Session 8L:

Lightning Talks Session 2

3:45 – 5:00 p.m.

Please hold your applause and questions until all the talks are done.

Vote for your favorite talk – use Whova!

Using Scapy in Teaching Network Header Formats, **Robert Montante**

Linked-List vs. Array in Memory: an Unplugged Active Learning Experience, **Elizabeth Boese**

An HTML5 Browser Application for Modeling and Teaching Linked Lists, **Robert Ravenscroft**

Teaching Deduction Using Athena and Related Tools, **Ramachandra Abhyankar**

Using Discord to Understand and Moderate Collaboration and Teamwork, **Lisa Lacher**, Cydnee Biehl

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Computer Programming Training for Under-Served Groups, **Dante Ciolfi**

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Benefits of Exposure Programs to K12 Student Interest in Computer Science, Jeffrey Miller, **Saty Raghavachary**

~~*Exploring Computer Science Beyond High School: Introducing Career and College Pathways,* **Abril Vela**~~

Asset Maps: A Simple Tool for Recruiting and Retaining Underrepresented Populations in Computer Science, **Adrienne Smith**, Rebecca Zulli

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Using Scapy in Teaching Network Header Formats

- Goals:
  - Hands-on control of header fields
    - » viz., TCP sequence, acknowledgement values
  - No major programming experience required
  - Good visualization

- Target audiences:
  - **Digital Forensics** majors
    – need to understand networking for incident analysis
  - **Computer Science** majors
    - understanding of how network protocols work
    - able to handle programming
    - » Much smaller audience than D.F.

Using Scapy in Teaching Network Header Formats

- Scapy features
  - Python-based
  - Programmable control of network header values
  - Good visualization

```
.
Sent 1 packets.
###[ IP ]###
  version= 4
  ihl= 5
  tos= 0x0
  len= 40
  id= 36380
  flags= DF
  frag= 0
  ttl= 64
  proto= tcp
  chksum= 0x3cf0
  src= 192.168.119.62
  dst= 192.168.119.52
  \options\
###[ TCP ]###
     sport= http_alt
     dport= 55425
     seq= 1576911827
     ack= 30
     dataofs= 5
     reserved= 0
     flags= FA
     window= 29200
     chksum= 0xb3fe
     urgptr= 0
     options= {}
###[ Padding ]###
        load= '\x00\x00\x00\x00\x00\x00'
```

Using Scapy in Teaching Network Header Formats

- Current status:
  - Assignment – Create and send raw Ethernet frames, ARP frames, LLDP frames, Ping packets
    - Set Ethernet type field explicitly
    - Observe results via Scapy and Wireshark
  - Assignment – Send raw IP packet, TCP Syn packet; simple TCP Denial-Of-Service proof-of-concept
  - Experiment – Create complete TCP session with explicit control and display of Sequence, Acknowledgement fields
    - Requires cooperating server
    - Implemented on VMs

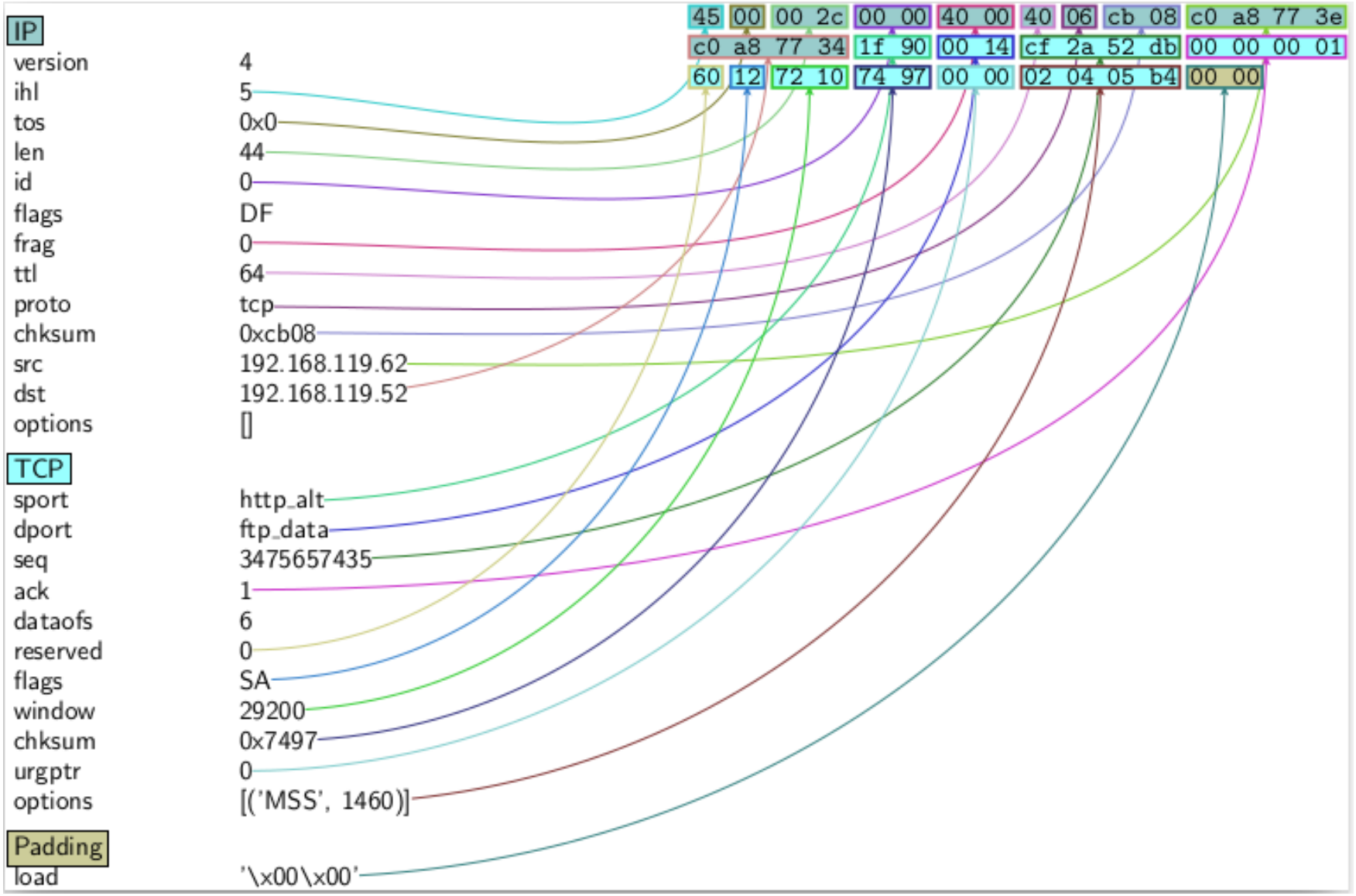
Using Scapy in Teaching Network Header Formats

- Contact:
  - Robert Montante
  - Department of Mathematical and Digital Sciences
  - Bloomsburg University of Pennsylvania
  - bobmon@bloomu.edu *or* bloomu.prof@gmail.com

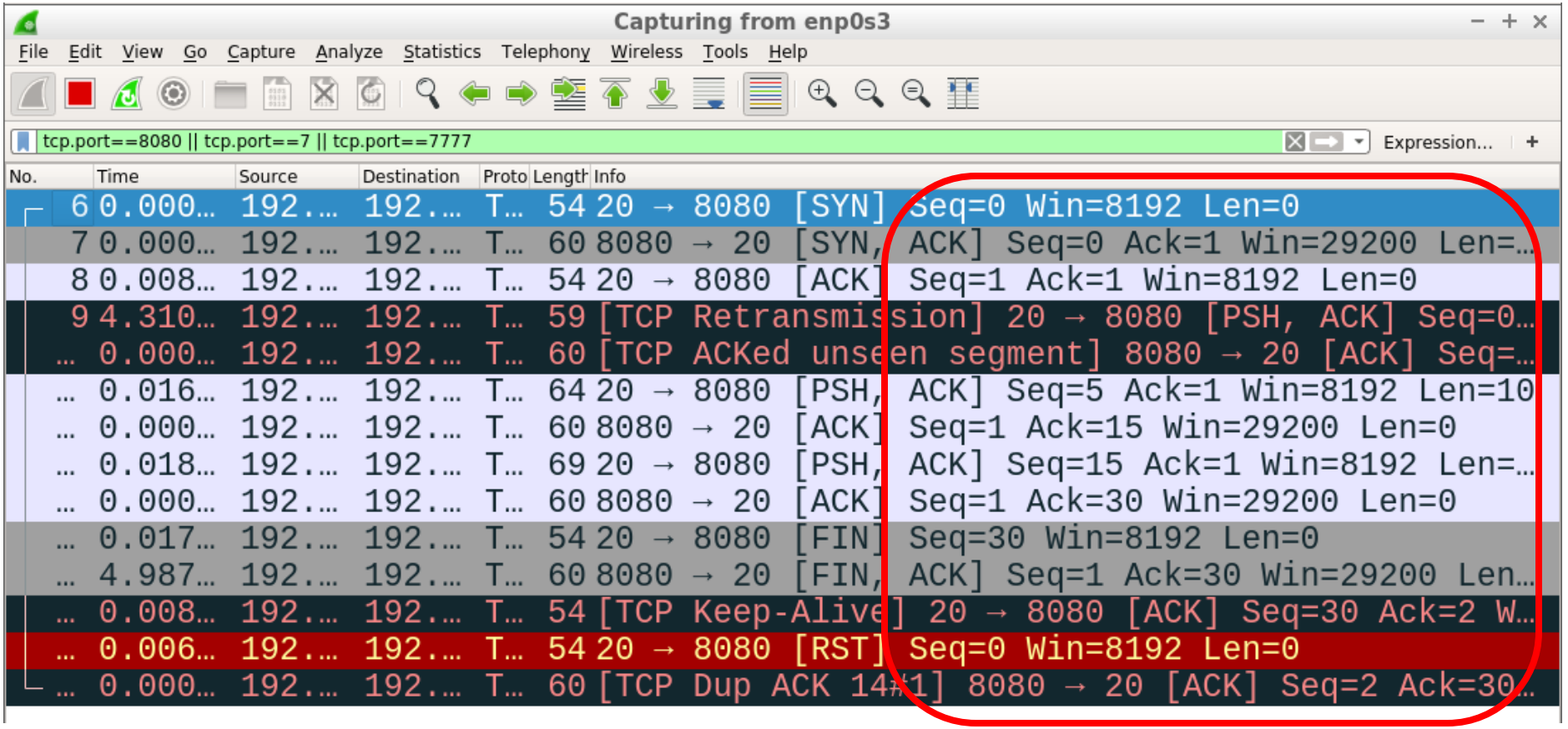
  - 1st Scapy assignment:
    montcs.bloomu.edu/VM-LAN/LAN04.asn.scapy.html

