National Federation of the Blind Youth Slam

Instant Messaging Chatbots and Location-Aware iPhone Apps

Jeffrey P. Bigham

University of Rochester
Computer Science

Blindness Statistics

- Population at Large
  - > 10 million visually-impaired people in U.S.
  - > 1.3 million blind in U.S.
  - 45 million visually-impaired people worldwide
- Students (ages 16 -25)
  - 11% of school-age children disabled
  - > 4 million students
  - > 20,500 blind students

[1] U.S. Department. Of Education, Special Education Programs. 2005.

NFB Youth Sla

- Exploring
  - Especi

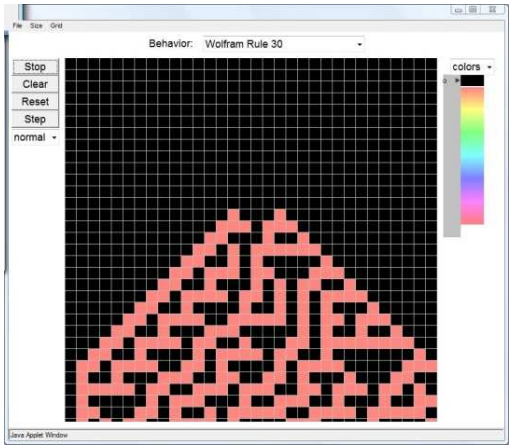
Goals for Project

- Illustrate an exciting application(s) of CS
- Ample opportunities for personalization
- Integrate problem solving
- Realistic but quick to start
- Project should be accessible
  - Screen reader
  - Low vision software

Related Work

- Inspiring Students
  - LOGO, Lego Mindstorms, CMU's Alice, CS Unplugged, ...
  - Game of Life (UW DOIT)
- Many visual projects
  - What about blind students?
- Chatbots
  - Eliza, AOL's SmarterChild, etc.
  - Cool Terminal Programs

Original LOGO Turtle



Game of Life

Outline

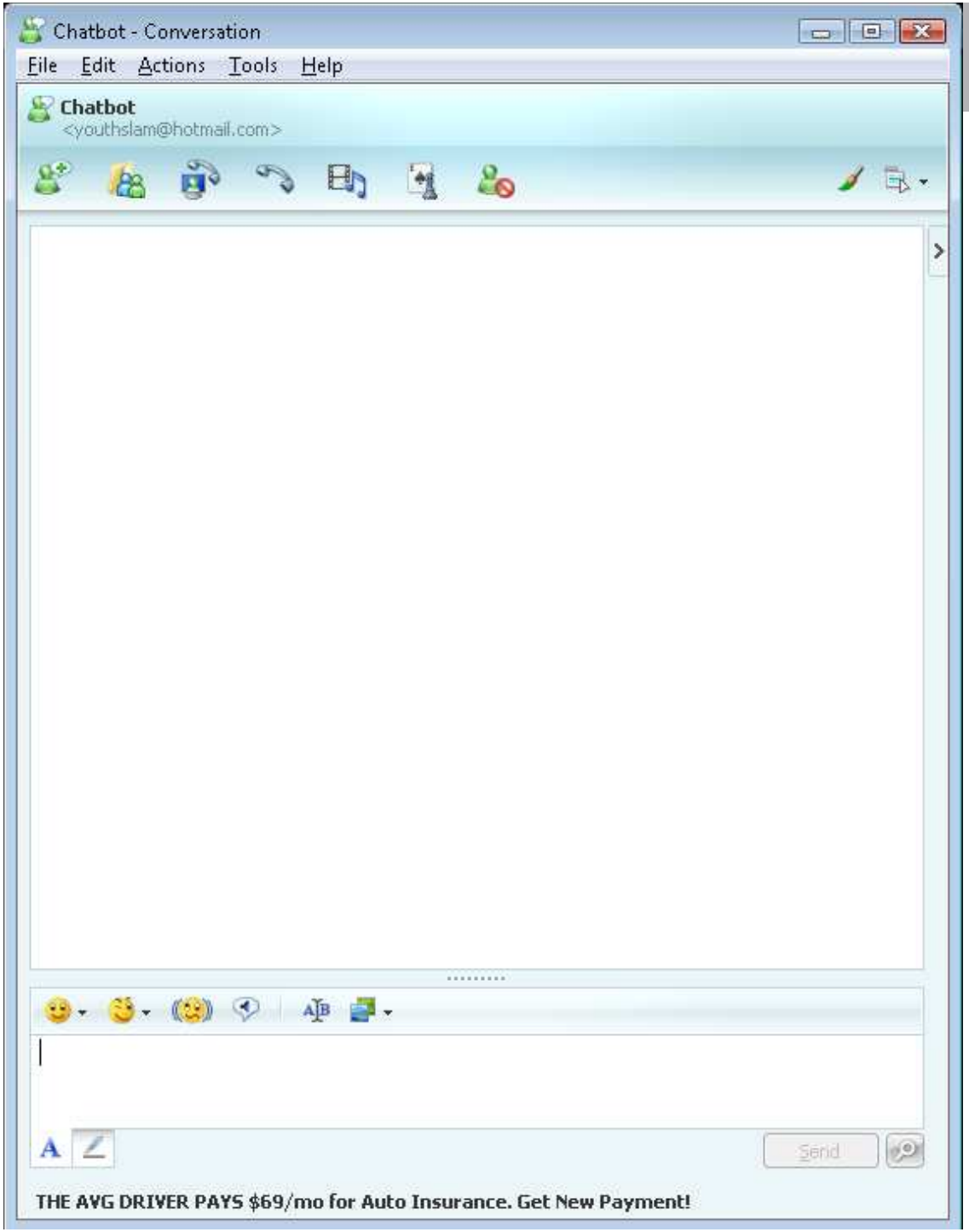
- Introduction
- Chatbots Project
- Accessible Tools and Curriculum
- Results

