

FROM STARTUPS TO SCHOLARSHIP

A LIFE IN THE LIBERAL ARTS AFTER UMM

Brent Heeringa '99



JOSEPH J. LATTERELL

“The Division of Science and Mathematics [...] supports the Visiting Alumnus Program established in Professor Latterell’s memory as a unique opportunity to expose Morris students to the enormous breadth of career options that exist for well prepared and articulate graduates of Morris’s science



Graduate School

UMass

1999

Vice-President of Technology

Adverplex

2005

Consultant

Fluent Mobile

2009

1995

UMM

2003

Williams

Visiting Instructor

2006

Williams

Assistant Professor

2009

Boston University

Sabbatical - Visiting Scholar

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UMASS
AMHERST

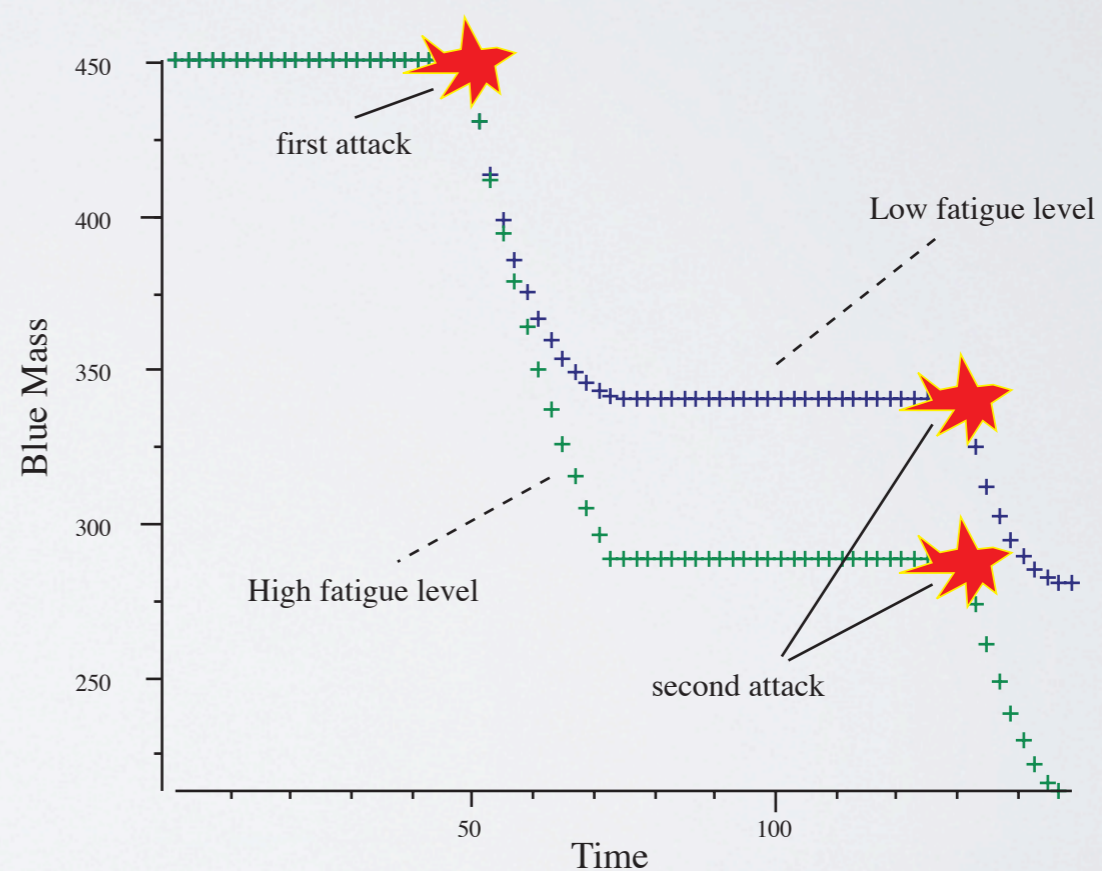
LANGUAGE AND SKILL ACQUISITION IN MOBILE ROBOTS