  - 2nd Scapy assignment:
    montcs.bloomu.edu/VM-LAN/LAN10.asn.scapy2.html

Using Scapy in Teaching Network Header Formats



Using Scapy in Teaching Network Header Formats



- Wireshark's Info column displays Sequence, Acknowledgement values

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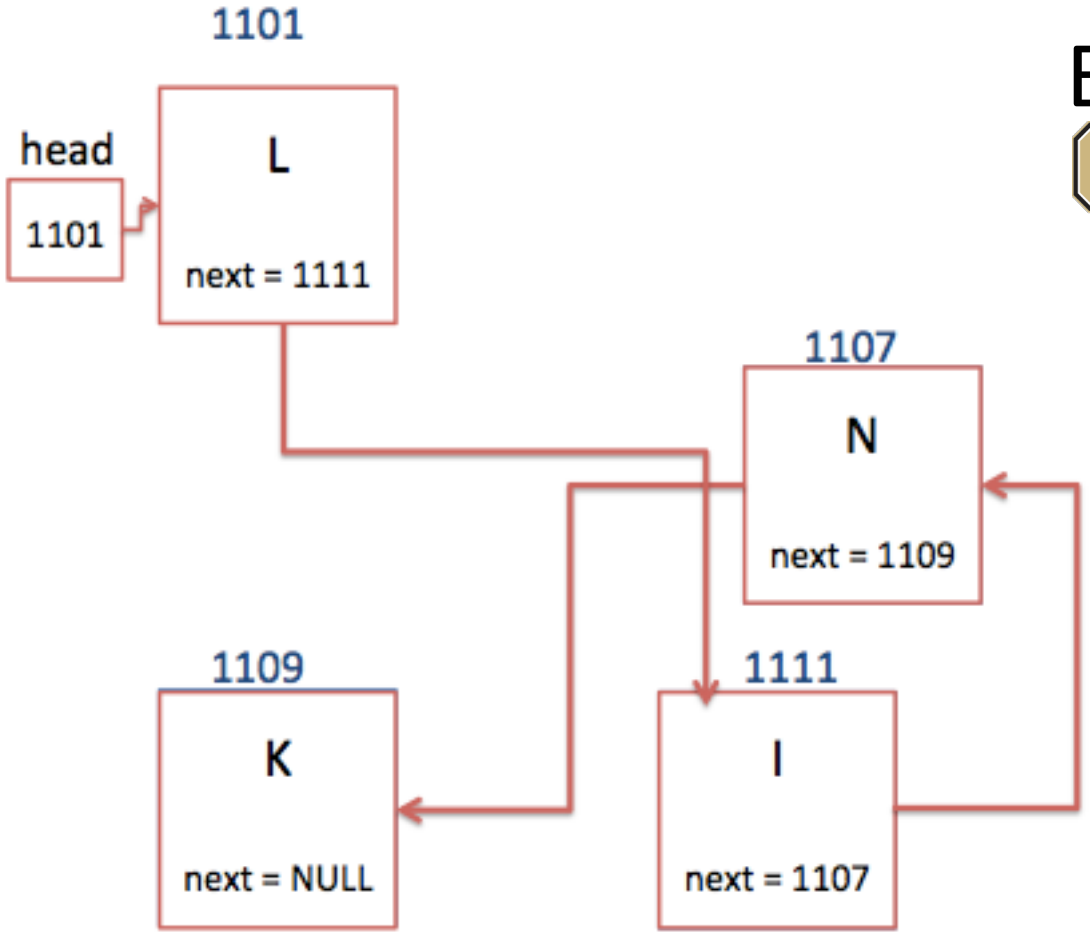
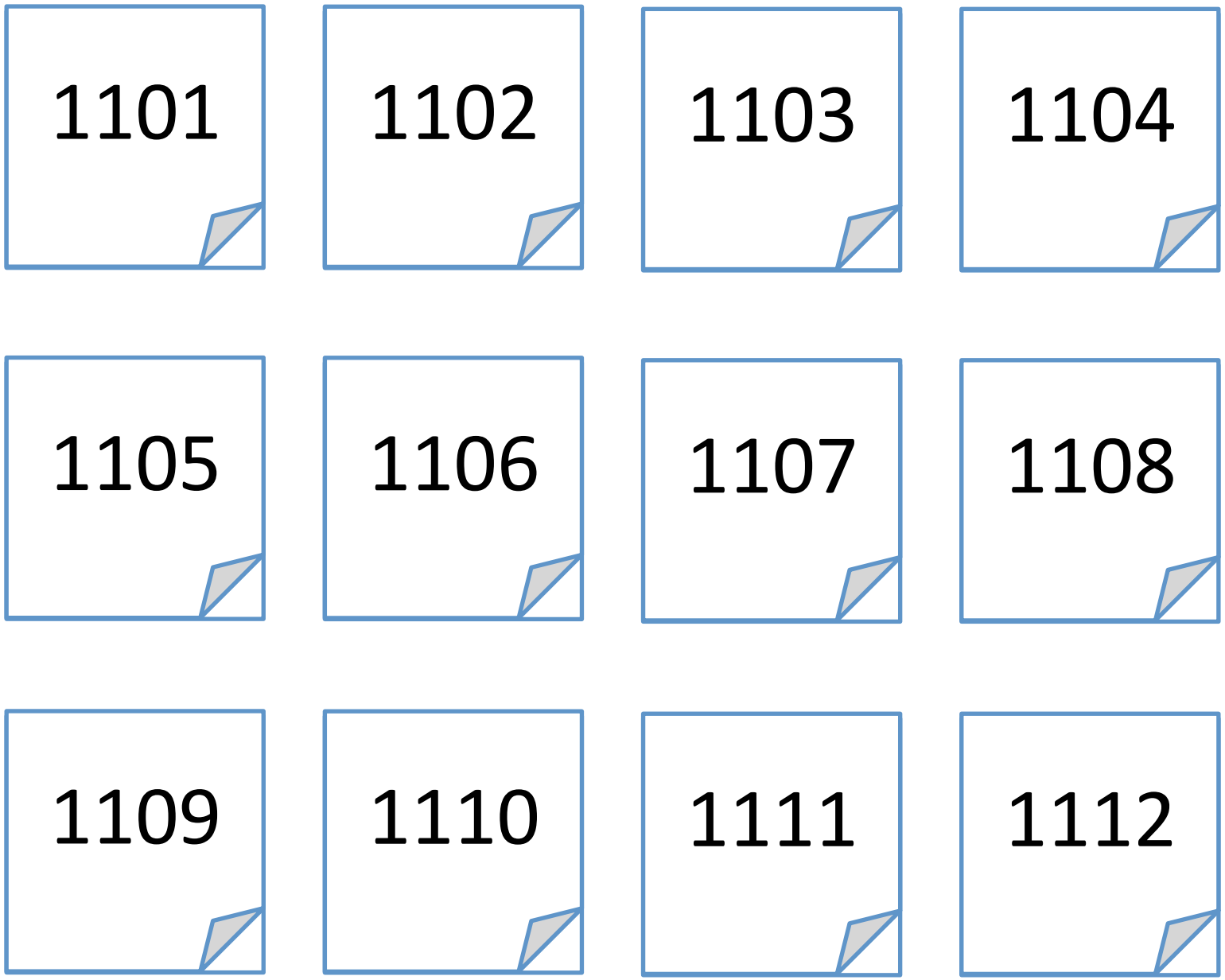
Linked-List vs Array in Memory

an Unplugged Active Learning Experience



Elizabeth Boese

University of Colorado Boulder



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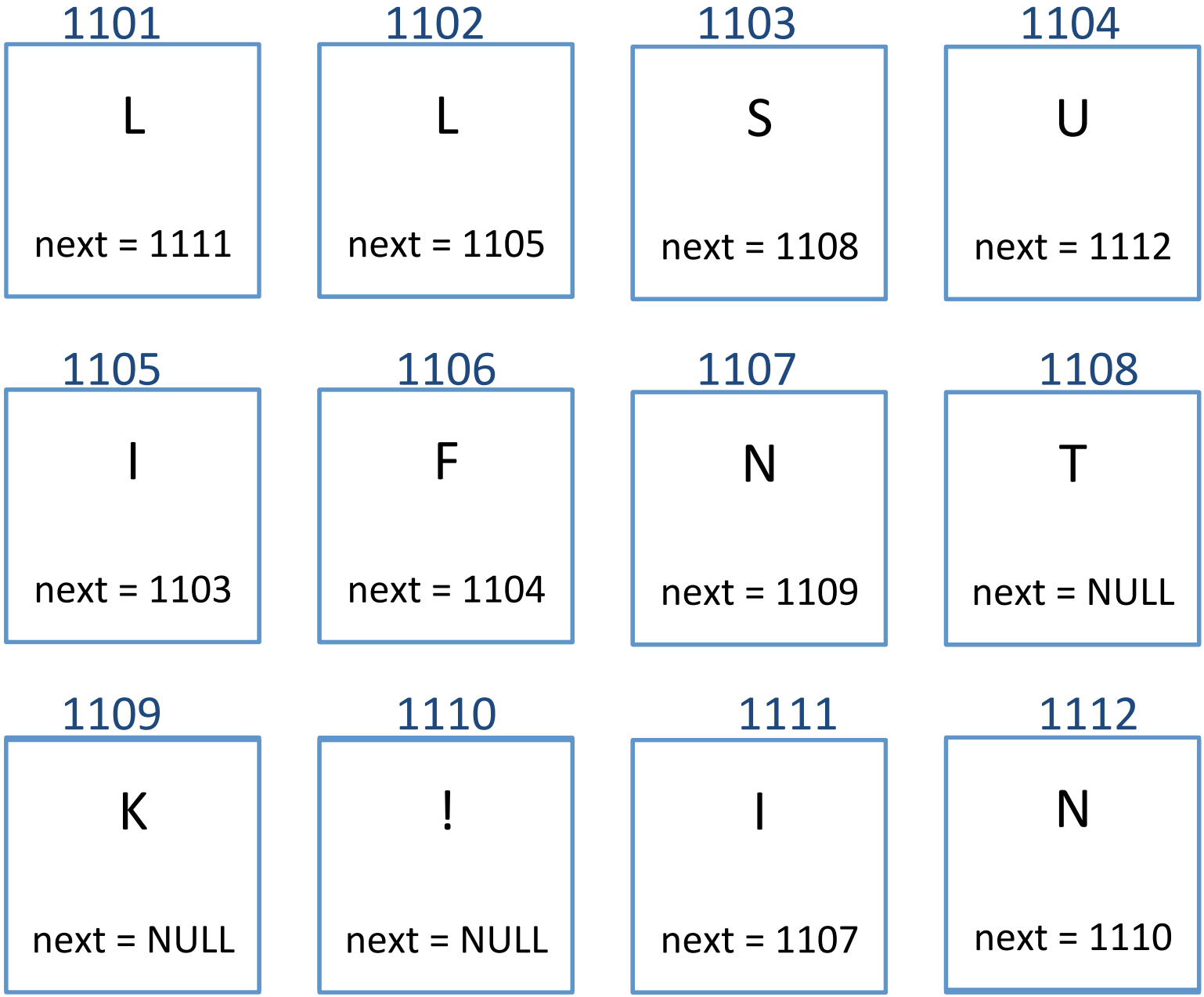

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Demo

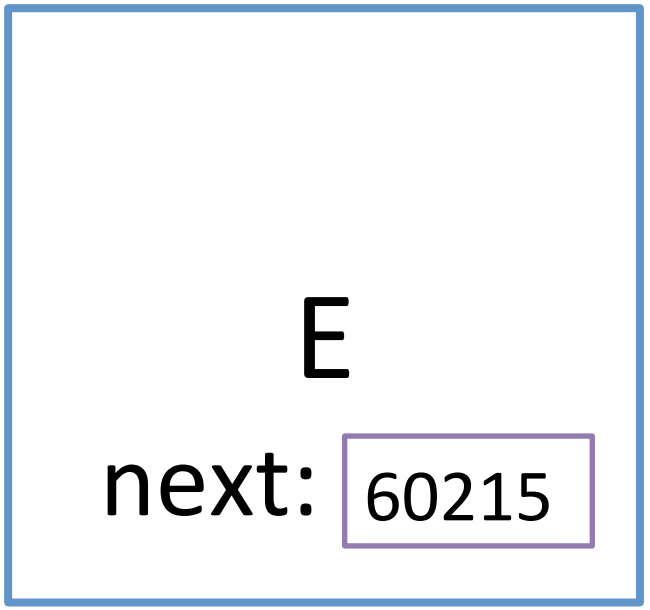
Linked List vs. Array Exercise

Front of card is your address in memory

Linked List vs. Array Exercise

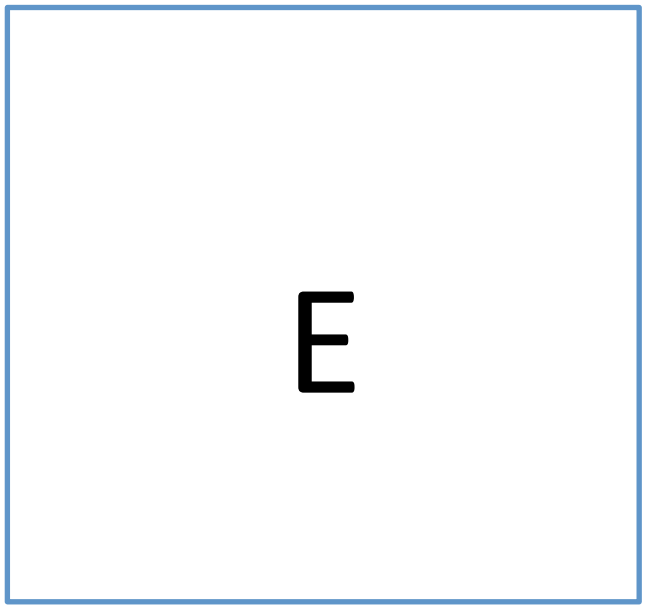
Inside *most of you* have data for the struct:

```
struct Data
{
    char letter;
    struct Data* next;
};
```



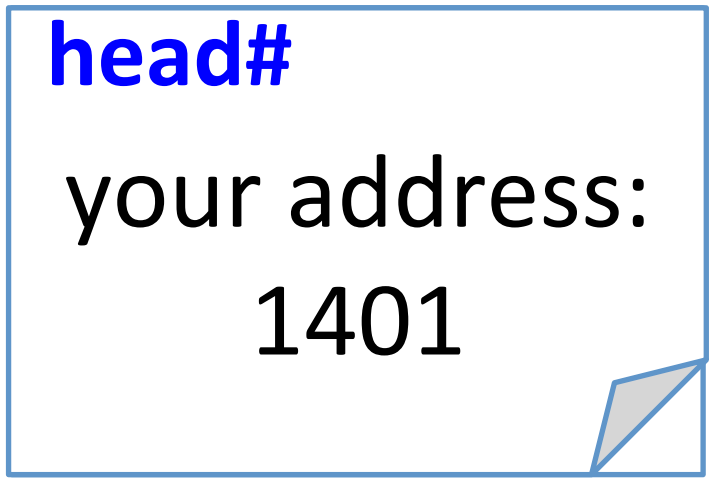
Linked List vs. Array Exercise

Those of you with JUST a letter inside, stand-up



Linked List vs. Array Exercise

Those of you with **head#** on the front, stand-up

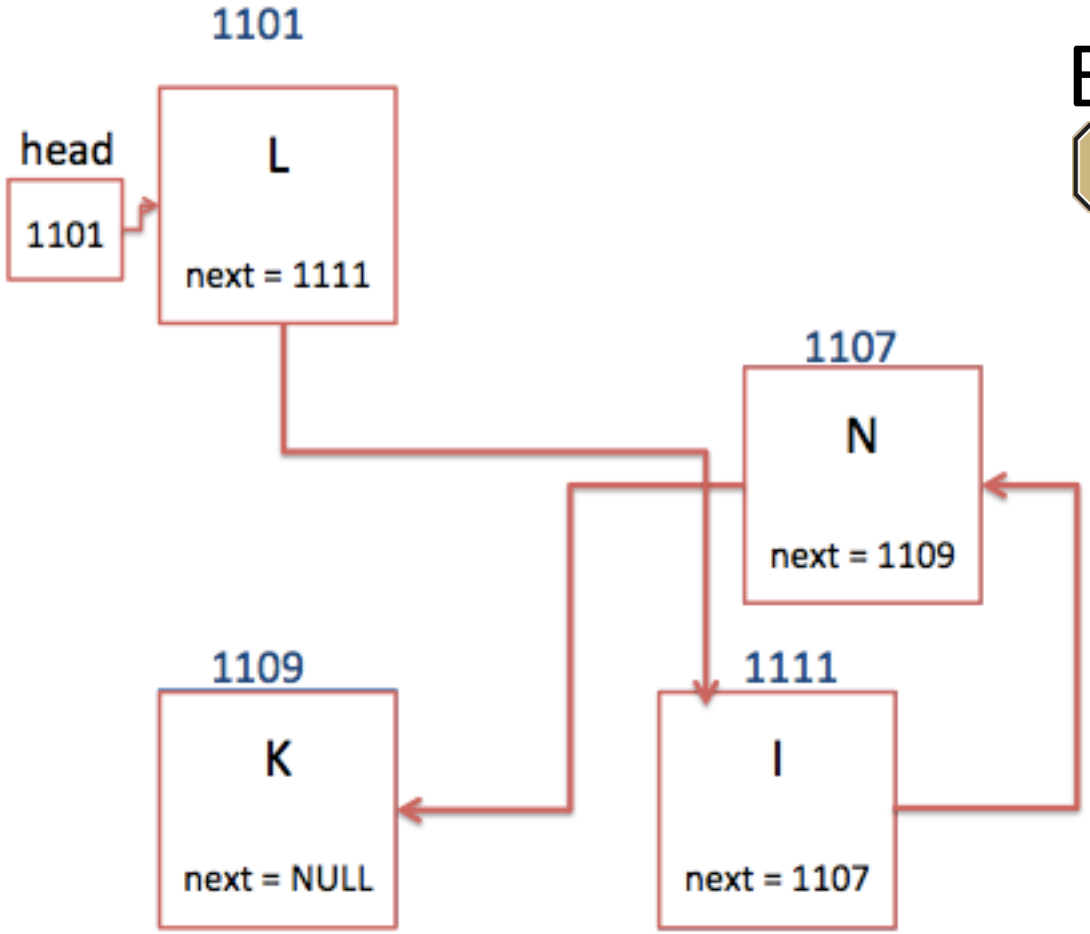


address

Data * head24;