An IM Client that Talks Back

- Otherwise known as a chatbot

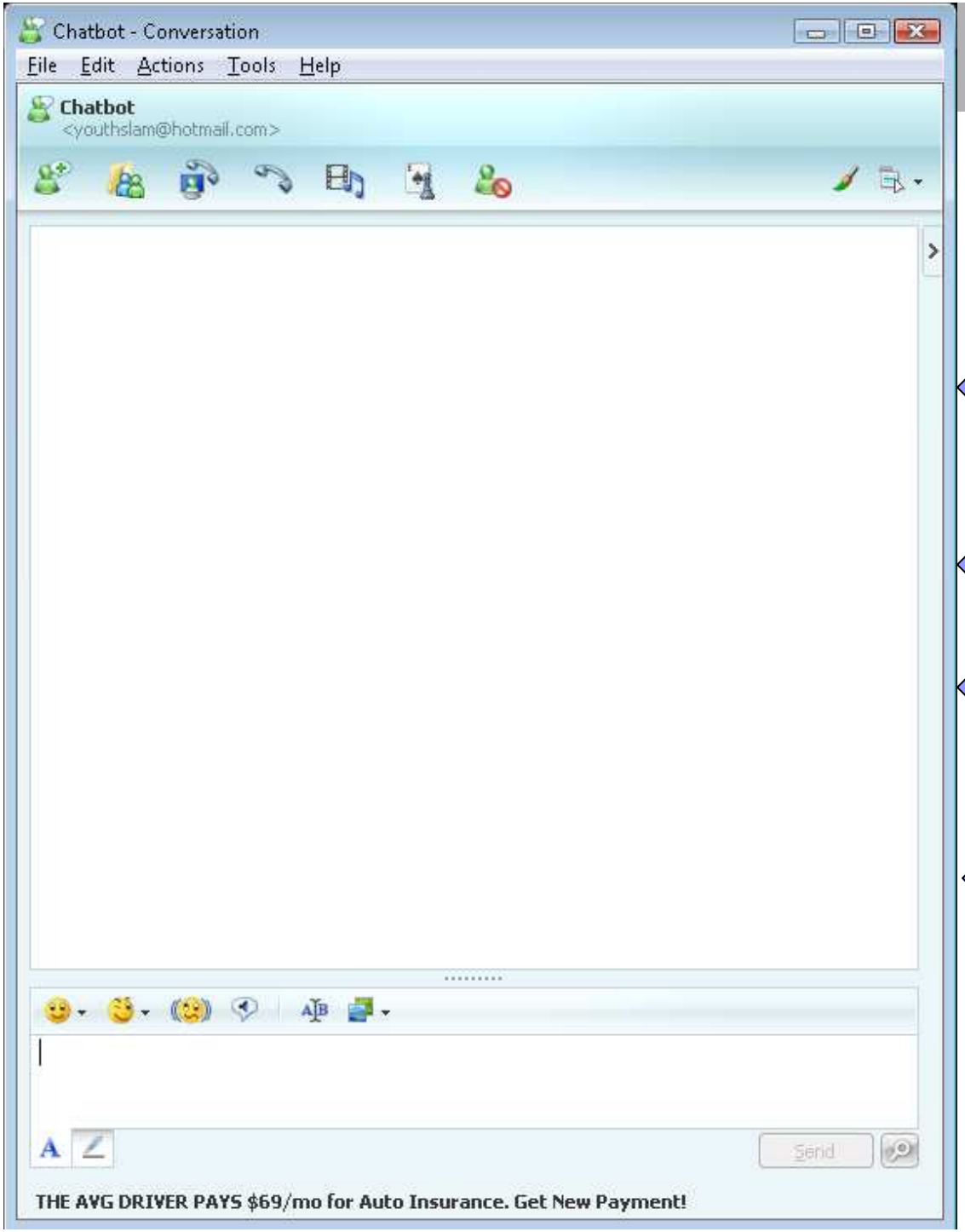
Students will build a fun chatbot that can talk to them (or their friends) through instant messenger. **Chatbots are software robots** capable of carrying on simple conversations. Students will be able to **create a personal chatbot** endowed with unique personas, such as those resembling a psychologist, Yoda from Star Wars, or anyone else that they can imagine. The chatbots will **draw information from the web** and be able to **answer useful questions** like "What's the weather in Baltimore?", "Who won the Orioles game last night?", or "Where's the nearest Chinese restaurant?" Students will return home with basic knowledge of **artificial intelligence, natural language processing and web programming**, along with a personalized chatbot that they can continue to use on their home computers.