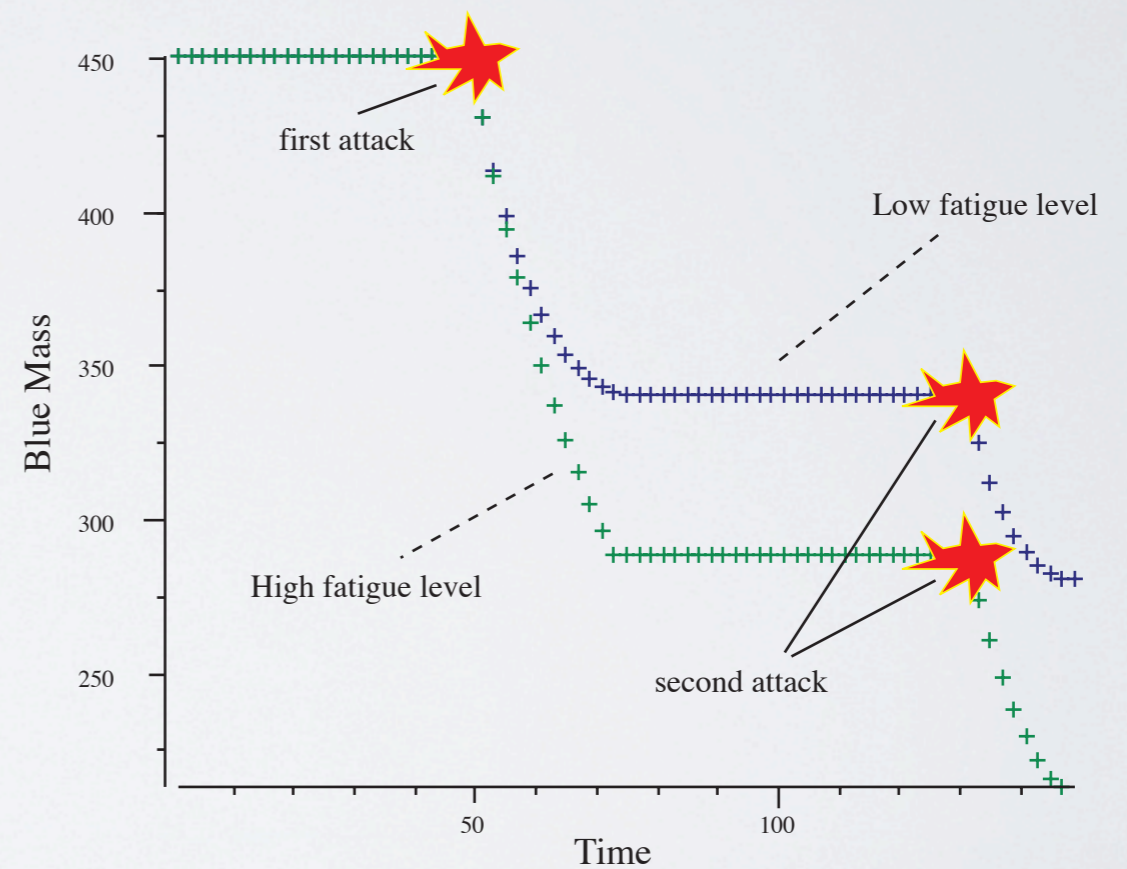
UMASS
AMHERST

WAR GAME SIMULATORS





WAR GAME SIMULATORS





UMASS
AMHERST

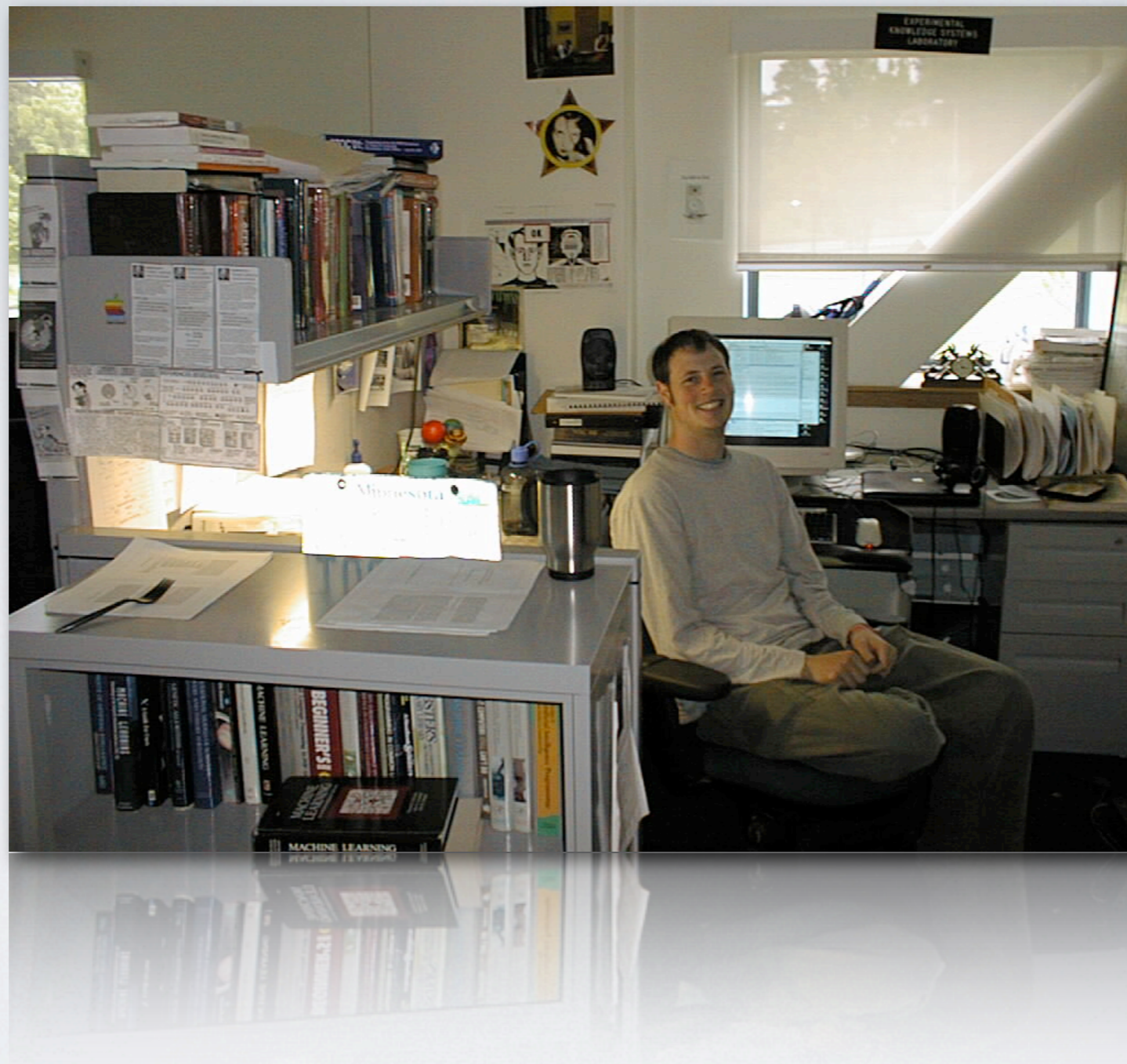
AUTOMATIC BOUNDARY DETECTION

IT WAS A BRIGHT COLD DAY IN APRIL AND THE CLOCKS
WERE STRIKING THIRTEEN WINSTON SMITH HIS CHIN
NUZZLED INTO HIS BREAST IN AN EFFORT TO ESCAPE THE
EVIL WIND SLIPPED QUICKLY THROUGH THE GLASS DOOR
SO FORTH VICTORY MANSIONS THOUGH NOT QUICKLY



IT • WAS • A • BRIGHT • COLD • DAY • IN • APRIL • AND THE
• CLOCKS WERE • ST • RI • KING • THI • RTEEN • WINSTO
N • SMITH • HIS • CHIN • NUZZL • ED INTO • HIS • BREA • S
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PED • QUICKLY • THROUGH • THE • GLASS • DOOR • SO F
• VICTORY • MANSIONS • THOUGH • NOT • QUICKLY





- **2002** stopped studying AI and began studying Theoretical Computer Science



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- **2003** one-year leave of absence to teach at Williams College

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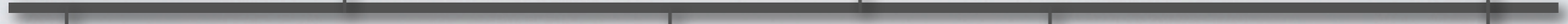
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WILLIAMS COLLEGE



"It would be no small advantage if every college were thus located at the base of a mountain." – Thoreau