Linked-List vs Array in Memory

an Unplugged Active Learning Experience



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An HTML5 Browser Application for Modeling and Teaching Linked Lists

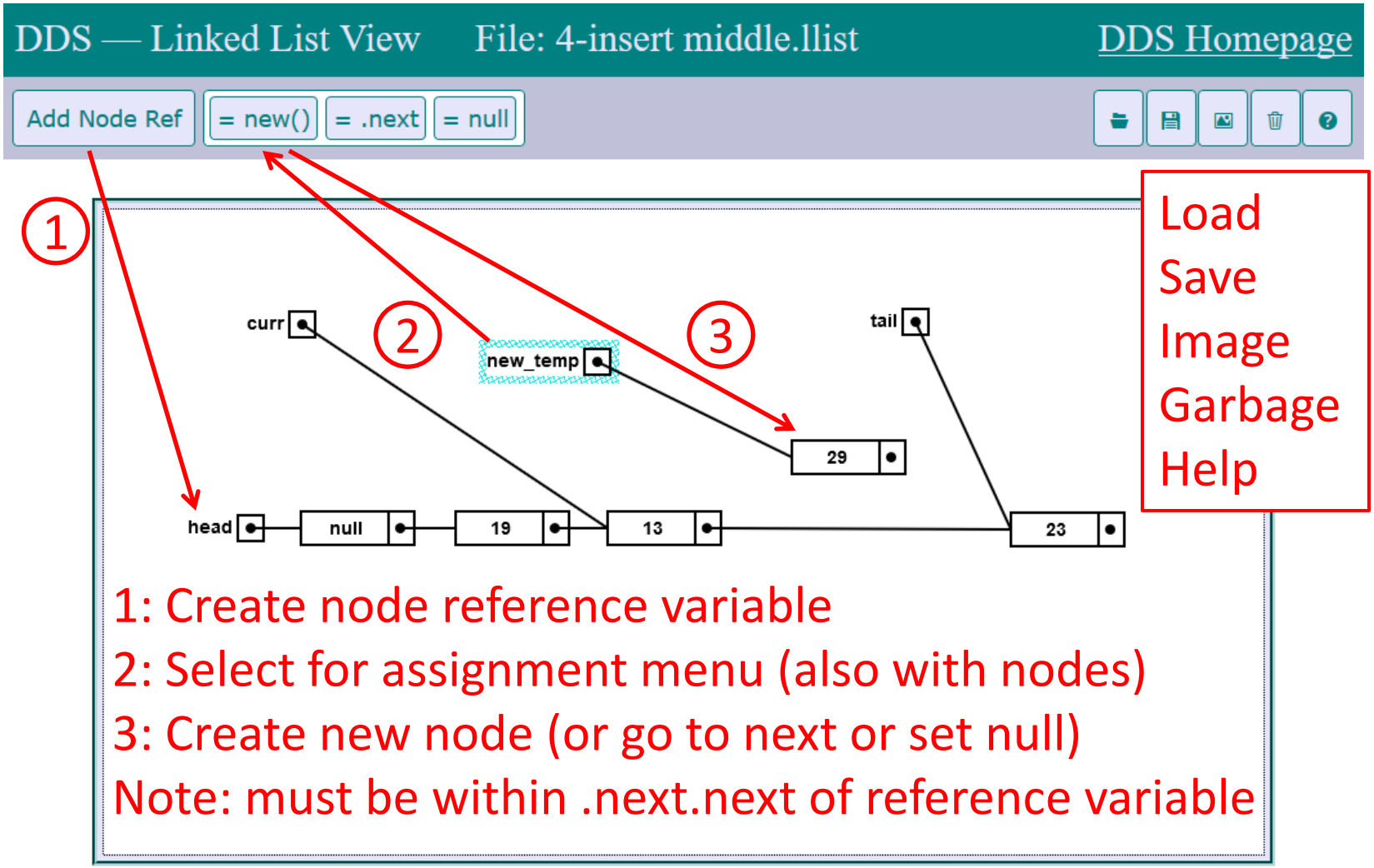
Robert A. Ravenscroft, Jr.

Rhode Island College

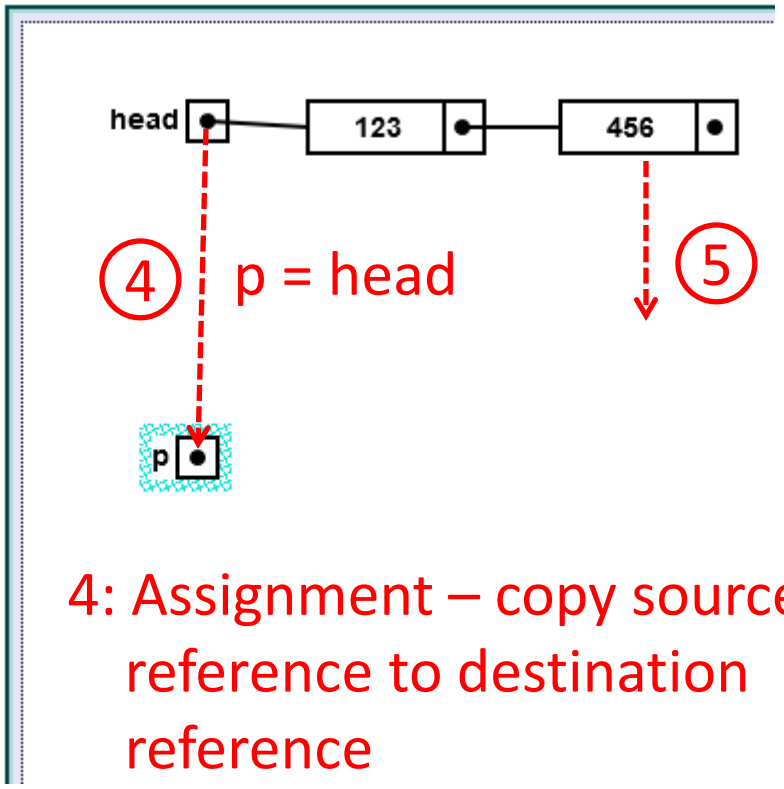
Goals

- White boards are static
- Linked lists are dynamic
- Web based classroom teaching tool
  - **No hand drawing**
  - Model and manipulate linked lists
  - Syntactically correct, consistent with Java
  - Easy to use
- **Not an algorithm visualization system!**

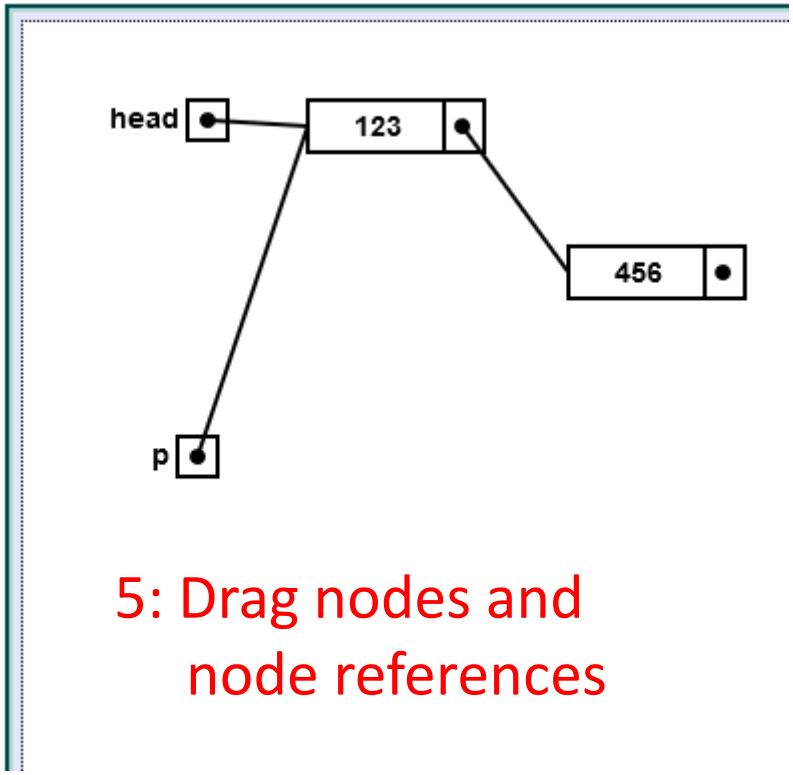
Dynamic Data Structures — Linked List



Assignment and Object Dragging



4: Assignment – copy source reference to destination reference



5: Drag nodes and node references

Integrity of the model is maintained!

Availability

- www.dsviewer.org
- www.dsviewer.org/dds-llist
- www.dsviewer.org/dds/homepage
- www.dsviewer.org/dds-btree

Classroom Experience

- Used to model List, Stack, and Queue ADTs
- Motivate, develop and trace algorithms
- Benefits
  - Met objectives (no hand drawing!)
  - Focus on examples, not on drawing models
  - Post class examples to web/lms
  - Reload examples with clean model
  - Responding to student questions (unexpected)

Classroom Experience

- Problems and concerns
  - Student notebooks are not dynamic
    - Cannot capture behavior
    - Needs a record feature
  - Needs undo facility
  - Needs tabbed interface
  - Student usage?
- See DDS Homepage
  - Proposed enhancements (and related issues)
  - A prototype block language (Firefox only)

DDS is Seeking …

- Users
- Suggestions for features and improvements
- Bug reports
- Collaboration on classroom usage
- Ideas for student usage
- Evaluation of student usage

- Let us know about your DDS experiences

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Teaching Deduction Using Athena

Ramachandra B. Abhyankar

Indiana State University

Athena – a language that combines computation and deduction

- Described in the book : “Fundamental Proof Methods in Computer Science: A Computer-Based Approach” by Konstantine Arkoudas and David Musser (MIT Press, 2017)
- Two main kinds of constructs: expressions and deductions.
- Athena – a functional programming language
- Define functions/procedures for performing computations
- Define “methods” for performing deductions

Athena : a system to aid development of natural deduction proofs

- Natural deduction proofs appeal to human beings, unlike say, resolution proofs, which are machine-oriented.
- Athena is not a theorem-prover
- Athena supports the following forms of reasoning: propositional logic, first-order logic, equality reasoning, mathematical induction.
- Any attempt by the user to perform a wrong deduction step is flagged by Athena as an error.

Athena supports top-down proof development

- Central idea: development of a proof is similar to the development of a program.
- In a top-down development of a program using stepwise refinement, “stubs” are used for subroutines yet to be written.
- Likewise, in the top down development of a proof, “forcing” is used for sub-proofs that have not yet been written.

Athena :Integration with other tools

- Athena is integrated with theorem provers SPASS and Vampire, to help in the development of difficult proofs (some translation needed , as most theorem provers are based on unsorted logic, but Athena is based on many-sorted logic).
- Athena integrated with SAT solvers and Satifiability Modulo Theories (SMT) solvers Yices and CVC4; used to check for satisfiability and to solve problems such as the N-Queens problem.
- Integration is seamless; Athena users need not know how to work with these tools on a stand-alone basis.

Example proof in Athena: Superman does not exist

- “If Superman were able and willing to prevent evil, he would do so. If Superman were unable to prevent evil, he would be impotent; if he were unwilling to prevent evil, he would be malevolent. Superman does not prevent evil. If Superman exists, he is neither impotent nor malevolent. Therefore, Superman does not exist.”

```
#Superman.ath
declare A, W , P, I , M, E  : Boolean
assert a1 := ( ( A & W ) ==> P )
assert a2 := ( ( ~ A ) ==> I )
assert a3 := ( ( ~ W ) ==> M )
assert a4 := ( E ==> ( ( ~ I ) & ( ~ M ) ) )
assert a5 := ( ~ P )

define D1 := method ( E a1 a2 a3 a4 a5 )
        (!force  false )

(!by-contradiction ( ~ E )
     assume ( E )
     conclude false
          (!D1 E a1 a2 a3 a4 a5)
)
```

```
#Superman2.ath
declare A, W , P, I , M, E  : Boolean
assert a1 := ( ( A & W ) ==> P )
assert a2 := ( ( ~ A ) ==> I )
assert a3 := ( ( ~ W ) ==> M )
assert a4 := ( E ==> ( ( ~ I ) & ( ~ M ) ) )
assert a5 := ( ~ P )
define D1 := method ( E a1 a2 a3 a4 a5 )
  { a6 := (!mp a4 E);
    a7 := (!left-and a6); # ~ I
    a8 := (!right-and a6); # ~ M
    a9 := (!mt a2 a7) ; # not ~ ~ A  but A
    a10 := (!mt a3 a8) ; # not ~ ~ W but W
    a11 := (!both a9 a10) ; #(A & W)
    a12 := (!mp a1 a11) ; # P
   (!absurd a12 a5)
}
(!by-contradiction ( ~ E )
      assume ( E )
      conclude false
            (!D1 E a1 a2 a3 a4 a5)
) # result is Theorem : (not E)
```

An Approach to Teaching Deduction Using Athena

- Problem: Check the Validity of the argument : “P has C as a logical consequence.”
- Use a theorem prover to check if C is a logical consequence of P; if it is, an Athena proof can be attempted.
- If the theorem prover fails to find a proof, use a model-builder or SMT-solver to see if (P & (~C)) is satisfiable. If it is satisfiable and a model is produced for (P & (~C)) , then C is not a logical consequence of P, and an Athena Proof need not be attempted.
- Otherwise, C may or may not be a logical consequence of P. An Athena Proof, even if it exists, may not be easy to find.

