As you arrive:

1. Start up your computer and plug it in
2. ***Log into Angel*** and go to CSSE 120
3. Do the ***Attendance Widget*** – the PIN is on the board
4. Go to the course ***Schedule Page***
5. Open the ***Slides*** for today if you wish
6. Check out today's project:

Plus in-class time working on these concepts AND practicing previous concepts, continued as homework.

Exam 1 preview

- Date and time of exam
- Exam location
- Format of exam (paper part + programming part)
- Possible topics on exam

Decision Structures

- Simple decisions
- Computing with Booleans
- If-else statements (plus nesting)
- Multi-way decisions

Exam 1information

- **When? Where?: See schedule page**
  - Please get in the habit of checking the **schedule page regularly**.
  - Time management is a problem solving process also
- **Format:**
  - Paper part: Zelle book, 1 double-sided sheet of notes, *closed computer*
  - Programming part: Zelle book, any written notes, and your computer
    - **Any resources you can reach from Angel or the course web site by clicking only!**

Q1

Possible Topics for Exam 1

- Zelle chapters 1-7, 8.4
- algorithm
- Comment
- variable, assignment
- identifier, expression
- Loop
  - definite (for)
  - counted (range function)
- phases of software development
- print, input
- import, math functions
- int, float conversion
- strings (basic operations)
- character codes (chr, ord)
- lists (concatenation, slices)
  - list methods
  - indexing
- reading, writing files
- formatted output
  - reading
  - Writing
- using objects, graphics
- method *vs.* function

More topics for exam 1

- Using zellegraphics library
- Functions
  - defining
  - calling (invoking)
  - parameter-passing
  - mutable parameters
  - optional parameters
  - return values
- decision structures
  - if, elif, else
  - computing with Booleans

Control structures

- Normally, statements in a program execute in order, one after the other
- Sometimes we want to alter the sequential flow of a program
  - What examples have we seen of this?

- ***Control structures***
  - Statements that ***alter*** the ***flow*** of execution of a program
  - ***Examples include***
    - Loops
      - Repeat execution of a block of code
    - Function call
      - Causes execution to jump around in the code
    - Other ➔

Decision, Decisions, Decisions

Decision structures are **control structures** that allow programs to ***choose*** between different sequences of instructions.

*Expressed as an **if** statement*

```
if <condition>:
    <body>
```

*If the **<condition>** is **True**, execute the **<body>***

True** and **False** are **Boolean constants

Simple conditions

<condition> ➔ <expr> <relop> <expr>

Relational operator

Some Relational operators

Math	<	≤	=	≥	>	≠
Python	<	<=	==	>=	>	!=

Q2

Checkout today's project: `10-DecisionStructures`

Troubles getting today's project? If so: →

Are you in the Pydev perspective? If not:

- `Window ~ Open Perspective ~ Other` then `Pydev`

Messed up views? If so:

- `Window ~ Reset Perspective`

No SVN repositories view (tab)? If it is not there:

- `Window ~ Show View ~ Other` then `SVN ~ SVN Repositories`

In your SVN repositories view (tab), expand your repository (*the top-level item) if not already expanded.*

- If no repository, perhaps you are in the wrong Workspace. Get help as needed.

Right-click on today's project, *then select* ***`Checkout`****. Press* ***`OK`*** *as needed.*

The project shows up in the **`Pydev Package Explorer`** to the right. Expand and browse the modules under **`src`** as desired.

