

Objectives

- Comparing Programming Languages

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Review: Extensions to

```
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
```

Consider what happens when **searchlist** is a list of *Persons*, **key** is a *str* representing the *name*

- Goal: find a **Person** with a certain name

Good capstone problem:
Brings together

- Algorithms
- Classes/Objects
- Lists
- Methods
- While loops
- Functions

| 0 | 1 | 2 | 3 | 4 |
|----------------------------|----------------------------|------------------------------|--------------------------------|-------------------------------|
| Person Id: "4" "Ben" | Person Id: "3" "Gal" | Person Id: "1" "Henry" | Person Id: "2" "Natalie" | Person Id: "5" "Samuel" |

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Review: Summary of Modifications to Binary Search

- Add a search method
 - Takes as parameter the name to search for
 - Need to lowercase that name
 - Original binary search function took a list as a parameter; 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

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Applying What You Know To Other Languages

- At the beginning of the semester, some of you wondered
 - “Why the Python programming language?”
 - “Will I be able to read/write programs in other programming languages?”
- We’ll answer the first question by showing that you can do the second

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Applying What You Know To Other Languages

- **Syntax:** symbols used
- **Semantics:** what the symbols *mean*

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What is the Python3 Program Doing?

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What is the Python3 Program Doing?

- Getting a line of input from “standard in” (from the user)
- Splitting the input into integers
- Calculating the result to a formula
- Deciding if a student is admitted, based on the result of the formula
- Displaying the result

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Admissions Problem

- Binary University decides to admit students based on a formula that weighs various factors
 - Scores of 70 or better are admitted
- Input: single line, 4 integers, in order below

| Category | Range | Weight Factor (Multiplier) |
|-----------------|----------|----------------------------|
| AP Courses | 0-10 | 10 |
| Intangibles | 1-10 | 8 |
| High School GPA | 0 - 10 | 0.25 |
| SAT score | 600-2400 | .01 |

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Example Input/Expected Output

| Input | Expected Output |
|--------------|-----------------|
| 0 1 0 300 | DENY |
| 6 10 99 2390 | ADMIT |
| 0 7 82 1500 | ADMIT |
| 2 5 0 990 | DENY |
| 2 5 0 1000 | ADMIT |
| 2 5 0 1010 | ADMIT |

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What is the Python Program Doing?

- Getting a line of input from “**standard in**” (from the user)
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Identify these pieces in the other programs

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Comparing Programming Languages

- How is the syntax/semantics of these languages different from Python?
- What is easier or harder to do in these other programming languages than in Python?

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Comparing Programming Languages

- Benefits of Python:
 - Simpler syntax (e.g., fewer `{}` and `()`)
 - Can cover some content with less overhead
- Drawbacks
 - Data types aren't explicit (static)
 - Can be harder for you to remember and keep straight
 - Not compiled explicitly beforehand
 - Keep executing to find all the syntax bugs
 - Doesn't check: "you're passing a file instead of a string"
 - Allows you to do some things that won't work in other programming languages

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Bash

- Scripting language
 - Can call Unix commands
- Example program:
 - `createPrintableLab.sh`

Who Uses Python?

- Google
 - Backends of Gmail and Google Maps and search-engine internals
- NASA
 - Collaborative engineering
- Yahoo
 - Groups: Maintain discussion groups; Maps
- RedHat Linux
 - System infrastructure
- Original BitTorrent client; Youtube; Civilization IV

Source: <http://wiki.python.org/moin/OrganizationsUsingPython>

Tiobe Index

Based on number of hits on web

| Apr 2018 | Apr 2017 | Change | Programming Language | Ratings | Change |
|----------|----------|--------|----------------------------|---------|--------|
| 1 | 1 | | Java CSCI209 | 15.777% | +0.21% |
| 2 | 2 | | C CSCI210 | 13.589% | +6.62% |
| 3 | 3 | | C++ | 7.218% | +2.66% |
| 4 | 5 | ▲ | Python CSCI111, 112 | 5.803% | +2.35% |
| 5 | 4 | ▼ | C# | 5.265% | +1.69% |
| 6 | 7 | ▲ | Visual Basic .NET | 4.947% | +1.70% |
| 7 | 6 | ▼ | PHP | 4.218% | +0.84% |
| 8 | 8 | | JavaScript CSCI335 | 3.492% | +0.64% |
| 9 | - | ▲ | SQL CSCI317 | 2.650% | +2.65% |
| 10 | 11 | ▲ | Ruby | 2.018% | -0.29% |

http://www.tiobe.com/tiobe_index

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Course Evaluations

- On Sakai, due Sunday
- Incentive
 - If 60% of students complete evaluation, 1% Extra Credit on *lab* grades
 - For each additional 10% of students who complete evaluation, 1% EC on lab grades
 - Total possible EC: 5%

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Looking Ahead: Friday

- Lab 11 due
- BI write up due
- Review computer science
 - Where we've been and where you can go
- Bring your exam questions and envelopes
 - Practice