Lab 11: Pair Programming

Alice	Giovanni		Hayden	Bobby
Andrew	Mike		Jake	Nate
August	Callie		James	Melissa
Bobby	Hayden		Jenna	Dan
Callie	August		Karel	Kassi
Cat	Laurie		Kassi	Karel
Charlotte	Matt		Laurie	Cat
Dan	Jenna		Matt	Charlotte
Danielle	Ellis		Melissa	James
Danny	Natalie		Mike	Andrew
Ellis	Danielle		Natalie	Danny
Giovanni	Alice		Nate	Jake

Review: Pair Programming Roles

Driver

- (Like the role I play when we write programs in class)
- Uses keyboard and mouse to execute all actions on the computer
- Ask questions wherever there is a lack of clarity
- Offer alternative solutions if you disagree with the navigator
  - When there is disagreement, defer to the navigator. If idea fails, get to failure quickly and move on
- Make sure code is "clean"
- Explains actions taken
- Brainstorms

Navigator

- (Like the role you play when we write programs in class)
- Directs driver's actions
  - Dictates the code that is to be written - the "what"
  - Clearly communicates what code to write
- Explains *why* chose particular solution to this problem
- Checks for errors and typos
- Plans the problem solving or debugging actions
- Asks questions

Switch roles at the beep

Lab 11 Directory

- Your directory should look like (to start)
  - connectfour.py
  - csplot.py
  - facespace.py facespace.out
  - person.py person.out
  - social.py social.out
  - test.py

Reviewing Lab 10

Text UI

Graphical UI

Backend

Data Store (files)

- Created two classes
  - Used one class within another class
  - Tested them
  - Example of a backend to a **real** application
    - Could add a different user interface
- "Good judgment comes from experience"
  - Test methods after writing method
  - Remember your data types
  - Refer to the data type's API
- What could you do to improve your development process?
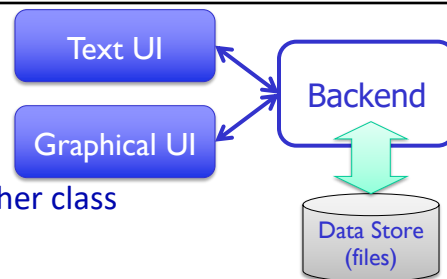
Lab 10 Feedback

- Problem solving capstone!
  - Solving lots of different small problems in a variety of ways
- Use methods you've already written
  - Example: use *addPerson* in *addPeople*
  - Who has this functionality? Do I have access to that object in this method?
- Adhere to interface
  - Accepted parameter types
  - Type of what is returned

Lab 11: Three Parts

- Linux practice:
  - Using the **wc** command
- Social Network extensions
  - Binary search – find people with a certain name
  - UI: add search functionality
- Two-dimensional lists
  - Including Connect Four

WC Command

- **WC**: Word Count
  - ➢ Counts the lines of Social Network code from Lab 10
  - ➢ Compare with code for this assignment
- Example:
  - ➢ `wc -l ../lab10/*.py`
- Specific directions are in the lab

Social Network, Extended

- Searching Overview
  - ➢ Allows you to search for people by their name—lowercased—for more intuitive results
  - ➢ Update `Person` and `SocialNetwork` classes and UI appropriately
    - Specific directions are in the lab

Extensions to Solution

Consider what happens when `searchlist` is a list of *Persons*, `key` is a *str* representing a name
Goal: return a Person object with that name (key)

```python
def search(searchlist, key):
    low=0
    high = len(searchlist)-1
    while low <= high :
        mid = (low+high)//2
        if searchlist[mid] == key:
            return mid
        elif key > searchlist[mid]:
            # look in upper half
            low = mid+1
        else:
            # look in lower half
            high = mid-1
    return -1
```

0	1	2	3	4
Person Id: "4" "Ben"	Person Id:"3" "Chadwick"	Person Id: "1" "Gal"	Person Id:"5" "Samuel"	Person Id:"2" "Scarlett"