Conclusion

- Athena proofs, when they are found, are very appealing and convincing for humans.
- Use of Athena along with other tools such as theorem provers, SAT and SMT solvers, and model-builders can give students a well-rounded introduction to deduction.

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Using Discord to Moderate Collaboration and Teamwork

Benefits of Discord

- Easy for instructors to:
  - create servers
  - add students
  - moderate participation and collaboration
- Moderation can keep students accountable for amount of participation in a group setting

Benefits of Discord

- Chat log with time and date stamps
- Allows for sharing of documents, links, and images
- User friendly
- Gamers tool, so may be familiar to many CS students
- Can create bots for custom tasks

Current Ideas

- Automate monitoring participation and collaboration with bot
  - count number of messages students post
  - count number of words in messages
- compare counts with Social Sensitivity scores and collective intelligence research
- sentiment analysis on messages to view team health
- compare with Forming, Storming, Norming, Performing stages
- survey student satisfaction for use as a collaboration tool in team projects

Suggestions

- Thank you for your interest!
- Do you have any further suggestions?

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SLASH: Reviewing Lectures Using Flash Cards

Wensheng Wu

USC

Welcome to *SLASH* ☺

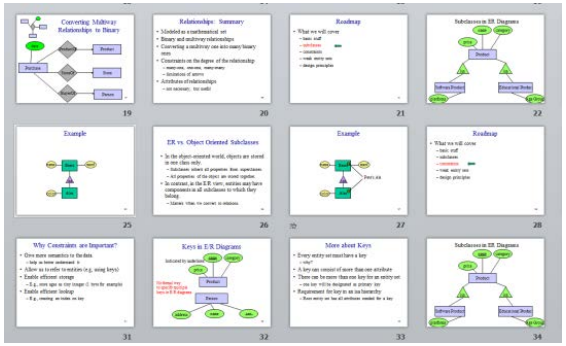
Generating flash cards

ER vs. Object Oriented Subclasses

In contrast, in the E/R view, entities may have components in all _____ to which they belong.

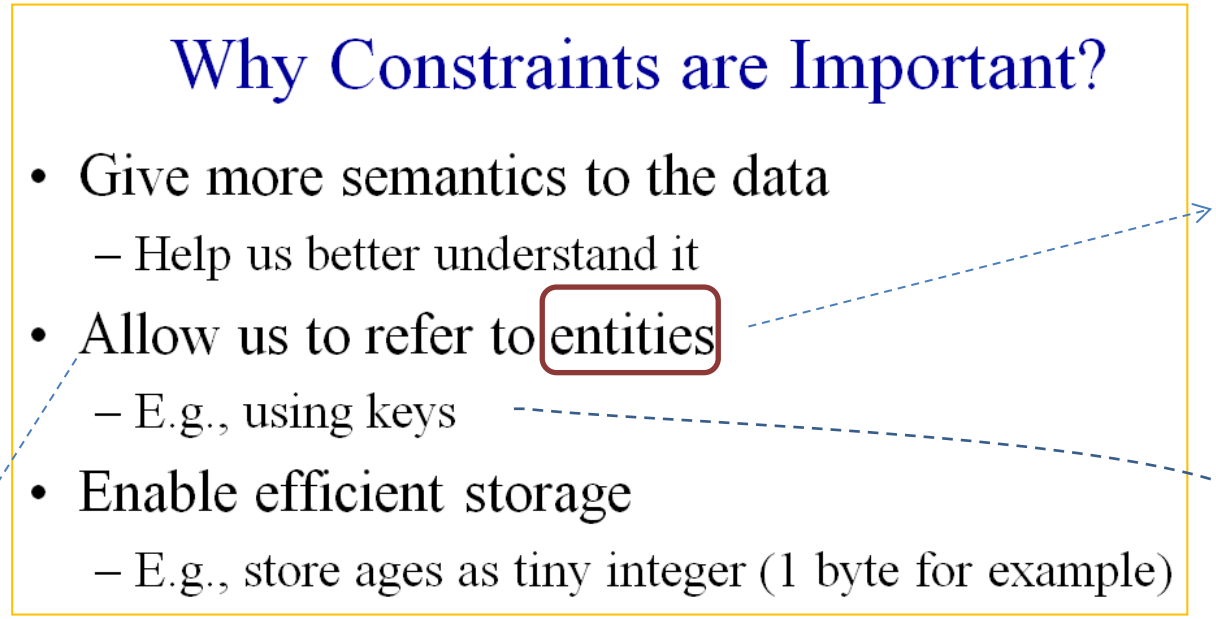
Entity set
Relationship
Subclass
…

Extracting key concepts



Challenge: Context discovery

How to discover just sufficient context for recovering the concept?



Key concept to be hidden

Difficult to recall the concept from the point itself

Useful to also include sub-bullet

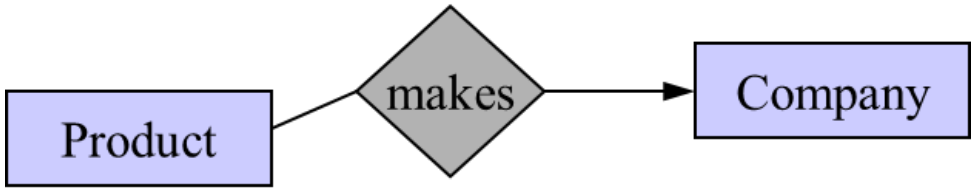
Challenge: Noisy contents

- Broken sentences:

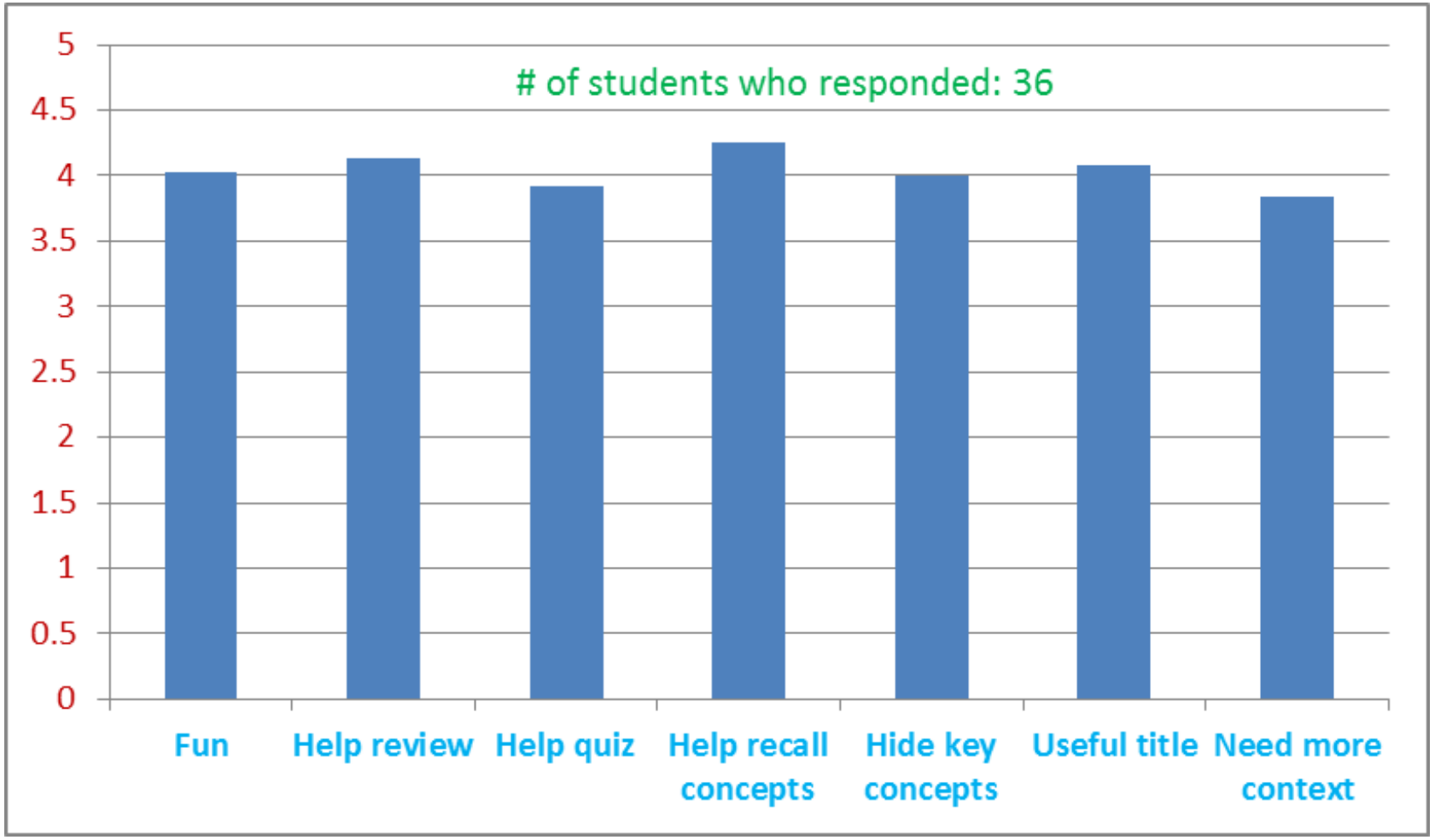
This happens when:

- part-of relationships
- splitting n-ary relationships to binary.

- Diagrams, formulas, and codes:



Student feedback



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Computer Programming Training for Underserved Groups: LMS Support Model

Full Paper

Dante Ciolfi

Georgia Institute of Technology

Fort Myers Technical College

LMS Support Model

- LMS
- Human tech support
- Network infrastructure support

References

- Images Licensing: Creative Commons - Non-commercial re-use with modification.
- Paths: en.Wikipedia.org
- Cockatoos: flickr.com
- Mountain (Taos): commons.Wikipedia.org
- Leaf: flickr.com

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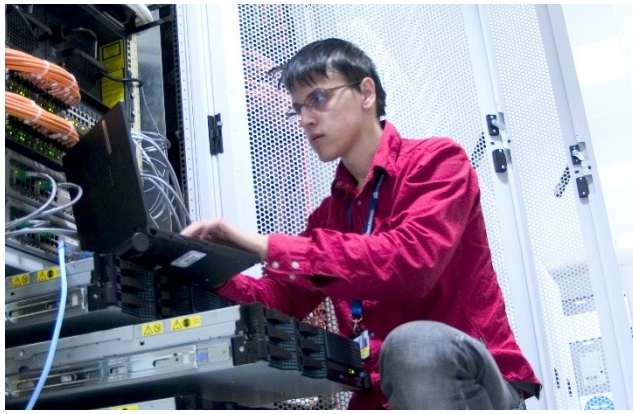
DEPARTMENT INFORMATIK
DIDAKTIK DER INFORMATIK

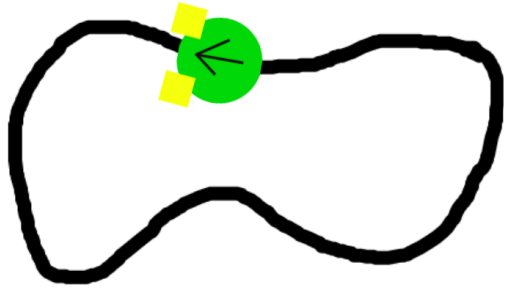
FRIEDRICH-ALEXANDER UNIVERSITÄT ERLANGEN-NÜRNBERG
TECHNISCHE FAKULTÄT

Toward Teaching Strategies for Block-based Languages: Possibilities, Challenges, and Experiences



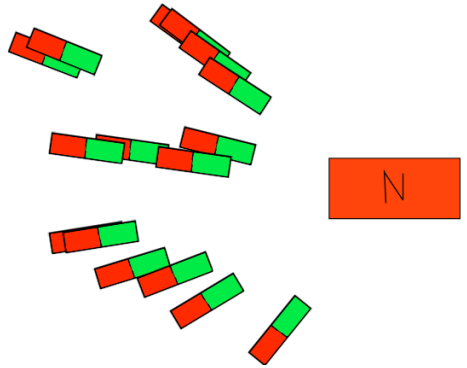
Sven Jatzlau, University of Erlangen-Nürnberg; sven.jatzlau@fau.de

The Scratch-Community …

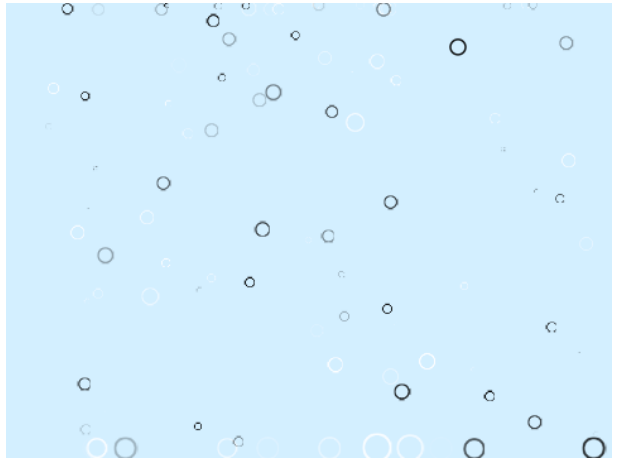


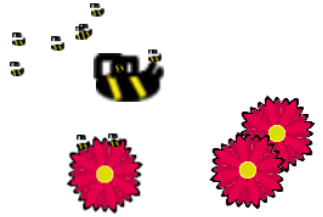
shared almost **30 million** projects, …

made by **25 million** registered users, …



who posted **145 million** comments!