No prior computer programming experience required.



Chatbot Demo

- Created by a student
- Read by a screen reader



Chatbot Demo

Responses triggered by simple regular expressions.

Chatbots work with remote web services – today's weather, news and dictionary.

Programming from the Start[1]

- Build confidence w/ realistic environment
  - Not facsimile of programming
  - Real programming

- Teaching the power of programming
- Taste of what programming is like
- Building excitement, not capacity

[1] VanDeGrift et al. “The Game of Life Workshop - Reaching Out to High School Students With Disabilities.” ASEE 2007.

Instructors and Mentors

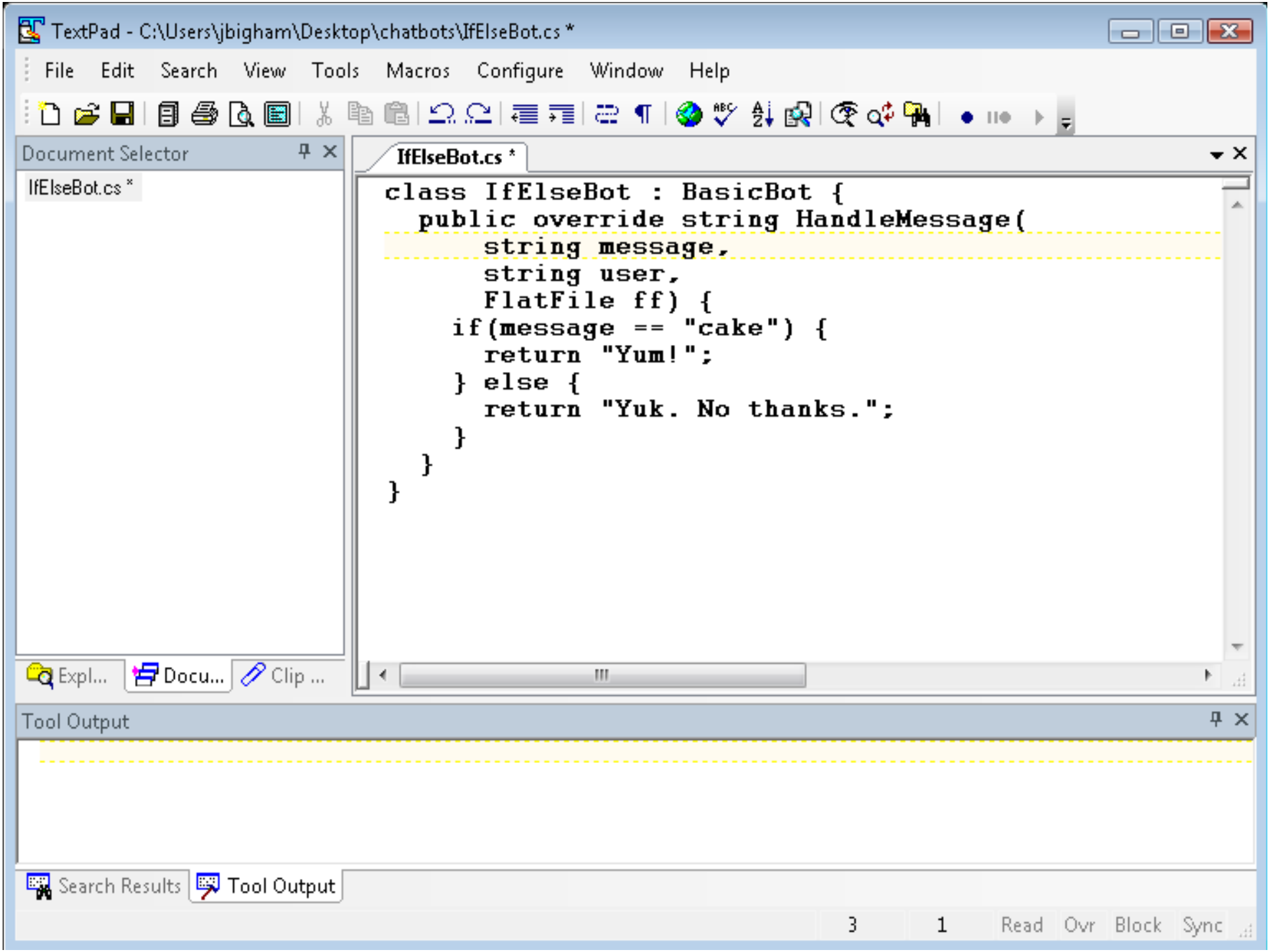
- Many Instructors
  - 1 instructor per 4 students
  - Provided personal attention
  - Supplemented by tutorial

- Blind mentors
  - Some knew how to use screen readers
  - Incredibly helpful

Example Code

```
class HowAreYouBot : BasicBot {
  public override string HandleMessage (
      string message, string user, BotMemory bm) {
    if(bm ["asked"] == "yes") {
      bm ["asked"] = "no";
      return "That 's great!";
    } else {
      bm ["asked"] = "yes";
      return "How are you today?";
    }
  }
}
```

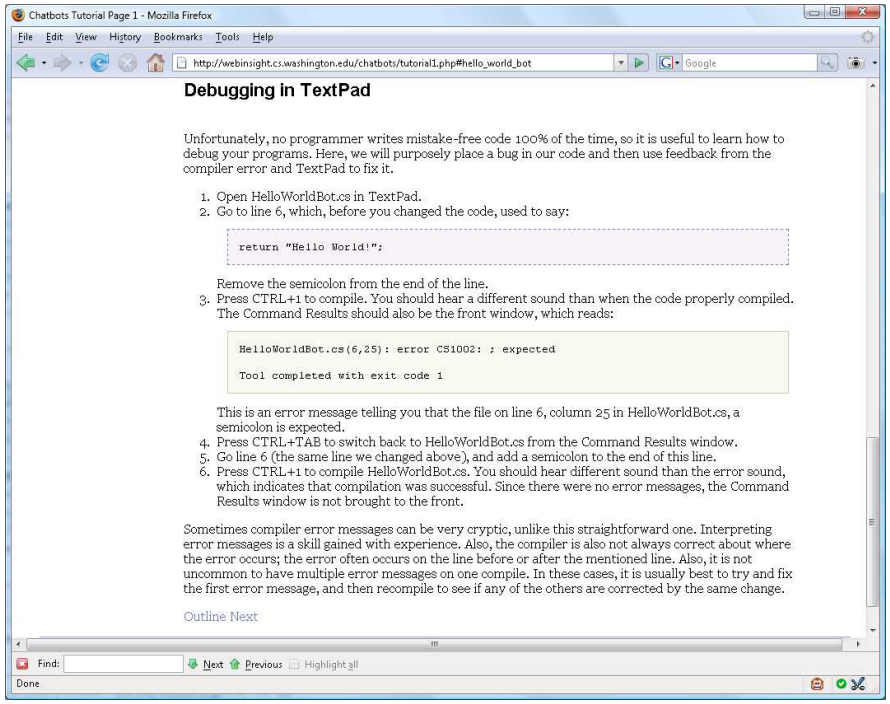
User: Hello
Bot: How are you today?
User: Great.
Bot: That's great!


