Computing In Context
ISI Discipline
NSF Workshop

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The Course

- Fayetteville State University CSC130
  - Program Design and Implementation
  - Pre-requisite: CSC120 – Programming Methodology
    - Teaching basic Python language features
- Using Python
  - Object-oriented programming
  - Input / output / file / string operations
  - Recursion
- 5 programming assignments
- 6 lab projects
  - Projects roughly paired with assignments (except for the last one)
  - Projects were mainly unrelated.

The Projects - Existing

- Language review
  - A review of language feature learnt in pre-requisite course: CSC120
- Graphics
  - Using the cs1graphics package endorsed by the textbook
- Creating class
  - This is the fundamental concept in object-oriented programming
- I/O and File handling
  - Students will practice on reading and writing data from and to files
- Inheritance
  - Another important concept in object-oriented programming
- Recursion
  - Introduce the concept of recursion that will be used repeatedly in the students' career

The Proposed Projects
The Scenario

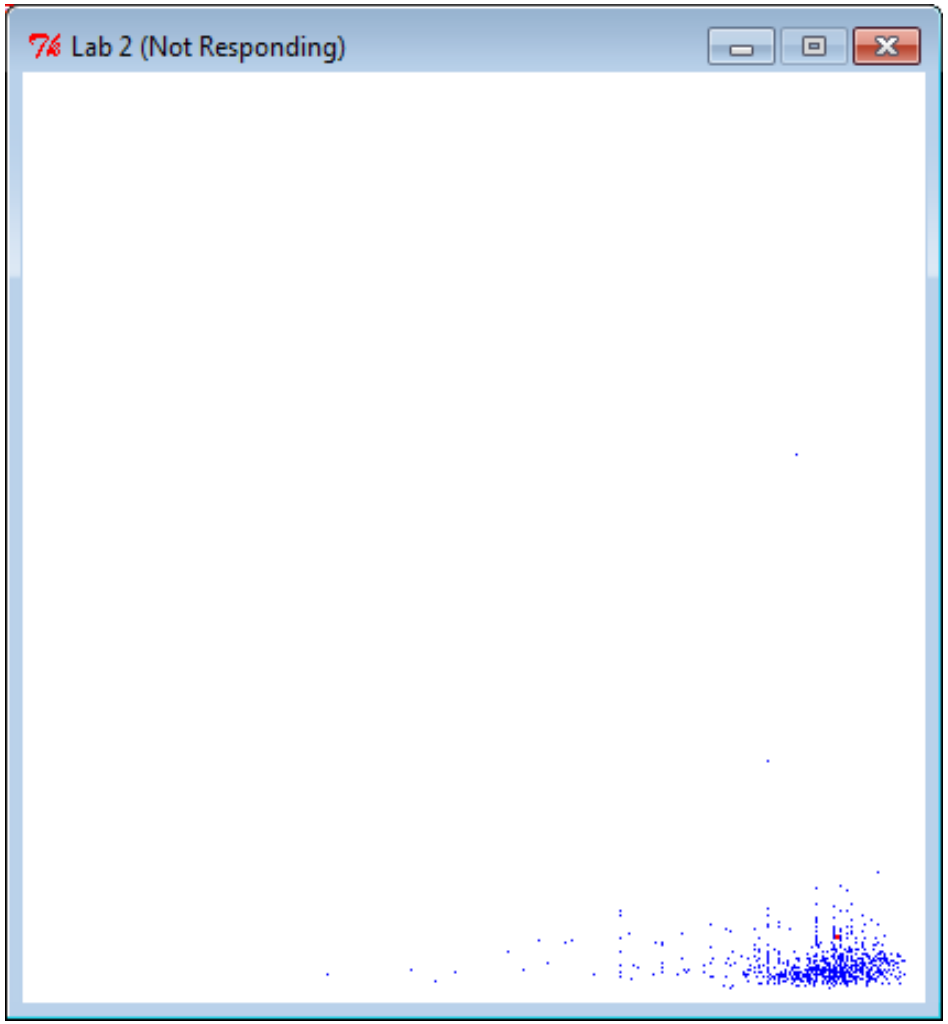
- Assume that you have received an email from your friend with inappropriate content. You doubted very much that the email is actually from your friend. You tried to call your friend but no one answered the phone.
- Fortunately, you have some of your friend's emails saved on the computer. So you want to write a program to find out if the email is actually from your friend.
- This is based on the idea that everyone has his/her own style of writing. What we want to do is to find out if this suspected email is an outliner compared to the archived emails.

The Proposed Projects
Lab 1

- In stead of using a real email archive, we use an e-book downloaded from the Internet. The book has been pre-processed to break it down into paragraphs.
  - Lab 4 deals with this pre-processing step.
- Students will be guided in:
  - defining and calculating a metric from each record
  - finding the centroid of all the metrics
  - calculating the distances between each metric and the centroid
  - and based on the distances, determine which ones are outliners.
- Students will learn the followings:
  - handing lists
  - basic arithmetic in Python
  - basic comparison in Python
  - sorting Python list

The Proposed Projects
Lab 2

- In this lab, students will be using the graphics system from the textbook to plot the following:
  - a point for each metric
  - a point for the centroid
- Students learn to do the followings
  - create a canvas windows for drawing
  - perform coordinate conversion
  - draw a small circle to represent a point
  - change the fill and border color of the circle (the centroid is drawn in a different color)
  - change the size of the circle (the centroid is drawn larger)
  - set appropriate depth so the centroid is always visible


Lab 2 (Not Responding)

The Proposed Projects
Lab 3

- In this lab, students will revisit Lab 1 and encapsulate a metric into a class
- Students learn to do the followings
  - create a class
  - create a constructor
  - create methods
  - instantiate objects of a class
  - use methods of a class

The Proposed Projects
Lab 4

- In this lab, students will perform the pre-processing step we have mentioned in Lab 1
- Students learn to do the followings
  - read data from a text file
  - manipulate data in a text file
  - filter unwanted characters (in our case, numbers and punctuations)
  - write data to a text file
  - miscellaneous string operations

The Proposed Projects
Lab 5

- In this lab, students will refactor the class created in Lab 3 into parent and child class and create new (metric) classes from the parent
- Students learn to do the followings
  - create child classes from parent class
  - know the importance of invoking the constructor of the parent class in the child classes
  - override methods in parent class
  - use child classes

The Proposed Projects
Lab 6

- In this lab, students will learn about recursion
- It is not determined whether this lab will be part of the CIC/ISI project

Evaluation

- The labs were used to be an optional components of the course
- They were used to give the students ideas on how to proceed in the corresponding programming assignments
- Mechanism (to be determined) can be introduced to collect information on how students are learning in these labs.