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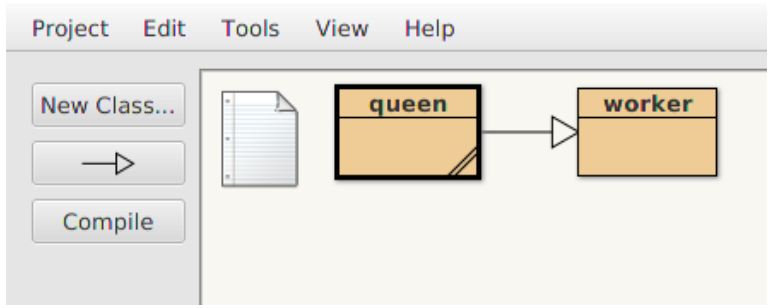
What is different with block-based languages?

Example: Teaching inheritance

In BlueJ:



?

In Snap:

➡ New concepts **cannot** be taught using **established** teaching strategies!

Sven Jatzlau, University of Erlangen-Nürnberg; sven.jatzlau@fau.de

Why teach these new concepts?

Prototyping

...instead of conceptually abstract casses

Object Nesting

...many objects combine to form a single composite object

Event-driven programming

...resulting in implicit concurrency

First-class objects

...using objects (such as data types) without any limitations

These concepts enable ...

- New approaches to solving problems
- New approaches to creating tasks

Sven Jatzlau, University of Erlangen-Nürnberg; sven.jatzlau@fau.de

Challenges and questions

- What new concepts need to be taught in schools?
- What is the best way to teach these new concepts?
- How does programming change when new solutions to problems are available?

➡ **How do approaches to teaching need to change with block-based languages?**

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GIRLS WHO CODE

EVALUATING OUR IMPACT

girls who code

THE PROBLEM

GENDER GAP IN TECH IS WIDENING

Only **23%** of tech industry employees are women, compared with **37%** in 1995

WOMEN DRASTICALLY UNDERREPRESENTED IN CS/TECH EDUCATIONAL PATHWAYS

Less than **4%** of women are choosing to major in CS or a related discipline. Less than **1%** are majoring in CS.

girls who code

Sources: ChangetheEquation.org; NCES

MISSION

GIRLS WHO CODE WORKS TO CLOSE THE GENDER GAP IN TECH BY **EDUCATING, INSPIRING, AND EQUIPPING GIRLS** WITH THE SKILLS AND RESOURCES TO PURSUE 21ST CENTURY OPPORTUNITIES.

girls who code

PROGRAMS

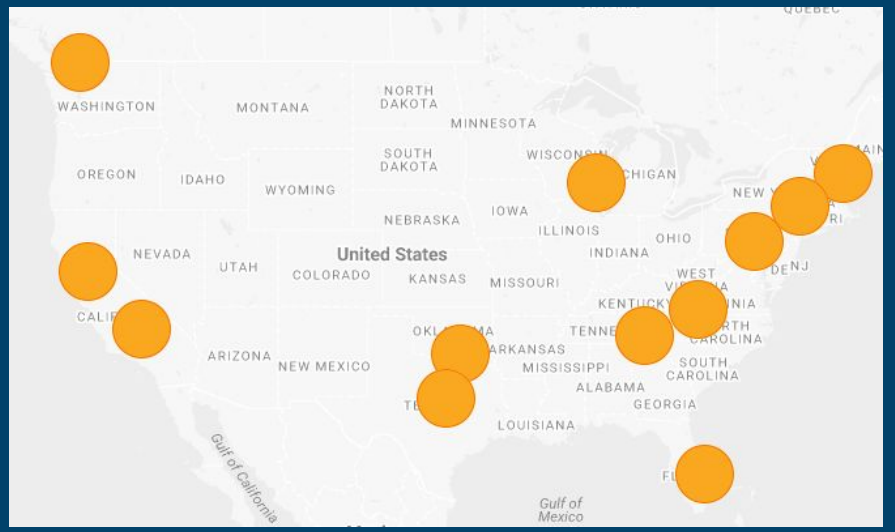
- ★ Summer Immersion Program (SIP)
- ★ Clubs
- ★ Campus
- ★ Alumni Initiatives

WHAT IS SIP?

- **What?** 7-week intro CS course covering CS fundamentals and applications (Robotics, Internet) and advanced topics (data structures, algorithms, Python).
- **Where?** Major tech companies and universities across the U.S.
- **Who?** Diverse population of rising 11th and 12th grade girls.
- **Why?** To promote diversity, female empowerment, and sisterhood in a CS ed setting.

2017 SIP: BY THE NUMBERS

- 80 classrooms
- 11 cities
- 48 partners
- 1,557 students
- 239 teaching staff

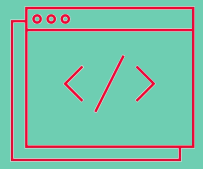


girls who code

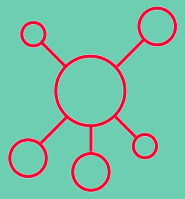
KEY OUTCOME AREAS

- CAREER

- CAPABILITY



- COMMUNITY



RESEARCH METHODS

STUDENT SURVEY

- Completed by **1,427 girls (96% response rate)**
- Assessed changes in knowledge, skills, and attitudes in areas related to the 3Cs.

TEACHER SURVEY

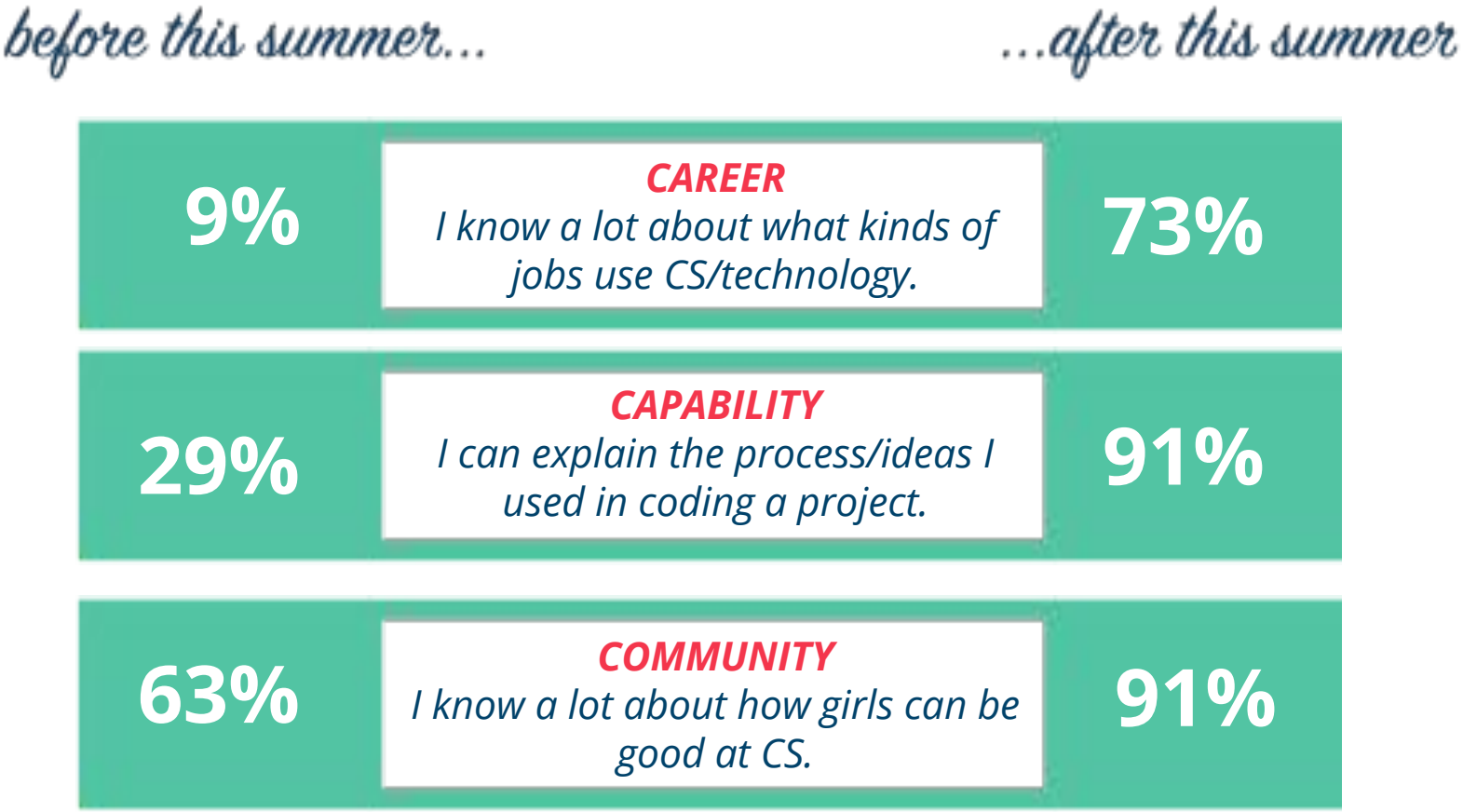
- Completed by **239 teachers (100% response rate)**
- Assessed teachers' perceptions of SIP and its impact on girls.

girls who code

WHAT WE LEARNED

SIP helps prepare girls for a CS education and career in many important ways.

WHAT WE LEARNED



girls who code

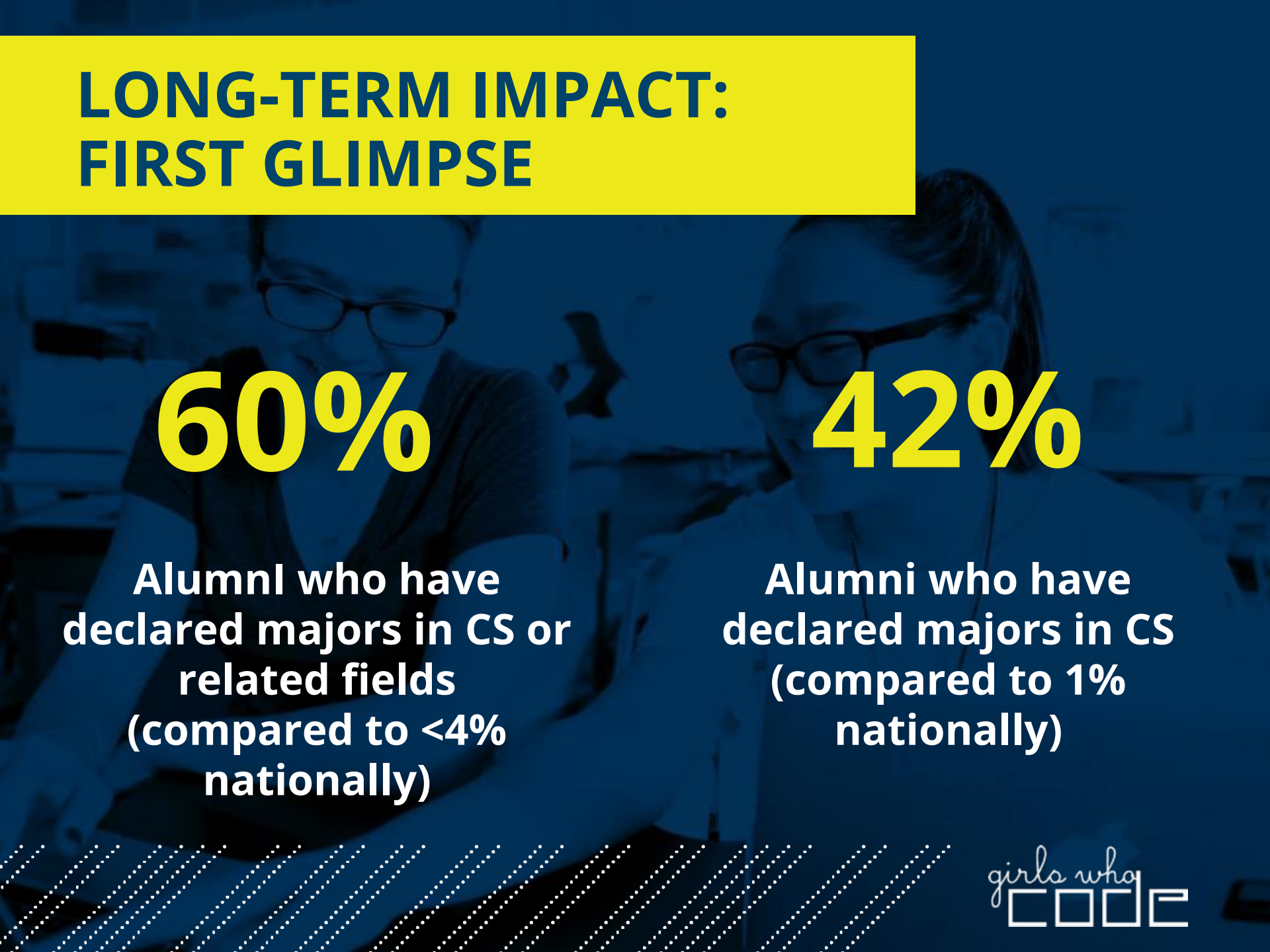
OUR "NORTH STAR" METRIC:
INTENT TO MAJOR/MINOR IN CS

84%

of SIP girls now want to major/minor in CS (49%), or are more interested in CS (36%), because of Girls Who Code.

COLLEGE-AGED ALUMNI

LONG-TERM IMPACT: FIRST GLIMPSE



60%

AlumnI who have declared majors in CS or related fields (compared to <4% nationally)

42%

Alumni who have declared majors in CS (compared to 1% nationally)

girls who code

LOOKING AHEAD

Q: So, what's next?