TextPad - C:\Users\jbigham\Desktop\chatbots\IfElseBot.cs *
File Edit Search View Tools Macros Configure Window Help
Document Selector
IfElseBot.cs *
IfElseBot.cs *
class IfElseBot : BasicBot {
public override string HandleMessage(
string message,
string user,
FlatFile ff) {
if(message == "cake") {
return "Yum!";
} else {
return "Yuk. No thanks.";
}
}
}
Expl... Docu... Clip ...
Tool Output
Search Results Tool Output
3 1 Read Ovr Block Sync

Outline

- Introduction
- Chatbots Project
- Accessible Tools and Curriculum
- Results

Accessible Tutorial

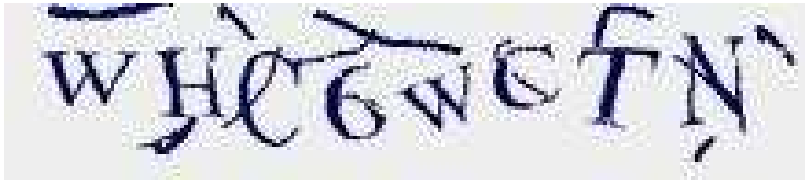


Headings
(h1 – h6)

Lists
ul, ol
li

- Unfortunately, not everything was accessible…
  - CAPTCHAS, even audio

Example 1 **Example 2**



Choosing Software

- Consulted Blind Programmers
- JAWS Screen Reader
- ZoomText for Students with Low Vision
- Chose accessible, free approach
  - C# on most computers
  - More readable errors
  - Curriculum on Web Page (easily converted)
  - TextPad
  - Windows Live Messenger (Formerly MSN)

Why Windows Live?

- Balance of Accessibility and Functionality
  - Most accessible IM client
  - Ability to be signed on an off often
- Chatbots compatible with many IM clients
  - Windows Live, AOL, Yahoo, Jabber (GTalk)
  - Bots can talk to friends

Lessons Learned

- Diverse set of abilities
  - Technical sophistication
    - Familiarity with screen reader
  - Preferred Accommodation
    - Screen reader (JAWS and Window-Eyes)
    - Screen Magnifier (ZoomText)
    - Sitting close to the screen
- Anyone can help
  - No prior experience required (but helpful)
  - Bring an audio splitter ☺