WILLIAMS COLLEGE



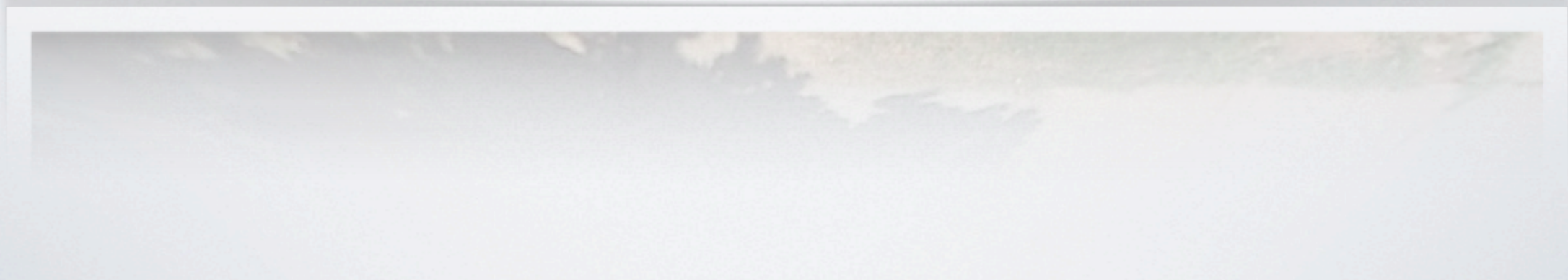
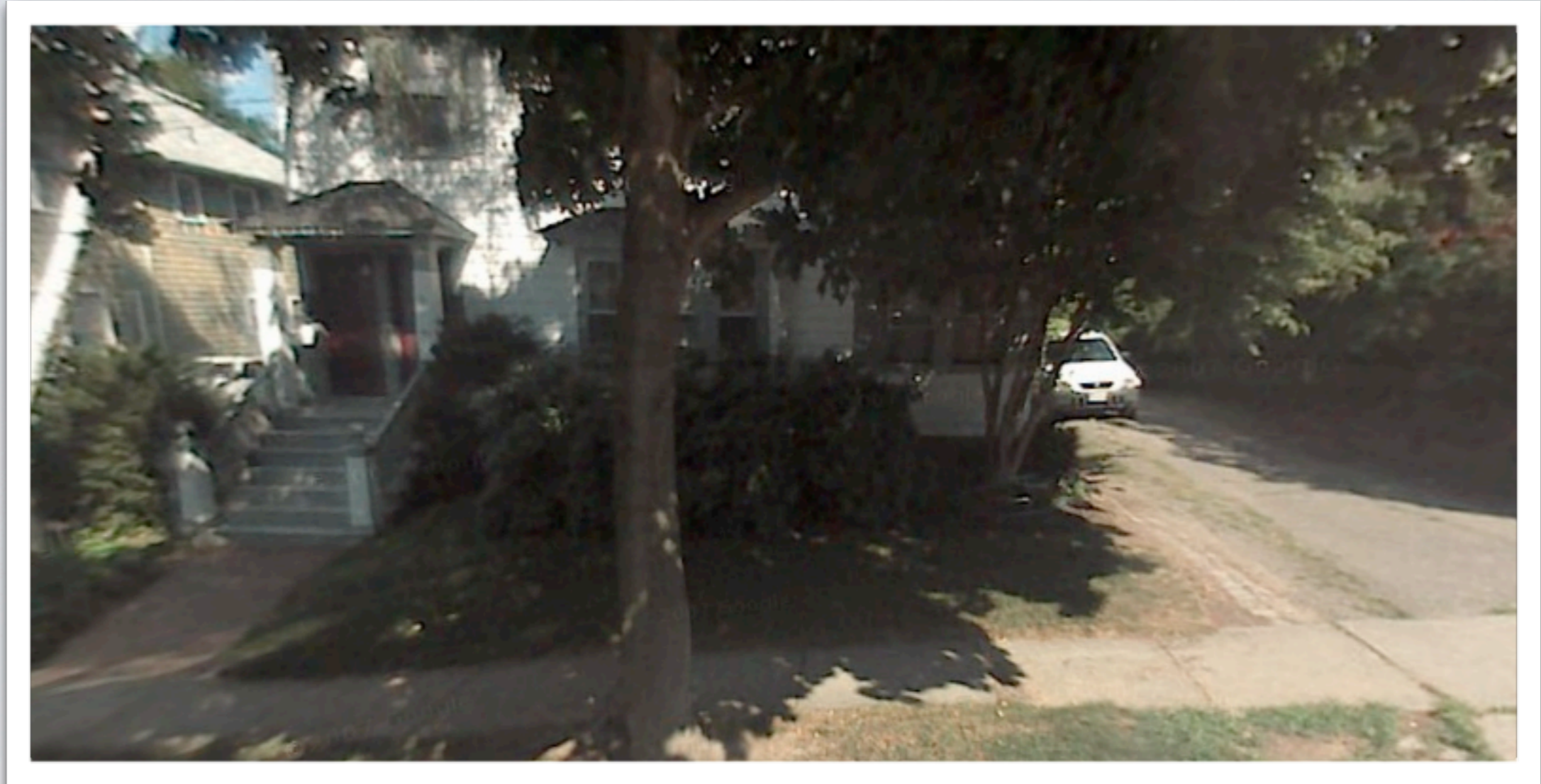
WILLIAMS COLLEGE



- Taught *Theory of Computation* and *Algorithm Design*
- An opportunity to gain real teaching experience at a top-notch liberal arts college
- Close enough to Amherst (60 miles) to meet with my advisor and continue working on Ph.D. research
- Stayed for the 2004-2005 year as a research scientist

Belmont

(A suburb of Boston)



Graduate School

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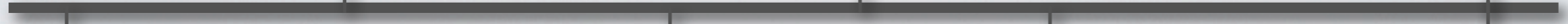
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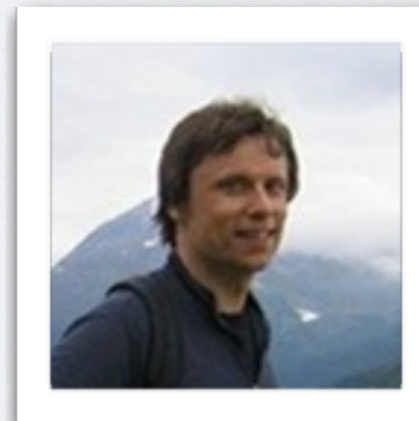
Sabbatical - Visiting Scholar



Founded in 2005



Dave Blundin



Micah Adler



Search Engine Marketing (SEM)

a form of Internet marketing that seeks to promote websites by increasing their visibility in search engine result pages through the use of search engine optimization, paid placement, contextual advertising, and paid inclusion (*)

(*) Wikipedia



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(*) Wikipedia



tidewater community college

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Williamstown, MA

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Any time

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Sep 29, 2010 ... Admissions and registration, academics, services for students, libraries and learning labs, news and events, workforce development, ...