A: Investigating persistence and professional participation

girls who code

girls who code

GIRLSWHOCODE.COM

RYAN CLARKE
Director, Research and Evaluation
ryan@girlswhocode.com

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Benefits of Exposure Camps to K12 Student Interest in Computer Science

Jeffrey Miller, Saty Raghavachary

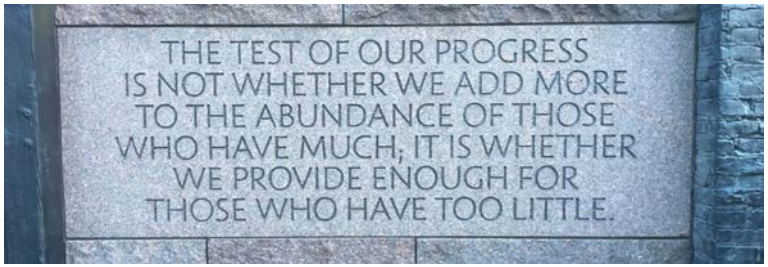
{jeffrey.miller, saty}@usc.edu

USC Viterbi School of Engineering

Institute for Education

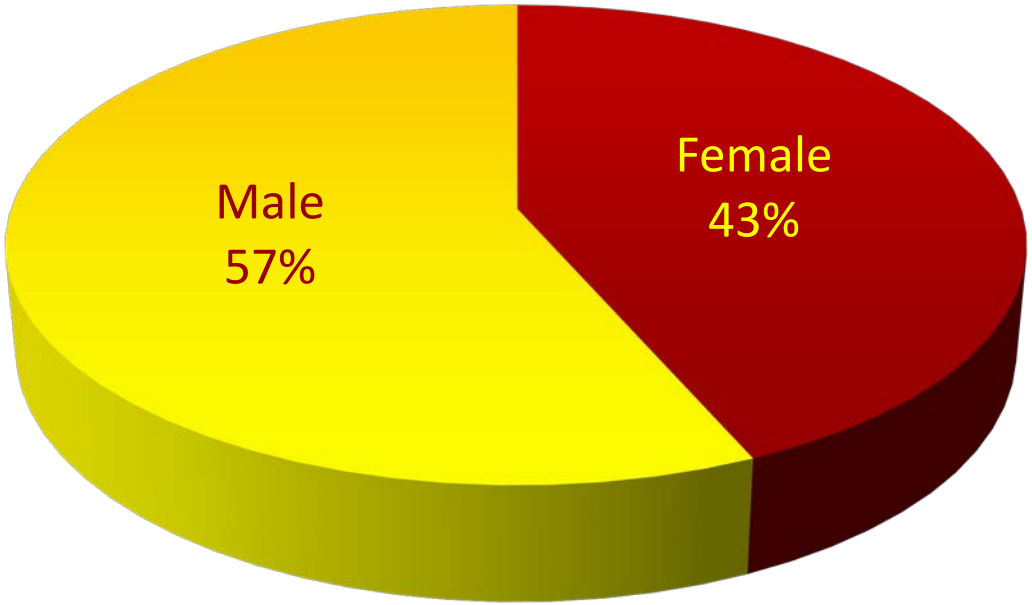
CS@SC Summer Camps

- Founded in 2015 by Coach Kathy Kemper of the Institute for Education jointly with USC Viterbi Department of Computer Science
- Goal: Provide free Computer Science education to K12 students in a diverse manner
- Primary demographics
  - Girls
  - Under-represented ethnicities
  - Low income families (annual income < $40,000)

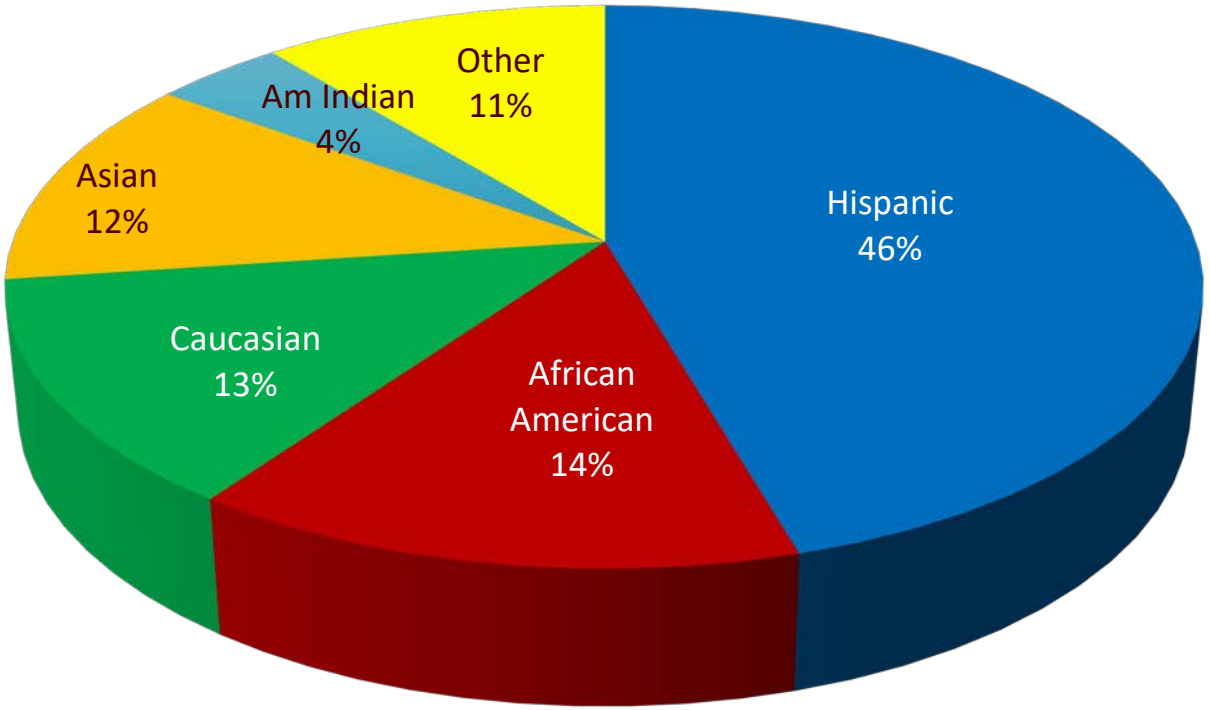


- In three years, over 1500 kids have attended for free!

Attendee Gender



Attendee Ethnicity



Camp Topics

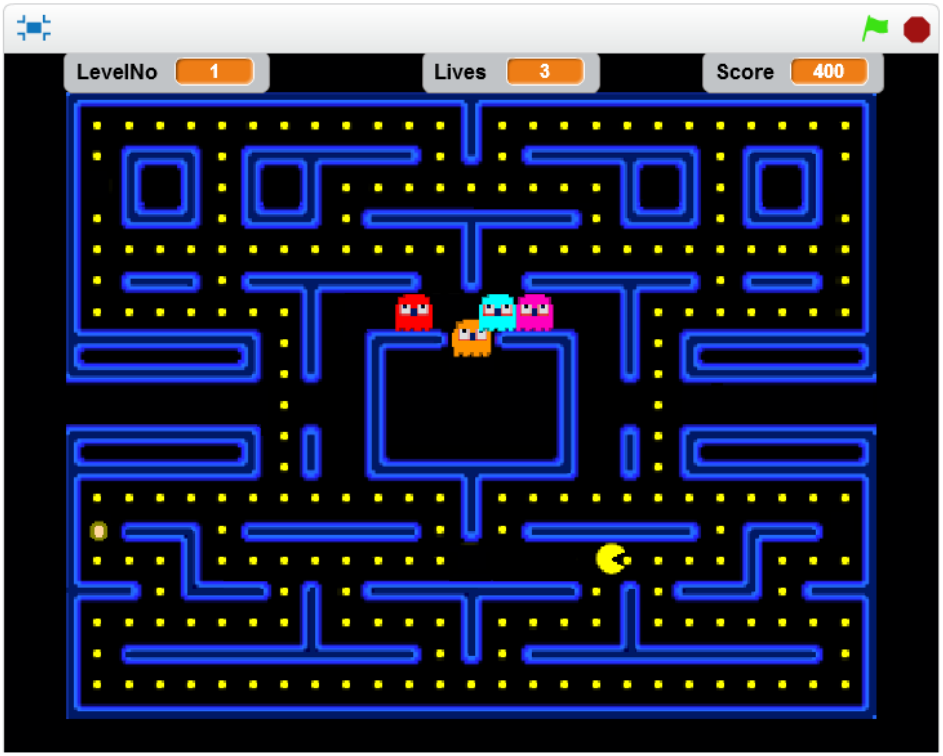
Kindergarten-3rd grade students

4th-8th grade students

9th-12th grade students

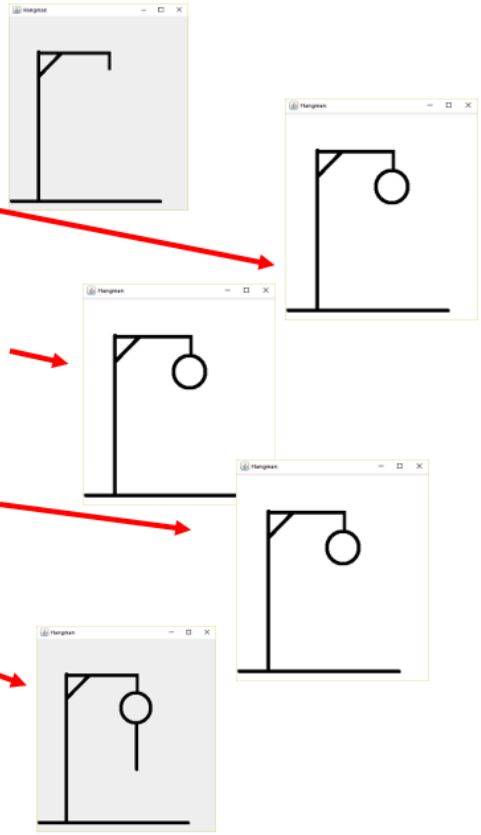
9th-12th grade students

Scratch Camp Programs



Java/Python Camp programs

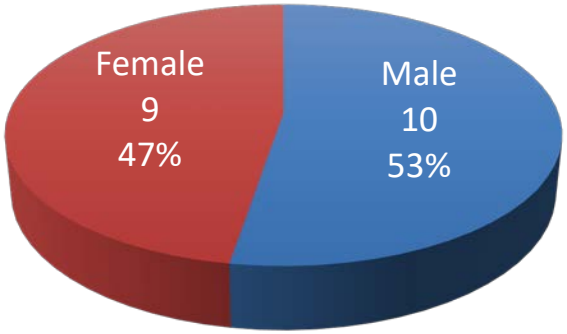
```
Welcome to Hangman!

Word to Guess: _ _ _ _ _

Enter a letter: q
q is NOT in the secret word.
That is incorrect guess #1.

Word to Guess: _ _ _ _ _

Enter a letter: m
m IS in the secret word at index 2.
m IS in the secret word at index 3.

Word to Guess: _ _ m m _

Enter a letter: y
y IS in the secret word at index 4.

Word to Guess: _ _ m m y

Enter a letter: l
l is NOT in the secret word.
That is incorrect guess #2.

Word to Guess: _ _ m m y

[the game continues]
```



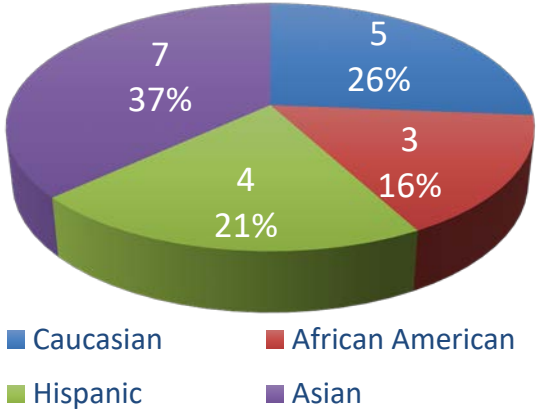
```
Enter the name of the board configuration file: battleship.txt

Reading configuration file...
Ready to play!

Current Board
  0 1 2 3 4 5 6 7 8 9
0 O O O O O O O O O O
1 O O O O O O O O O O
2 O O O O O O O O O O
3 O O O O O O O O O O
4 O O O O O O O O O O
5 O O O O O O O O O O
6 O O O O O O O O O O
7 O O O O O O O O O O
8 O O O O O O O O O O
9 O O O O O O O O O O

Enter column: 8
Enter row: 1

That is a hit!

Current Board
  0 1 2 3 4 5 6 7 8 9
0 O O O O O O O O O O
1 O O O O O O O O * O
2 O O O O O O O O O O
3 O O O O O O O O O O
4 O O O O O O O O O O
5 O O O O O O O O O O
6 O O O O O O O O O O
7 O O O O O O O O O O
8 O O O O O O O O O O
9 O O O O O O O O O O

Enter column: 8
Enter row: 0

That is a miss.
```