Results

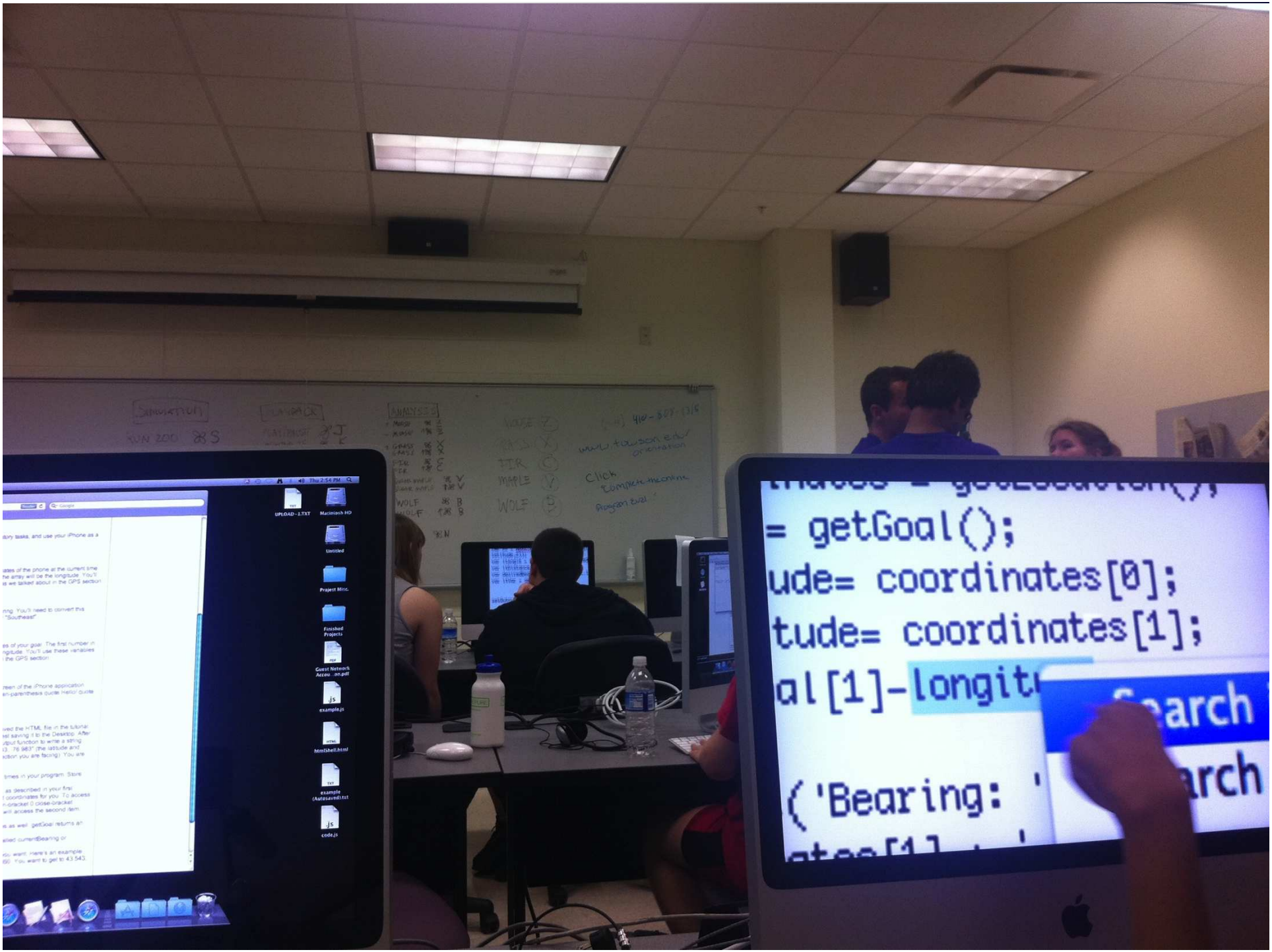
"After the first day, we realized that programming is hard, but after we got into it, it was really fun!"

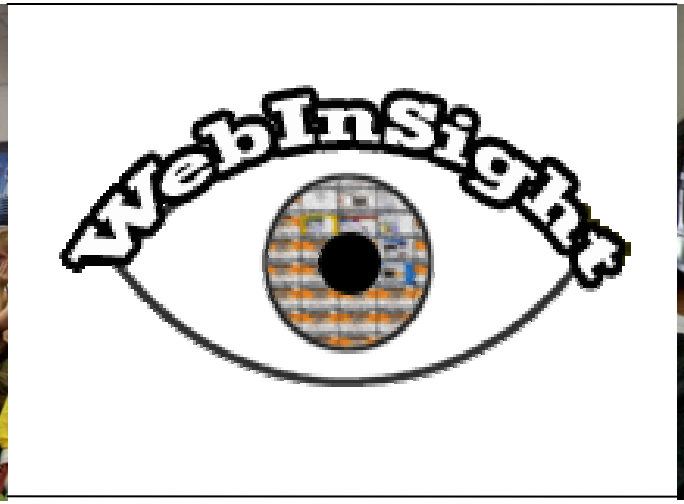
- 2 students continued after the workshop
  - Followed up over several weeks
  - Easy to set up on their own computer