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- Programs & Degrees, Locations, Class Schedule, Current Students, Jobs@TCC, Information Center, Admissions, Course Descriptions

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Places for tidewater community college

A Tidewater Community College - Norfolk Campus - 2 reviews - Place page www.tcc.edu - 300 Granby St, Norfolk, VA - (757) 822-1122

B Tidewater Community College: Virginia Beach Campus - 3 reviews - Place page www.tcc.edu - 1700 College Crescent, Virginia Beach - (757) 822-7100

C Tidewater Community College - Place page www.tcc.edu - 1428 Cedar Rd, Chesapeake, VA - (757) 822-5100

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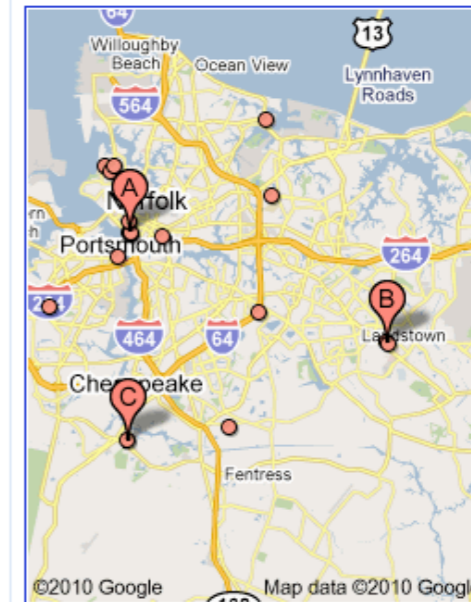
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Tidewater Community College

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Programs & Degrees @

Aug 19, 2010 ... Tidewater C education offering programs o

Employment Opportunit

Tidewater Community Colle below. Located in America's F

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Tidewater Community

tcc.bncollege.com/ - Cached

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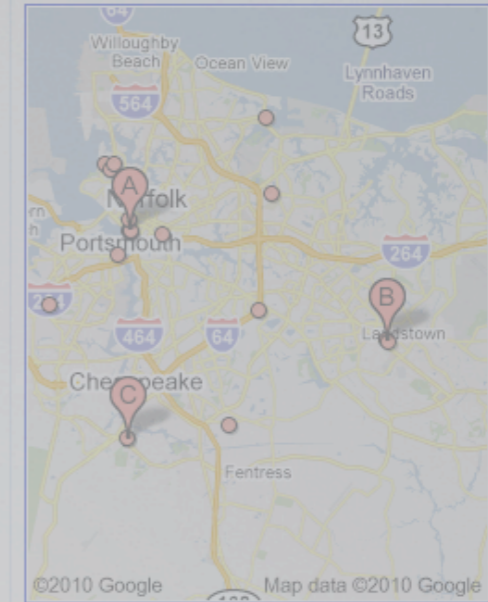
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educationedge.com	\$3	\$2.01
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courseadvisor.com	\$5	10%	\$3.01
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educationedge.com	60	\$2.01
collegeopera.com	10	\$1.00

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bidder	bid units	charge
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educationedge.com	60	\$2.01
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courseadvisor.com	50	\$3.01
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collegeopera.com	10	\$1.00
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- **Bid Optimization:** best position to maximize return on investment
- **Keyword Generation:** find ~ 1 million words relating to education
- **Campaign Management:** modify bids, keywords quickly and easily
- **Ad Text (Creative):** develop and test effective creative

THE WASHINGTON POST COMPANY

1150 15TH STREET, N.W. • WASHINGTON, D.C. 20071 • (202) 334-6662

The Washington Post Company Acquires CourseAdvisor Inc.

Washington, DC, October 11, 2007 – The Washington Post Company (NYSE:WPO) has acquired the outstanding stock of CourseAdvisor Inc. (www.courseadvisor.com), a premier online lead generation provider, headquartered in Wakefield, MA. Terms of the acquisition were not disclosed. In 2006, The Washington Post Company made a small investment in CourseAdvisor.

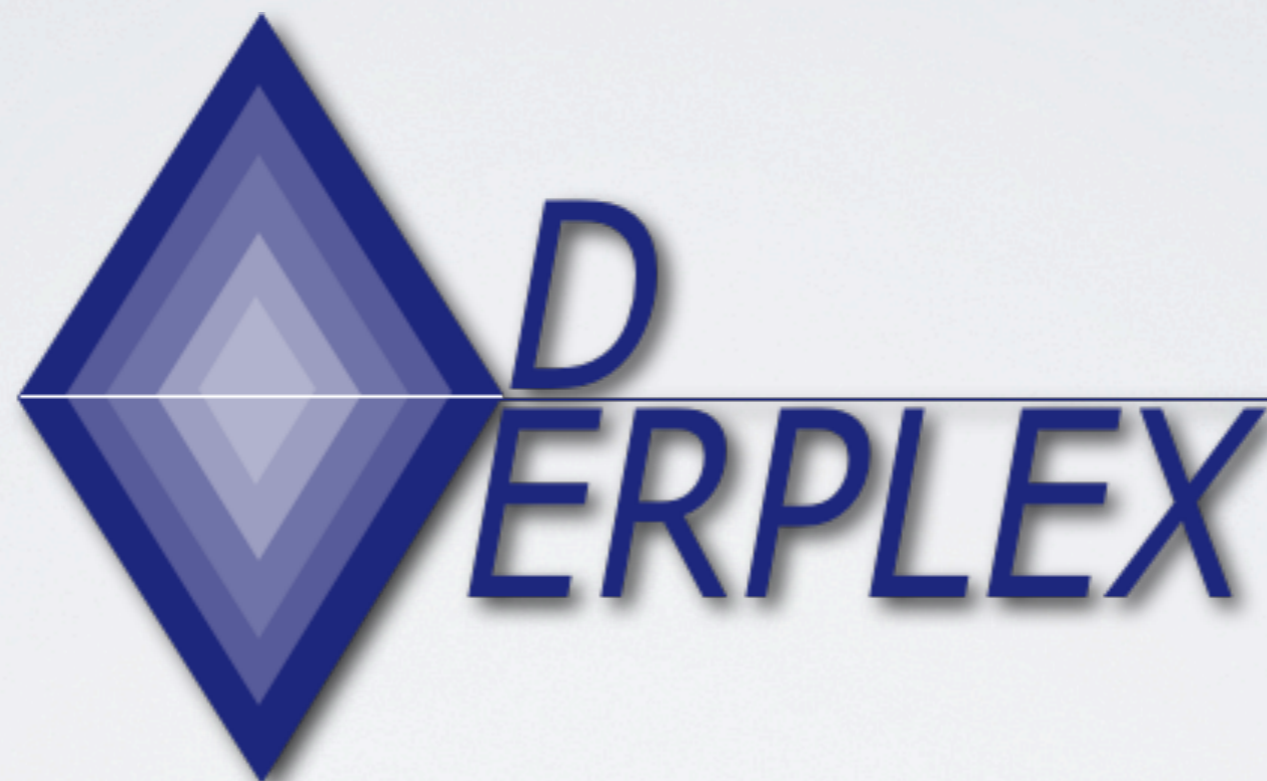
Through its search engine marketing expertise and proprietary technology platform, CourseAdvisor generates student leads for the post-secondary education market. Currently, more than 1.5 million students use CourseAdvisor's leading online education directory, CourseAdvisor.com, to match their skills and education needs to degree and certificate programs from more than 500 educational institutions and 8,000 programs.