Teaching Staff

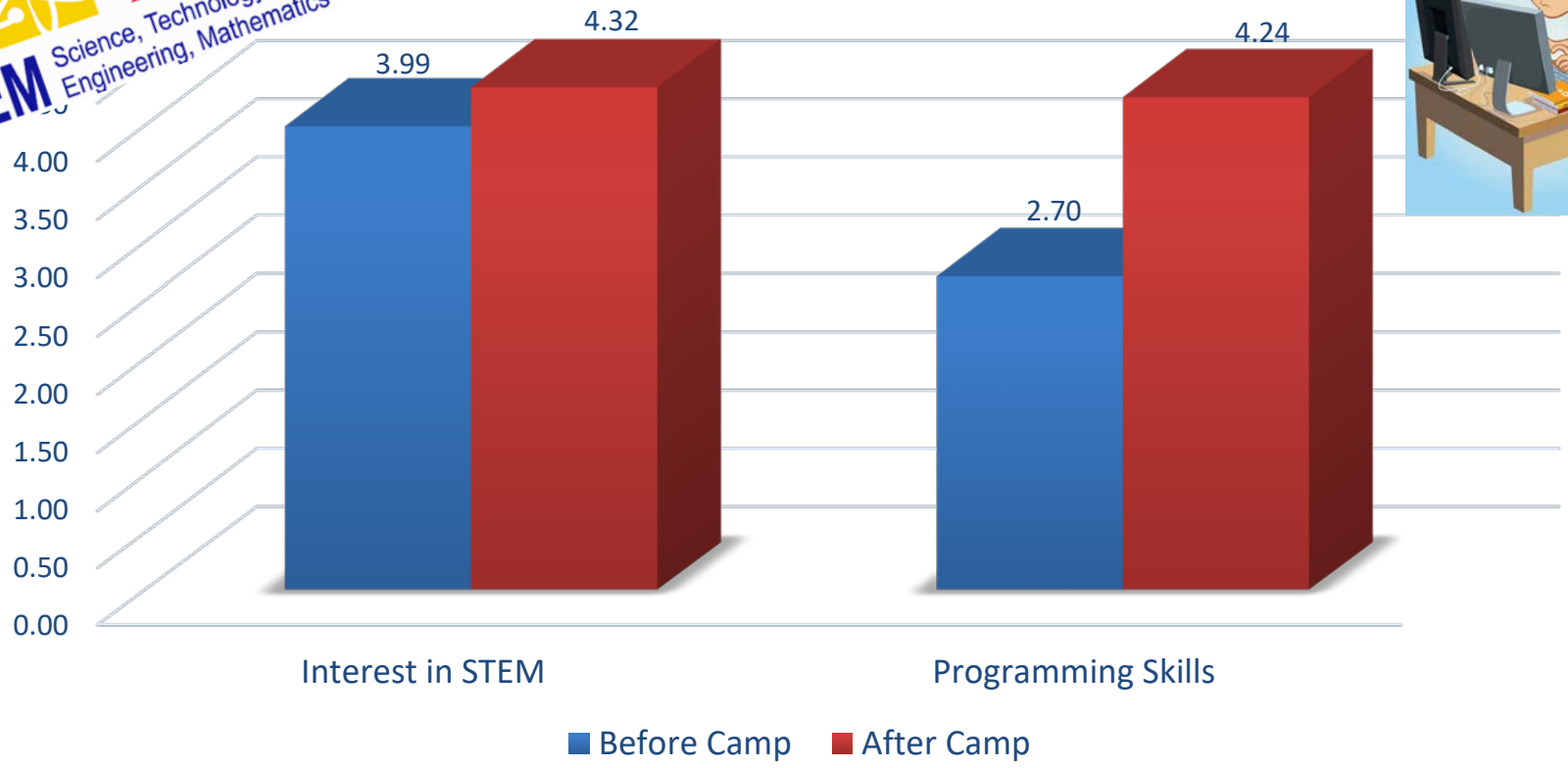
Gender of TAs



Ethnicity of TAs



Interest in STEM and Programming Skills



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ASSET MAPPING

A SIMPLE TOOL FOR RECRUITING AND RETAINING UNDERREPRESENTED POPULATIONS IN COMPUTER SCIENCE

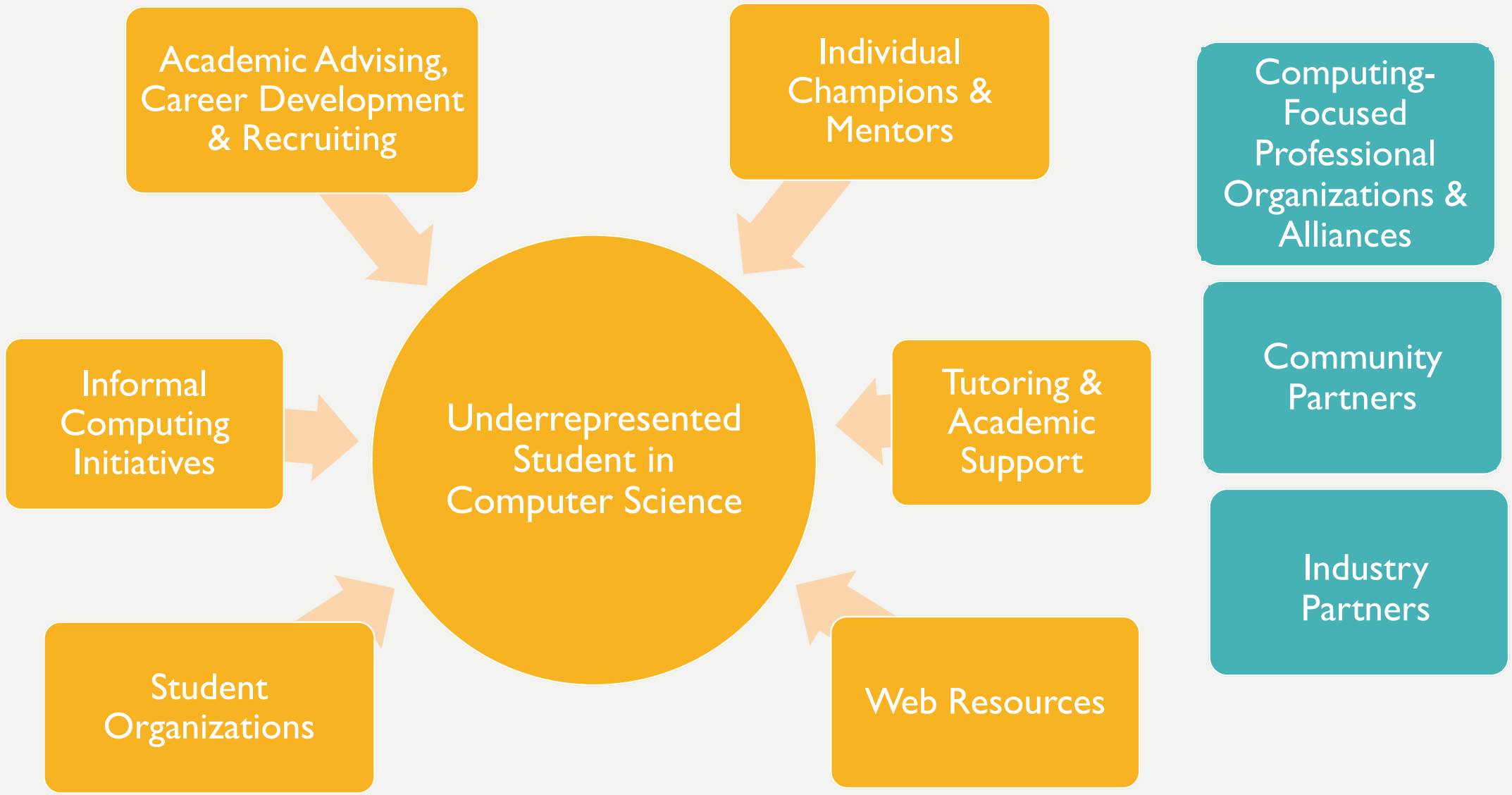
ADRIENNE SMITH & REBECCA ZULLI
CYNOSURE.CONSULTING.LLC@GMAIL.COM

Asset mapping is a process of documenting the people and resources available within a community that support or enhance a specific goal.


A Resource Map for Students or Faculty
A Recruiting Tool
Uses for an Asset Map
A Referral Resource
A Tool for Strategic Planning

SO WHAT ARE OUR ASSETS?

STEP 1: IDENTIFY CATEGORIES OF ASSETS



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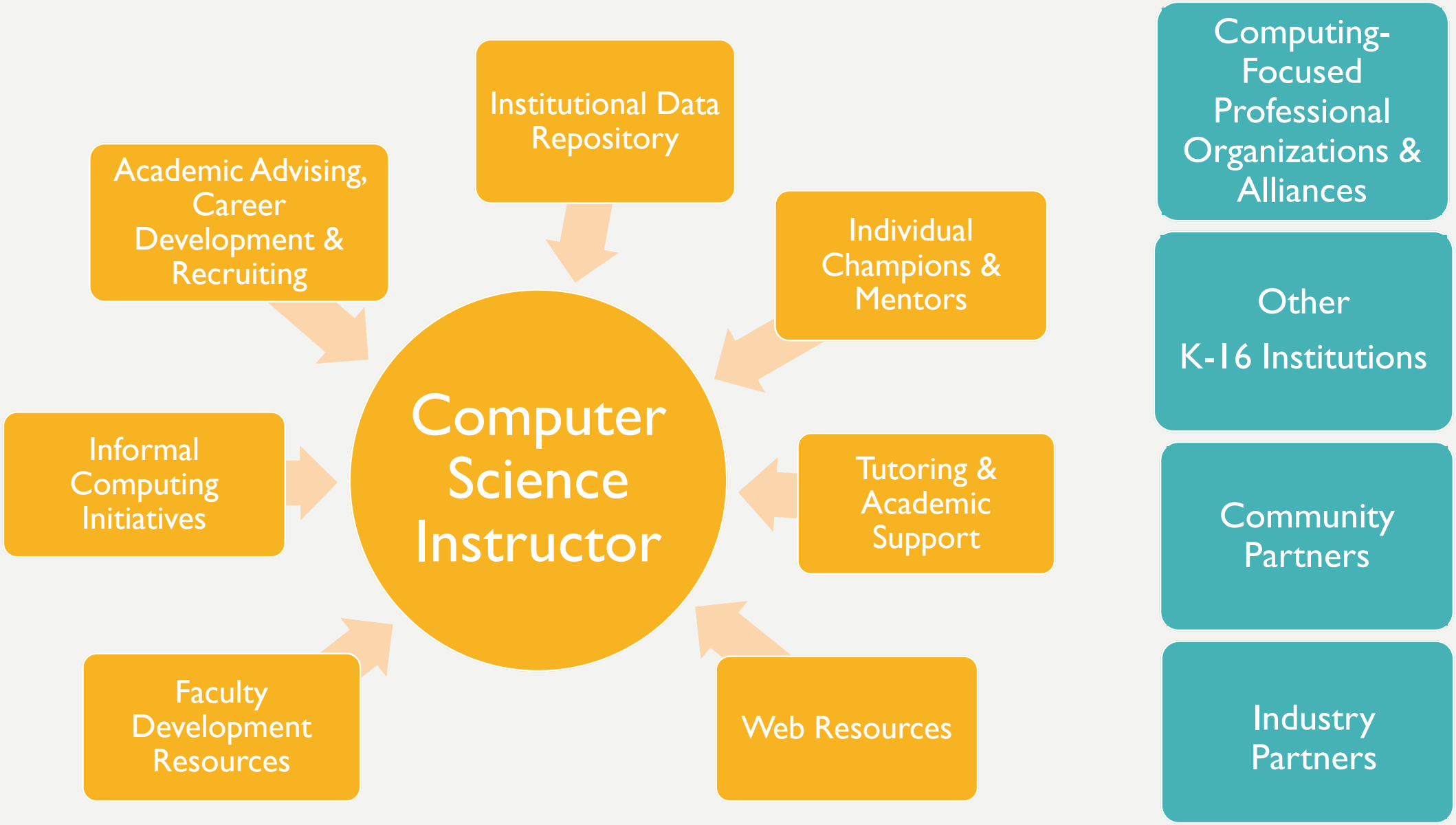

STEP 2: START MAPPING

- Look at the categories and jot down all the places to which you refer students, faculty, or colleagues in relation to each of the categories.
- List all of your current partnerships and known collaborations. Use your online contact lists, mailing lists, list serves, followers, etc.
- Ask your connections about any other assets of which they are aware.
- Print out a campus map and start to circle places where supports are located.
- Do an internet search of your campus/organization looking for key words.
- Read through the university directory and highlight offices whose work would support your mission and the individuals you serve.

STEP 3: DISPLAY YOUR ASSETS

Some questions to consider….

Who will be using this map and for what purpose?

What information do we want to include in the map (e.g., email, phone, location etc.)?

Do we display the assets on a campus map?

Do we make an asset website with the categories and links?

Do we want a visual graphic that helps users to understand different categories of assets?

STEP 4: GO FURTHER

Start tracking your success!

Asset maps can be used for documenting impact and tracking growth by charting the number and nature of connections to assets over time; especially relevant for those forming alliances and working to build a networked improvement community.

These kinds of living documents will be helpful for strategizing next steps for growing your campuses supports and can fulfill accountability purposes for tracking your organizations efforts.

