COMS 3157: Advanced Programming

Epilogue

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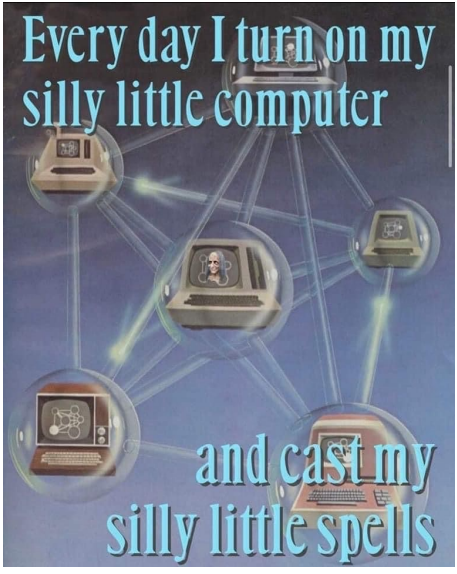
Course Recap


Every day I turn on my
silly little computer
and cast my
silly little spells

Follow the River and You Will Find the C

SIGCSE 2011 paper by Jae Woo Lee et al.

Link to paper can be found on the course homepage

Transition from object-oriented programming to other programming paradigms

~~Read it now, and again after completing this class~~
Read the paper now!

The course, a drama

Exposition
- Lab1: Tools
- Lab2: Pointers
- Lab3: Linked List

Rising action
- Lab4: I/O
- Lab5: UNIX
- Lab6: Sockets

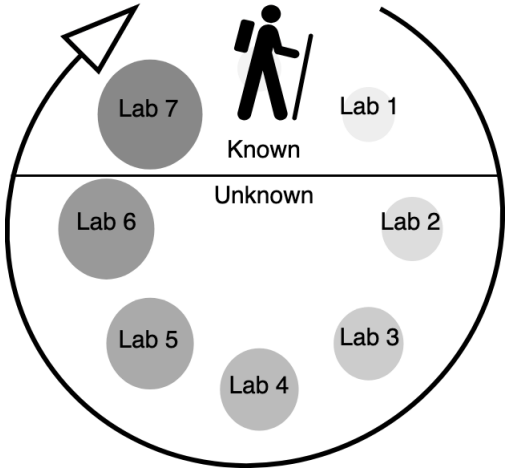
Climax
- Lab7: Web server

Falling action
- Multi-tier architecture

Resolution

C++ essentials
- Lab9: Object lifetime
- Lab10: Linked List II
- SmartPtr

The Programmer's Journey

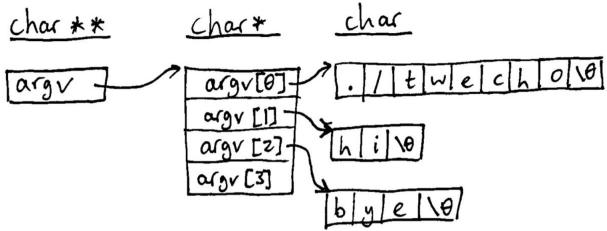


Lab 1: Call to `adventure()`

```
$ ./wordle -f words/short-list -- play
Guess:hello
__-+-
You correctly guessed 3 characters.
```

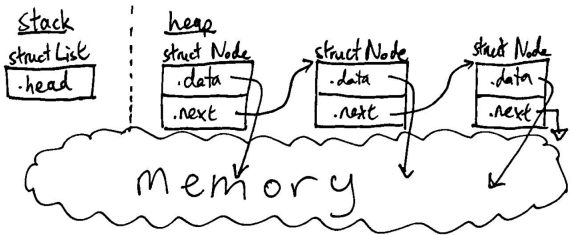
- Discovering a new programming language
- Applying prior programming experience
- Acclimating to the command line

Lab 2: Crossing the Threshold



- Separate compilation
- Bits and bytes
- Pointers and strings

Lab 3: The Road of Trials



- Heap memory management
- Data structures with pointers and `structs`
- Libraries and header files

Lab 4: Abyss

```
$ ./mdb-lookup mdb-cs3157
lookup: ryan
   2: {ryan} said {hi mom}
 154: {aryana} said {hi}
 367: {ryan's dad} said {what about me?}
 946: {mom} said {hi ryan}

lookup: _
```

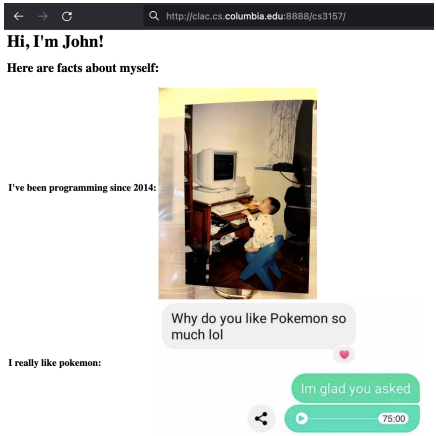
- File streams
- Interactive I/O
- Text vs binary data

Lab 5: Apotheosis

```
--> GET /~j-hui/cs3157/index.html HTTP/1.0
--> Host: clac.cs.columbia.edu:80
-->
<-- HTTP/1.1 200 OK
<-- Date: Mon, 14 Nov 2022 11:58:17 GMT
<-- Server: Apache/2.4.52 (Ubuntu)
<-- Content-Length: 363
<-- Content-Type: text/html
<--
<-- <html>
<-- ...
```

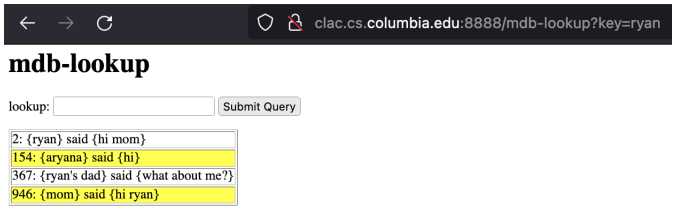
- HTTP (client side)
- TCP connections as file streams
- Sockets API and adapting boilerplate

Lab 6: The Ultimate Boon



- HTTP (server side)
- C string parsing and error-handling
- Multi-processing and signal-handling

Lab 7: The Road Home



- Three-tier service architecture
- Dynamic web content
- Applying prior programming experience

The Road Ahead

Bytes, Pointers, and Evaluation

COMS W4115: Programming Languages and Translators

COMS W4181: Security I & COMS W4182: Security II

File and Network I/O

CSEE W4119: Computer Networks

COMS 4111: Introduction to Databases

Processes and Concurrency

COMS W4118: Operating Systems I

COMS W4113: Fundamentals of Large-Scale Distributed Systems

Completing AP

Fill out CourseWorks evaluations!

Academic honesty reminder

Do NOT upload class-related code to public GitHub repos

Acknowledgments

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The TAs

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Chloe Ho
Phillip Le
Claire Liu
Phoebe Lu
Sagarika Sharma
Anjali Smith
Nandini Talwar
Jake Torres
Patrick Tong
Imanol Uribe Echevarria
Maÿlis Whetsel*
Noam Zaid
Tal Zussman*

*Head TA

Yourselves

Celebrate what you've achieved

Don't compare yourself with your peers;
compare with yourself 12 weeks ago

Keep programming!