Donald E. Graham, chairman and chief executive officer of The Washington Post Company, said, “CourseAdvisor is a top producer of online leads. Since its founding in 2004 by a group of MIT and UMASS graduates and faculty, the company has been led by an outstanding and experienced management team, and we plan to keep that team in place as the business continues to grow.” CourseAdvisor will operate as an independent subsidiary of The Washington Post Company.

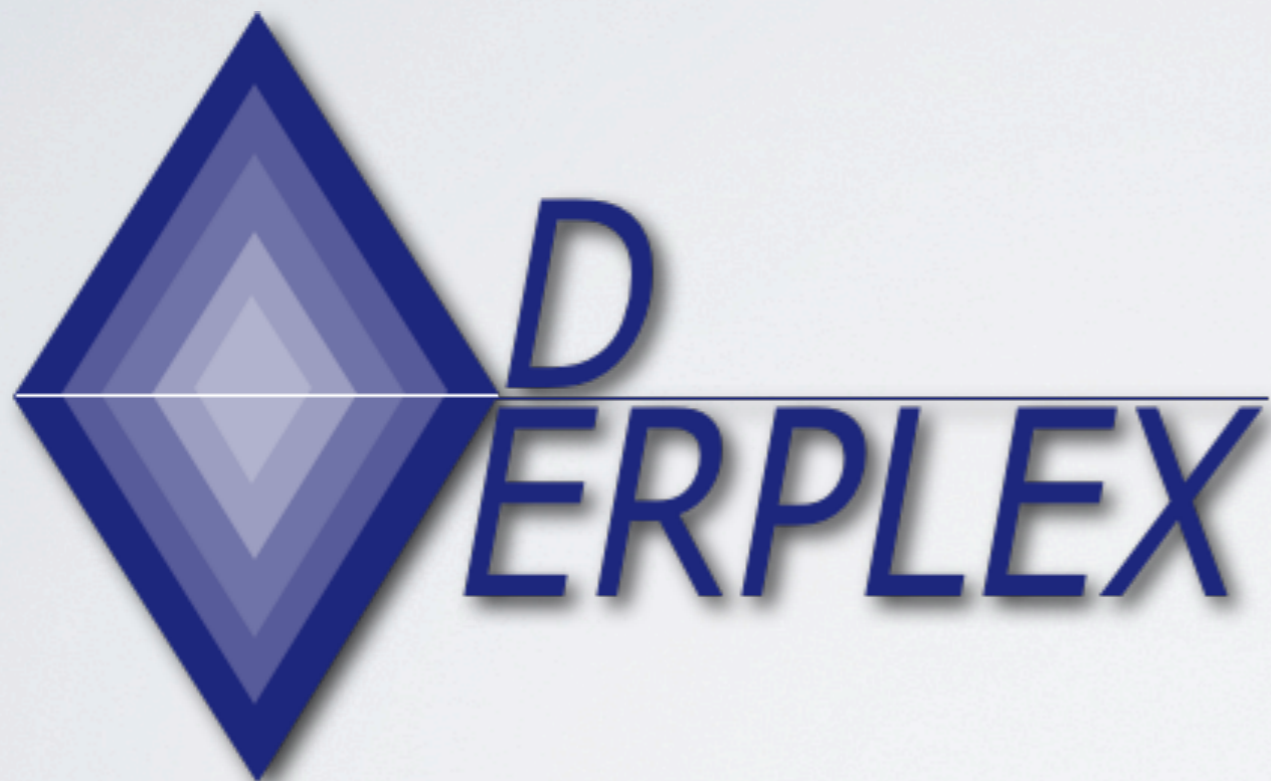
LIFE AT A START-UP



LIFE AT A START-UP



LIFE AT A START-UP



ADVERPLEX
ADΛEBPΓEX

ΓVΛΓΓV

Graduate School

UMass

1999