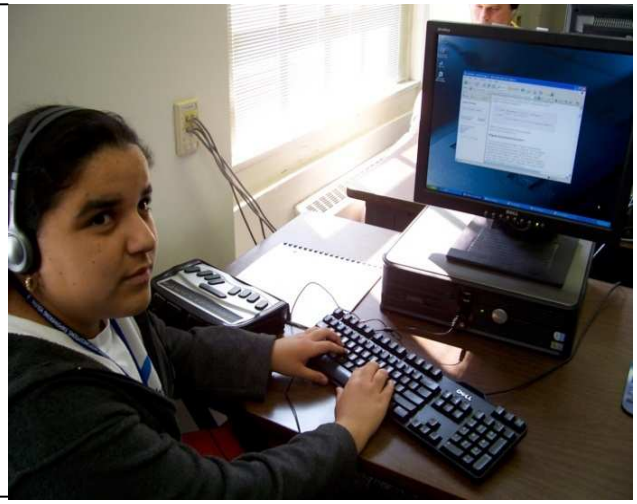
2011 Update

- Reworked the Curriculum for iPhone
- Location-Aware iPhone Applications
  - where am I?
  - directions to a location
  - GPS tag

user | slam #
pass | thankyou thankyou
GPS tutorial
VoiceOver (Antonio)
GPS


= getGoal();
ude= coordinates[0];
tude= coordinates[1];
al[1]-longit
('Bearing: '
Search
arch
UPLOAD-1.TXT
Macintosh HD
Untitled
Project Misc.
Finished Projects
Guest Network Accou...on.pdf
example.js
htmlShell.html
example (Autosaved).txt
code.js





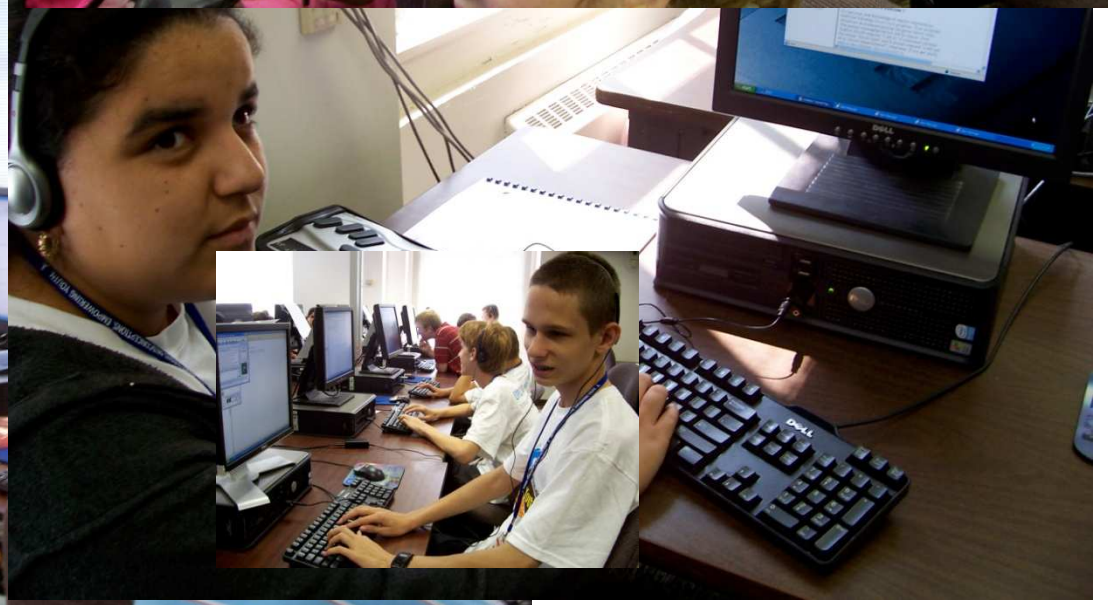
Code and curriculum at:

webinsight.cs.washington.edu/chatbots

http://roc.cs.rochester.edu/youthslam

Thanks to: National Federation of the Blind, National Science Foundation, Boeing, John Hopkins University, Sangyun Hahn, Marc Riccobono, Mary Jo Thorpe.

R



Short History of Chatbots

- Eliza – a psychologist
  - **User:** I am happy.
  - **Chatbot:** Do you enjoy being happy?
  - **User:** Yes, very much
  - **Chatbot:** I understand.
  - **User:** That's great
  - **Chatbot:** Tell me more...
  - **User:** It's really, really great
  - **Chatbot:** Come, come, elucidate your thoughts.
- SmarterChild (AIM)
  - Chatbot on AOL Instant Messenger