FOR MORE INFORMATION

PLEASE FEEL FREE TO CONTACT US

Dr. Adrienne Smith and Dr. Rebecca Zulli

Email: CynosureConsultingLLC@gmail.com

Website: www.CynosureConsulting.net

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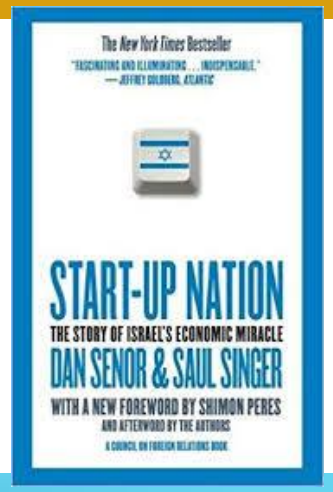
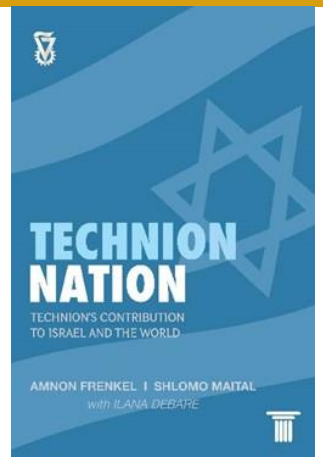
Orit Hazzan, Technion Dean of UG Studies

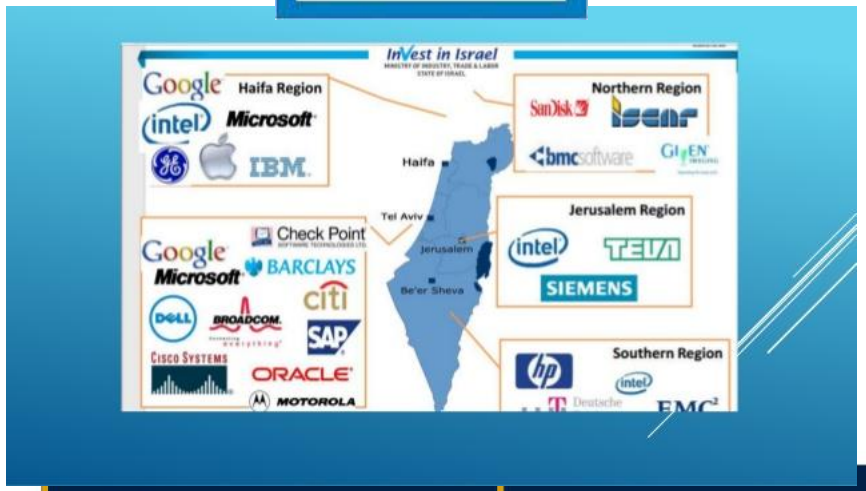
TECHNION
Israel Institute of Technology

Israel: Startup Nation – Technion



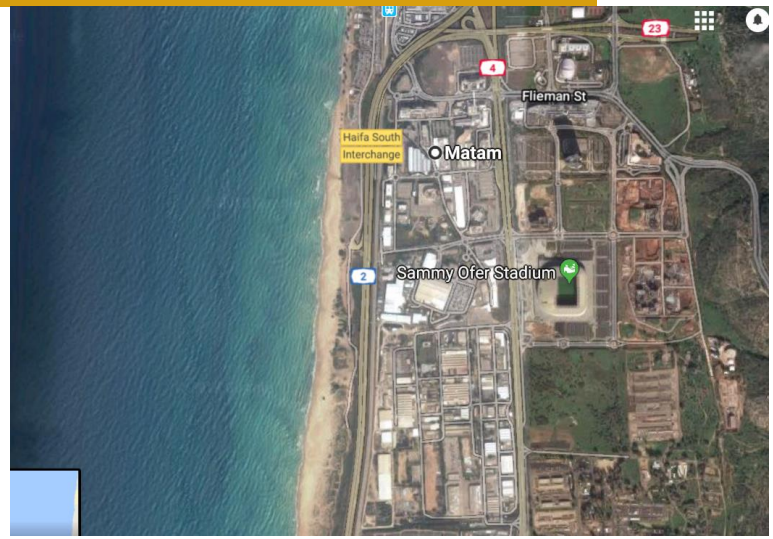


הטכניון
מכון טכנולוגי לישראל
TECHNION
Israel Institute of Technology

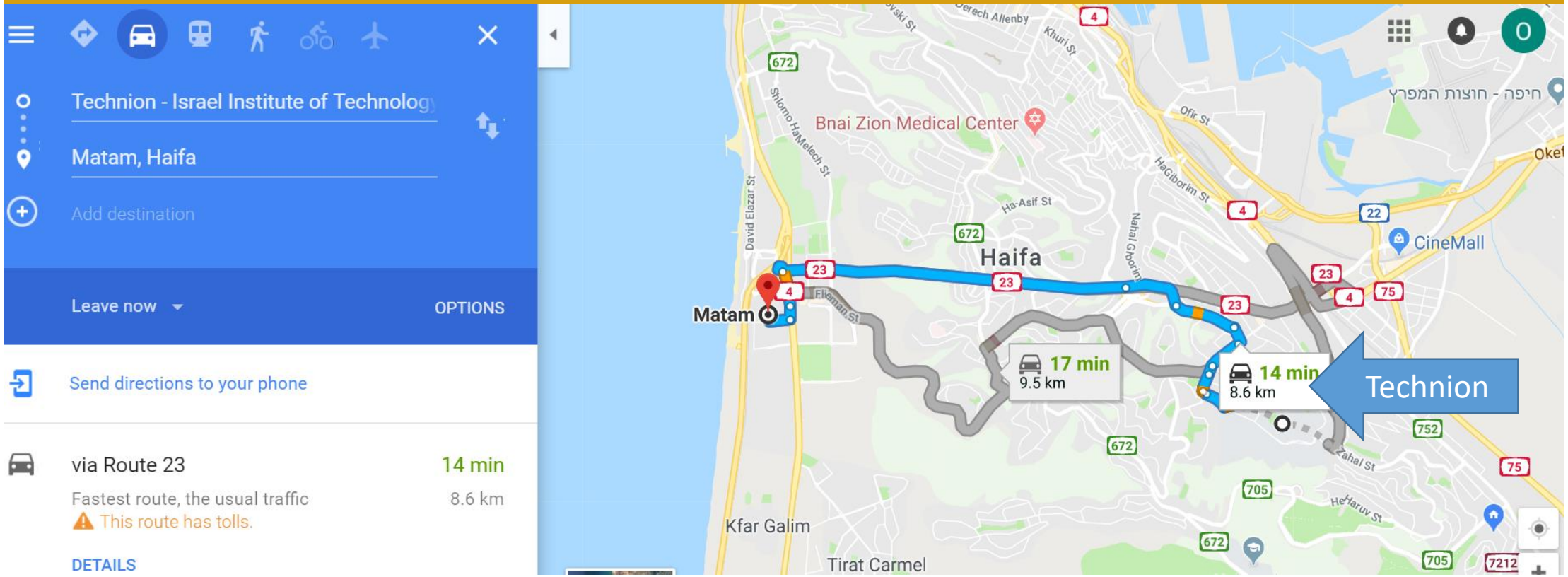


- Technion prestige
- High qualified students and graduates

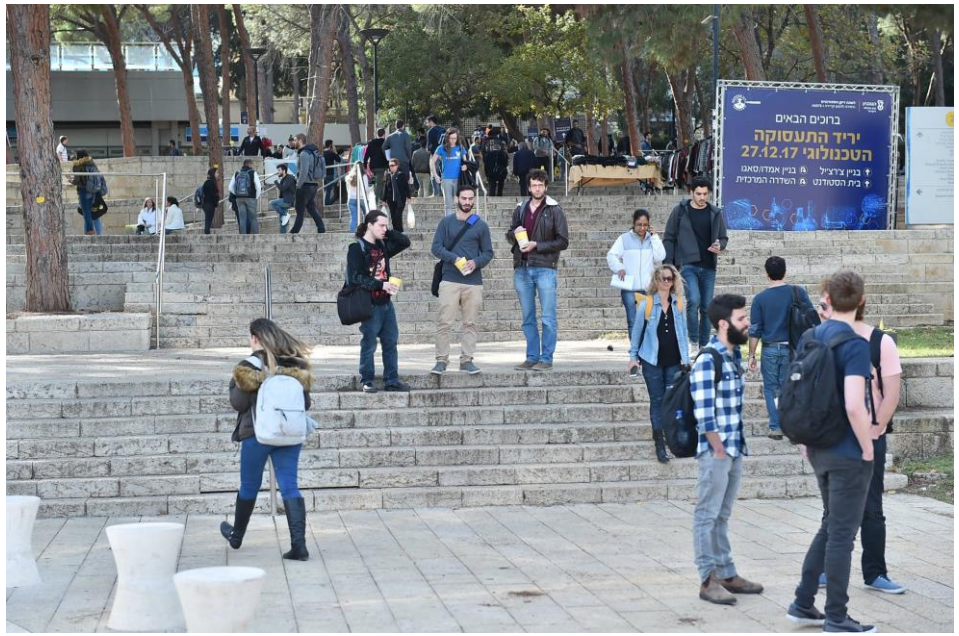
MATAM: Haifa Hi-Tech Industrial Park



Technion – MATAM: Haifa Hi-Tech Industrial park



Job Fair – 27.12.2017: 62 companies

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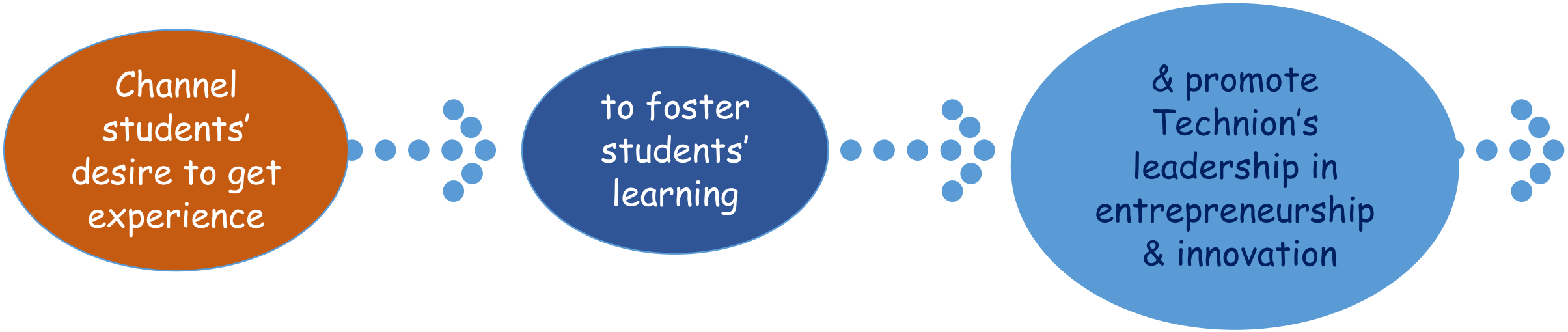
Result: Students juggle work and study

- On the one hand:
  - These kinds of jobs are very tempting for many students.
- On the other hand:
  - This situation is very demanding and, due to the high standards of the studying at the Technion, influences their studying.

- **Two main reasons for work:**
  - **Economic**
  - **The desire to gain work experience prior to graduation.**


Channel students' desire to get experience
to foster students' learning
& promote Technion's leadership in entrepreneurship & innovation

The solution

- **Balance:**
  Reduce work load &
  Change work place

and get more!

- **Work in the Campus in Professional Works - Research Groups**

- Advantages:
  - **Gain research skills**
  - **Connection to the Technion spirit**
    - Graduate studies/direct path
    - Entrepreneurship
    - Inerdesiplinarity
    - Technion's position and brand as a research hub for innovation
  - Improve learning experience
  - Provide additional skills to industry

#Ladders

#Ladders - homepage

לימודי הסמכה

#סולמות – חשיפה למחקר של סטודנטים בתואר ראשון בטכניון

מטרתה של תוכנית **#סולמות** היא חשיפת הסטודנטים הלומדים לתואר ראשון בטכניון למחקר המתבצע בטכניון, באופן שייטב עם הסטודנטים/יות הן בטווח הקצר והן בטווח הארוך.
שילוב ייחודי זה בין חברי הסגל החוקרים ובין סטודנטים/יות לתואר ראשון יאפשר לסטודנטים ליישם את התכנים אותם הם לומדים, לרכוש כישורים חשובים בעולם התעסוקה העתידי ולצבור ניסיון ממשי.
קריטריונים להשתתפות בתוכנית

רישום למקצועות

מועדי רישום סמסטר אביב תשע"ח

הטכניון
מכון טכנולוגי לישראל

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בחינת סיווג פיסיקה

מועדי רישום סמסטר אביב תשע"ח

קטלוג לימודים תשע"ח

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בחינת סיווג כימיה

בחינת סיווג מתמטיקה

מציגים בדוכן #סולמות ביריד התעסוקה

פורמט נגיש

תכנית #סולמות

#סולמות – חשיפה למחקר של סטודנטים בתואר ראשון בטכניון

#Ladders: Purpose, application

- #Ladder's purpose it to expose Technion's undergraduate students to the research that takes place in the campus.
- This research skills will give them an added value in the future either in the academia or industry.

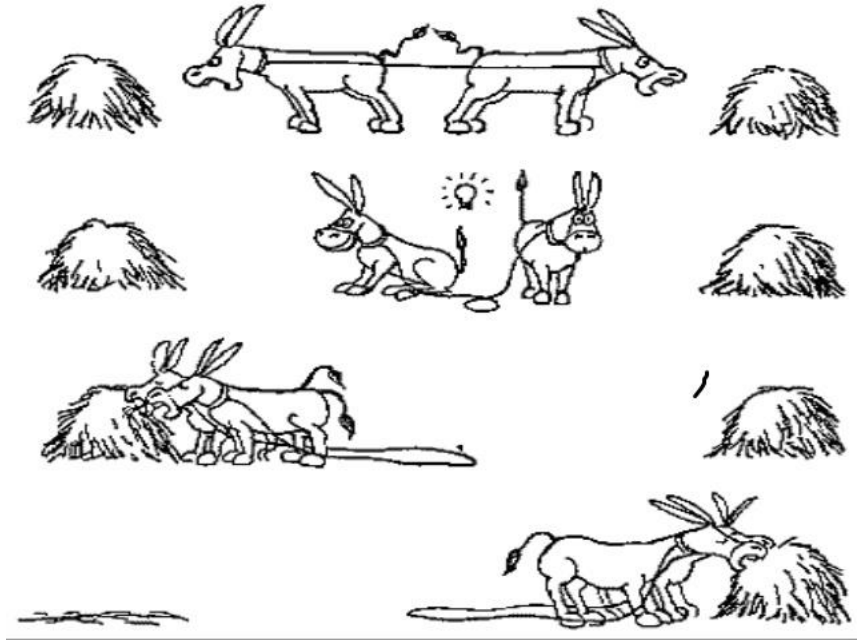
- **All Win:**
  - **Technion**
  - **Faculty Members**
  - **Students**
  - **Industry**

Ladders - 3 Channels

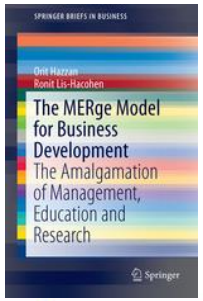
- Job Fair
- Elective course
  - Open to all Technion students
  - Exposure to other faculties
- Exposure to research with a salary
  - 70 hours: 7 weeks, 10 hours a week

Summary

Students: Work Study
Faculty members: Research Teaching



- From all loose situation to all win
- T model of engineering education
- MERge



ALL WIN