Vice-President of Technology

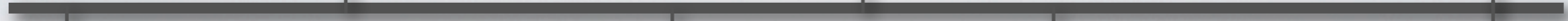
Adverplex

2005

Consultant

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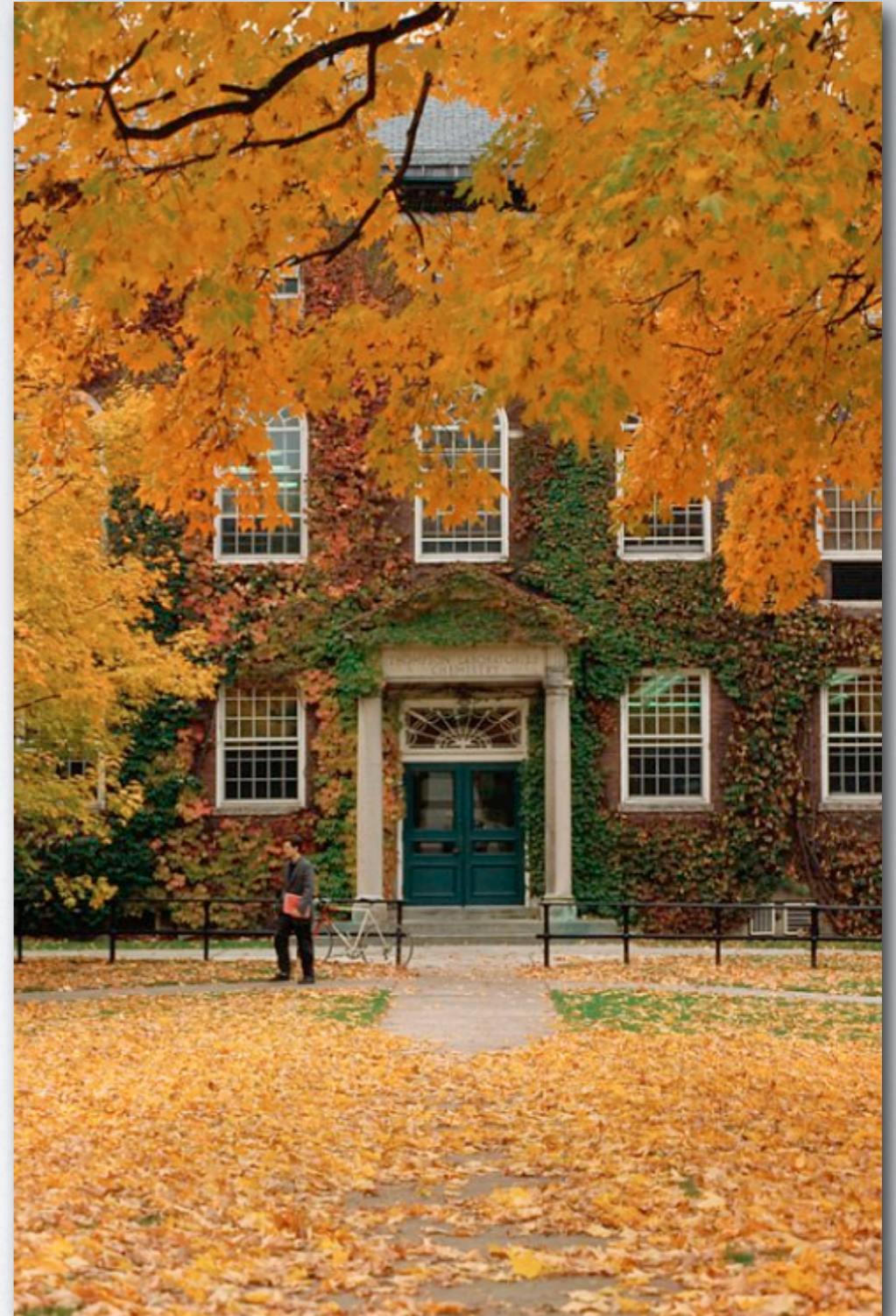
Sabbatical - Visiting Scholar



WILLIAMS COLLEGE

“The ideal college is Mark Hopkins on one end of a log and a student on the other.”

– President James A. Garfield
(on Mark Hopkins, Williams Professor 1830-1887)



WILLIAMS COLLEGE



- Tutorial System
- Early Sabbatical
- Teaching Load
- Balance of Research and Teaching

APPROXIMATION ALGORITHMS

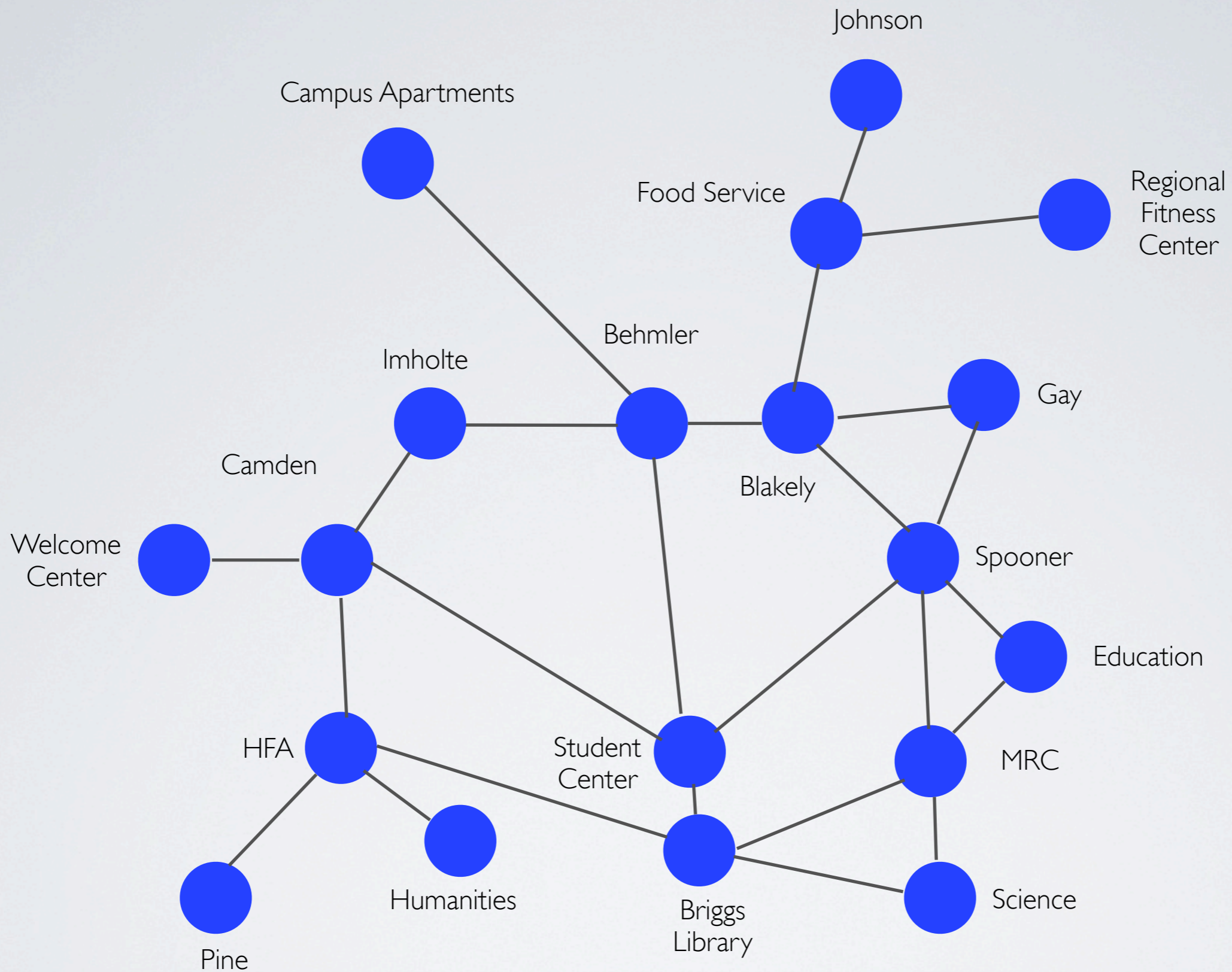
Pretty good solutions to fairly hard problems