Apr 2, 2019

Summary of Modifications to Binary Search

- Add a search method
  - Takes as parameter the name to search for
    - Need to lowercase that name for more intuitive results
  - Original binary search function took a list as a parameter; our method does not
    - Where should we get our list to search?
- Check the *name* of the Person that is at the midpoint, lowercased
- If we have a match, return that Person
- Represent (in method) and handle (in UI) when no person has that name
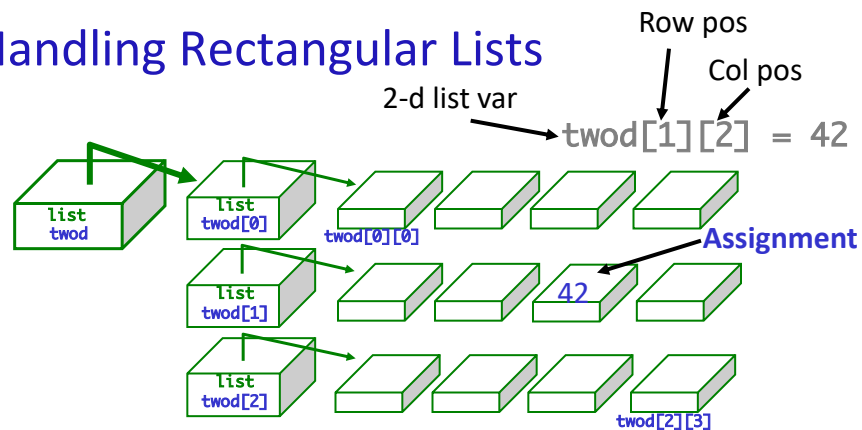
SocialNetwork Code

- Fix the major problems in your code first
- Or, use the code in the handouts/lab10_solution directory
  - ➢ person.py, social.py, facespace.py

2D LISTS

Review

- How do you create a 2D list?
- How do you get the 2nd element in the 3rd "row" of a list?
- How do you find the number of lists in a 2D list?
- How do you find the number of elements in one of those lists?

Handling Rectangular Lists

Row pos

Col pos

2-d list var

$twod[1][2] = 42$

list twod

list twod[0]

twod[0][0]

list twod[1]

42

Assignment

list twod[2]

twod[2][3]

- What does each component of twod[1][2] mean?
- How many rows does twod have, in general?
  - ➤ `rows = len(twod)`
- How many columns does twod have, in general?
  - ➤ `cols = len(twod[0])`

Game Board for Connect Four

- 6 rows, 7 columns board
- Players alternate dropping red/black checker into slot/column
- Player wins when have four checkers in a row vertically, horizontally, or diagonally

How do we represent the board as a 2D list, using a graphical representation?

Game Board for Connect Four

- How to represent board in 2D list, using graphical representation?

Number	Meaning	Color
0	Free	Yellow
1	Player 1	Red
2	Player 2	Black

2D Window

Row 5

Row 0
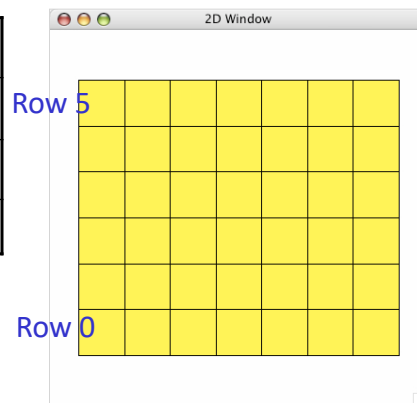
Connect Four (C4): Making moves

- User clicks on a column
  - "Checker" is filled in at that column

```python
# gets the column of where user clicked
col = csplot.sqinput()
```

ConnectFour Class

- Play the game method implementation
  - Repeat:
    - Get input/move
    - Check if valid mo
    - Make move
    - Display board
    - Check if win
    - Change player

```python
won = False
player = ConnectFour.PLAYER1

while not won:
    print("Player {:d}'s move".format(player))
    if player == ConnectFour.PLAYER1:
        col = self._userMakeMove()
    else: # computer is player 2
        # pause because otherwise move happens too
        # quickly and looks like an error
        sleep(.75)
        col = self._computerMakeMove()

    row = self.makeMove(player, col)
    self.showBoard()
    won = self._isWon(row, col)

    # alternate players
    player = player % 2 + 1
```

Problem: C4 - Making a Move

- The player clicks on a column, meaning that's where the player wants to put a checker

- How do we update the board?

Looking Ahead

- Bring your final exam envelopes to me by Friday
  - ➤ Exam will be taken in Parmly 405
- Bring your final exam questions Friday

Thanks to **Hammad, Alyssa,** and **Rinn** for their help this semester!