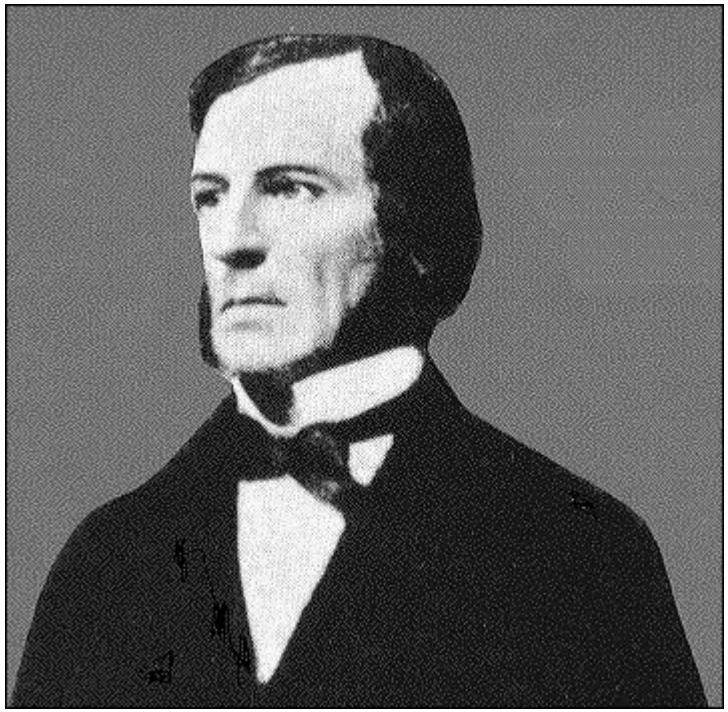
Class Exercise

- In module `01-grade.py`, define a function **grade(score)**
  - where score is an exam score
  - and result is "perfect", "passing", or "failing" based on the score

Comparisons--Boolean expressions

- **Conditions** are ***Boolean expressions***
  - They evaluate to True or False → Boolean constants
- Try in PyDev console:

```
>>> 3 < 4
>>> 42 > 7**2
>>> "ni" == "Ni"
>>> "A" < "B"
>>> "a" < "B“
```



George Boole

Q3

Boolean Variables and Operations

- **Boolean** constants: **True**, **False**
- Relational operators (<, etc.) produce **Boolean** values.

```
>>> 4 < 5
True
>>> 6 != 6
False
```

- Other **Boolean** operators: **and**, **or**, **not**

P	Q	P and Q
T	T	T
T	F	F
F	T	F
F	F	F

P	Q	P or Q
T	T	T
T	F	T
F	T	T
F	F	F

P	not P
T	F
F	T

Truth tables

Q4

Having It Both Ways: if-else

Syntax:

```
if <Condition>:
        <statementsForTrue>
else:
        <statementForFalse>
```

Semantics:

If <condition> is True, execute these statements

If <condition> is False, execute these statements

Q5

A Mess of Nests

- Can we modify the **grade** function to return letter grades—A, B, C, D, and F?

Multi-way Decisions

- Syntax:

```
if <condition1>:
    <case 1 statements>
elif <condition2>:
    <case 2 statements>
elif <condition 3>:
    <case 3 statements>
…
else:
    <default statements>
```

reach here if condition1 is false

reach here if condition1 is false AND condition2 is true

reach here if BOTH condition1 AND condition2 are false

Cleaning the Bird Cage

- Advantages of **if-elif-else** vs. nesting
  - Number of cases is clear
  - Each parallel case is at same level in code
  - Less error-prone
- Fix **grade** function to use **if-elif-else** statement instead of nesting

Q6

Individual Exercise on Using if-else

- Finish the quiz first. Turn it in.

- Then open **02-ountPassFail.py**
- Define (in that file) a function **countPassFail(scores)** that
  - takes a list of exam scores
  - *returns* two values:
    - the count of passing scores in the list (those at least 60), and
    - the count of failing scores in the list
- Examples:
  - **print(countPassFail([57, 100, 34, 87, 74]))** prints **(3,2)**
  - **print(countPassFail([59]))** prints **(0,1)**
  - **print(countPassFail([]))** prints **(0,0)**
- Commit your project to your repository.

Q7

Begin working on your homework

- A version of star that uses conditionals
- Follow the homework 10 instructions in this order:
  - circleOfCircles
  - Star
- Use the appropriate PyDev modules in the `10-DecisionStructures` project to solve these exercises
- Commit your solutions to your repository