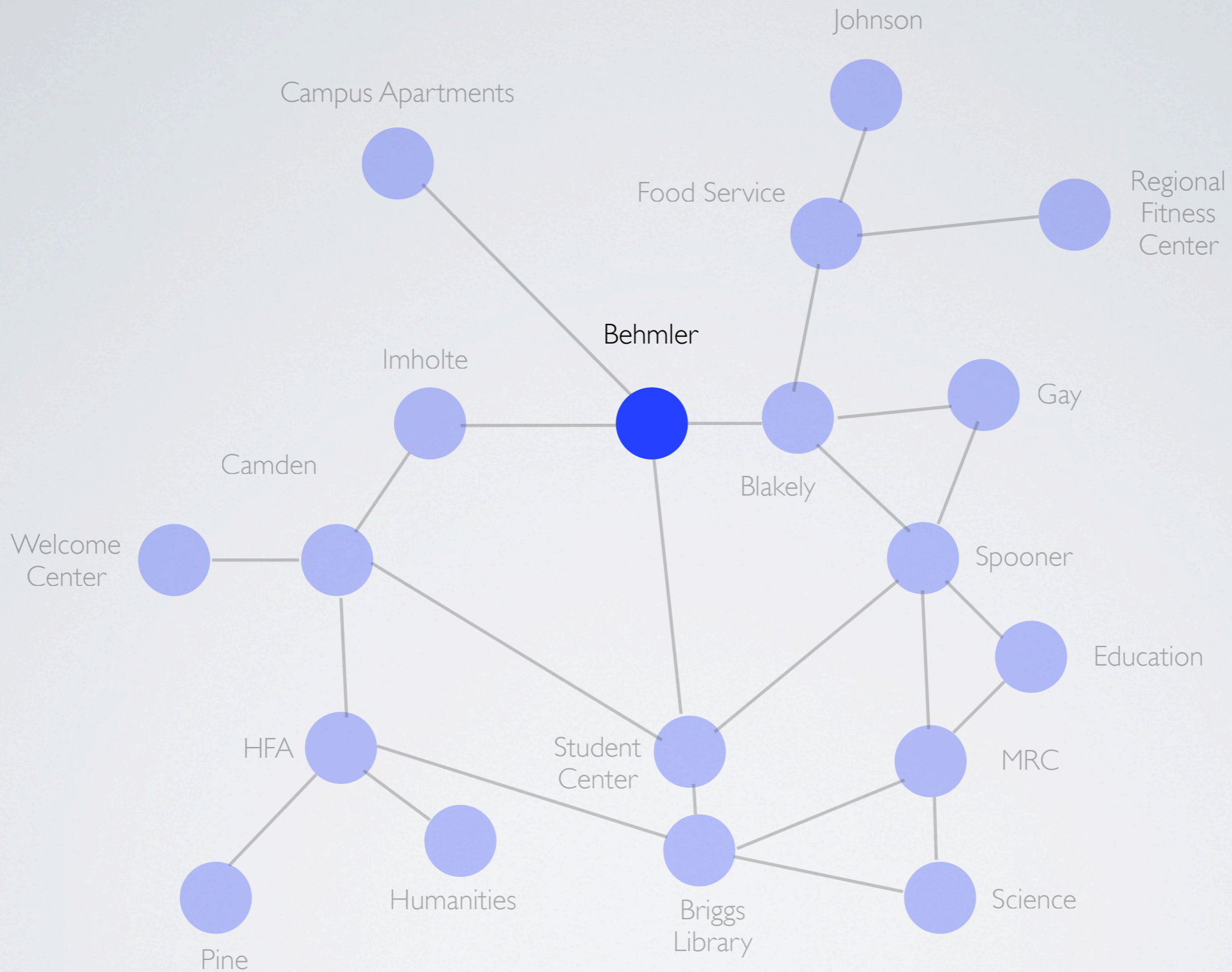
Chalking sidewalks is a vital form of advertisement on college campuses
Access to chalk should be quick and effective

