number of employees
- Create a function to display employee name and salary
- Create a class Manager and it should inherit the properties of Employee class.
- Create instances of Employee and Manager class and call their member functions.

2. Create a 10x10 array with random values and find the minimum and maximum values

Assignment Overview

The following assignment focus on to make one familiar with python programming. One should be able to use classes to build any of the management system. This can be used as back end for any web application created in Python. Also we will learn about numpy package and will see how this can be implemented.

Lab Assignment

1. Write a python program to create any one of the following management systems. You can also pick one of your own.
    a. Library Management System (should have classes for Person, Student, Librarian, Book etc.)
    b. Airline Booking Reservation System (classes for Flight,Person,Employee,Passenger etc.)
    c. Hotel Reservation System (classes for Room,Occupants,Employee etc.)
    d. Student Enrollment System (classes for Student,System,Grades etc.)
    e. Expense Tracker System (classes for Expense, Transaction Category etc.)

Prerequisites:

Your code should have atleast five classes.
Your code should have _init_ constructor in all the classes
Your code should show inheritance atleast once

Your code should have one super call
Use of self is required
Use at least one private data member in your code.
Use multiple Inheritance atleast once
Create instances of all classes and show the relationship between them.
Your submission code should point out where all these things are present.

2. In tutorial 3, we have created tic tac toe. Encapsulate the functions created in tutorial 3 in one class as Game. Also add the following:
   I. Add one constructor _init_ in Game class with 3*3 board size
   II. Check for winning condition. The player wins the game if any row or any column or any diagonal is filled by a single player. Create member function for the same.
   III. Prints the congratulatory message.
   IV. Create instance of game and start the game.
   V. Remember Player 1 has sign X and player 2 has sign 0

3. Using Numpy implement game of life for random matrix of size 10*10. Your python source code should show calculations for birth , survive and death as given in rules below.

   Hint: refer this link to know rules of game of life
   http://jakevdp.github.io/blog/2013/08/07/conways-game-of-life/

Submission Guidelines:

- Submit your code at Github and properly document it. Submit your screenshots as well.
- Properly document your code
- Remember code similarity less than 45%
- Use following link to submit your assignment:

  https://goo.gl/forms/5r5KqG2Mm412YdqL2