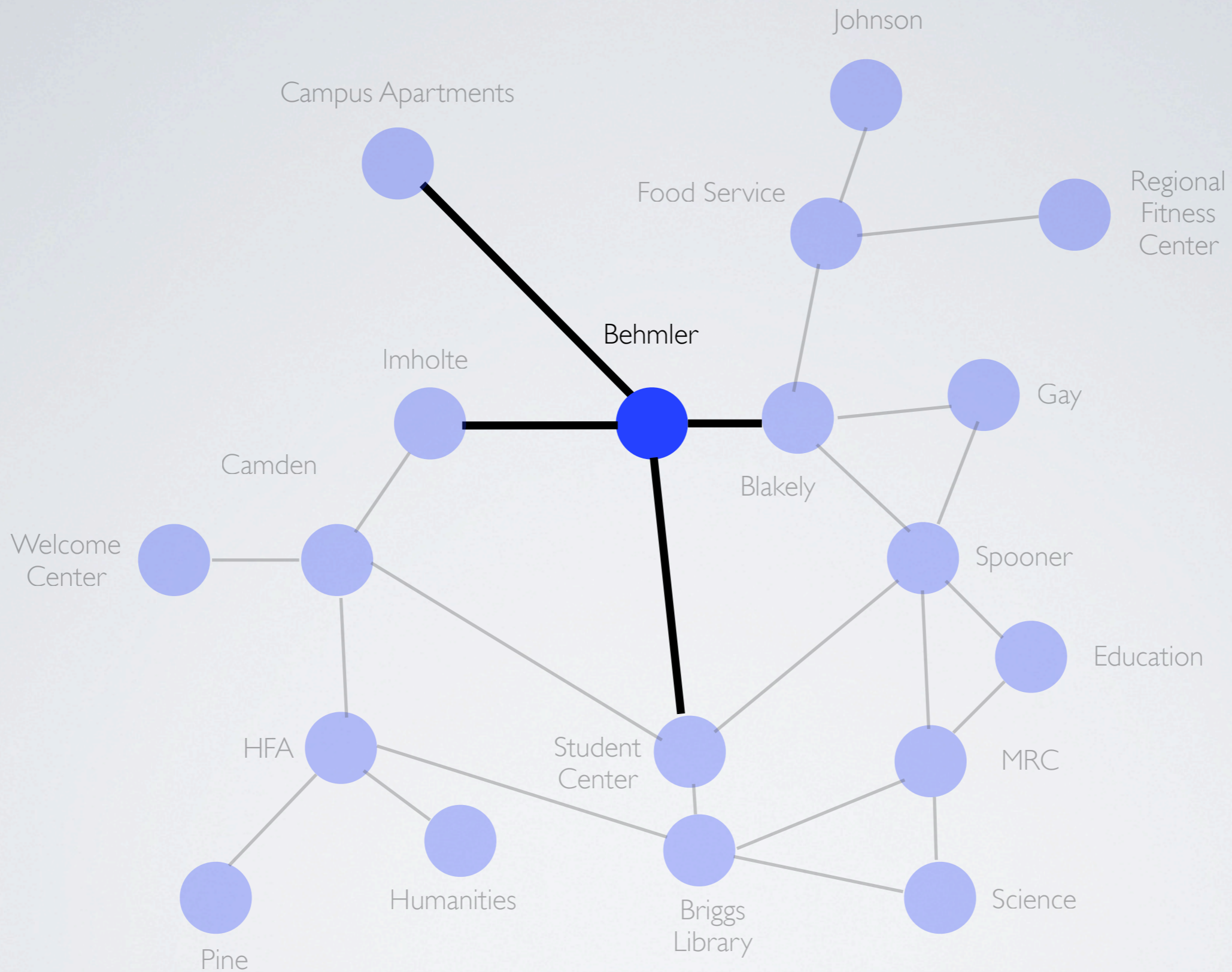


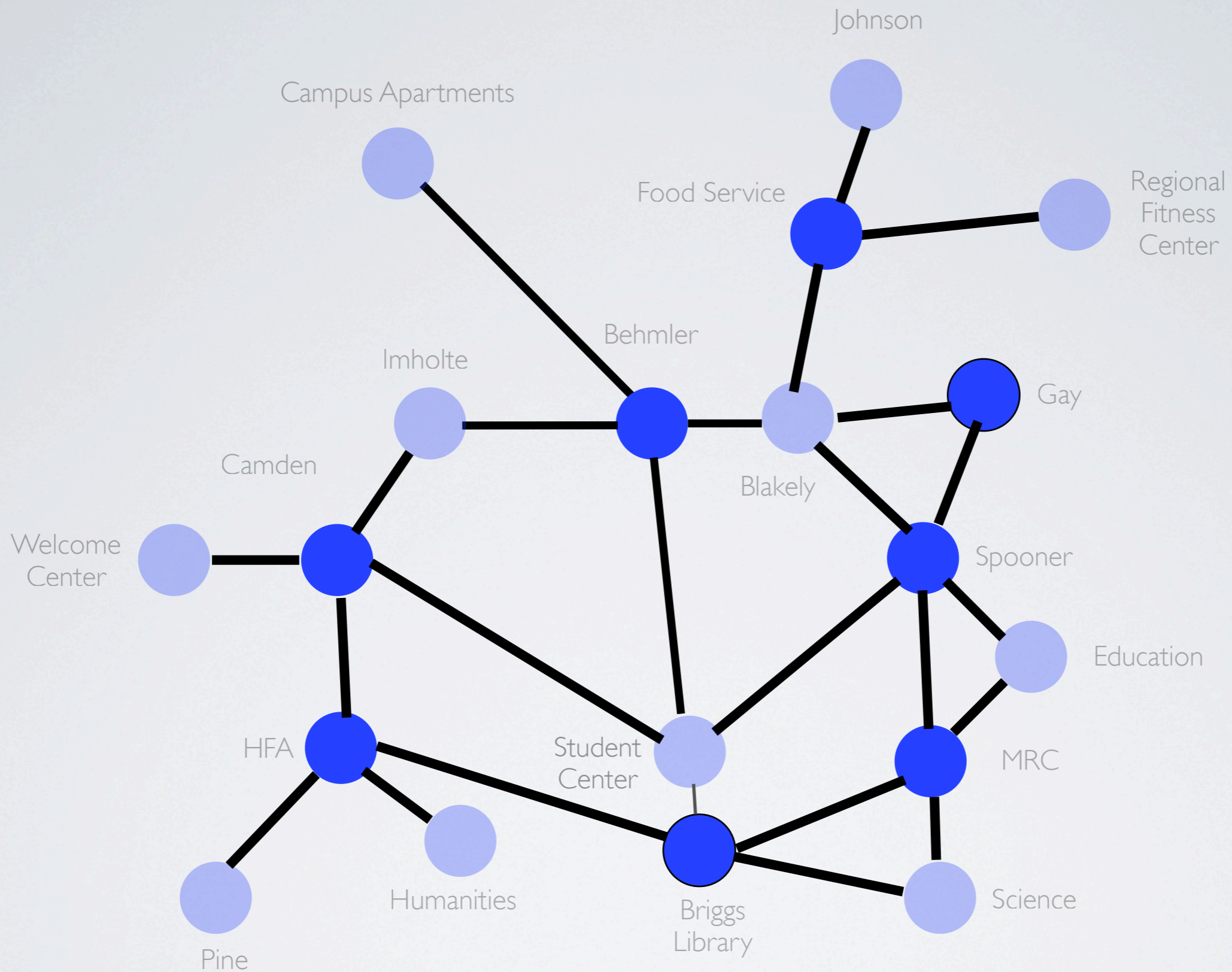
Where should we put the chalk?





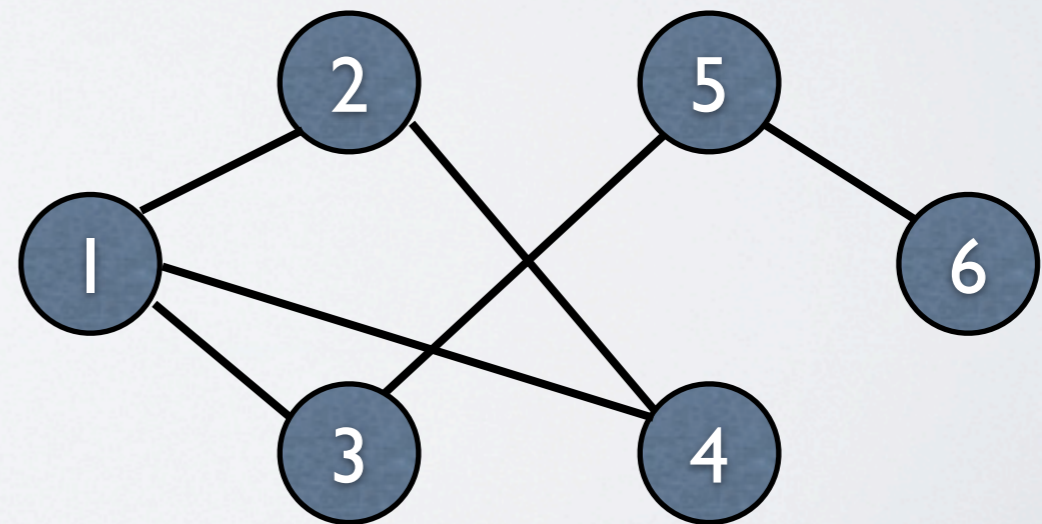




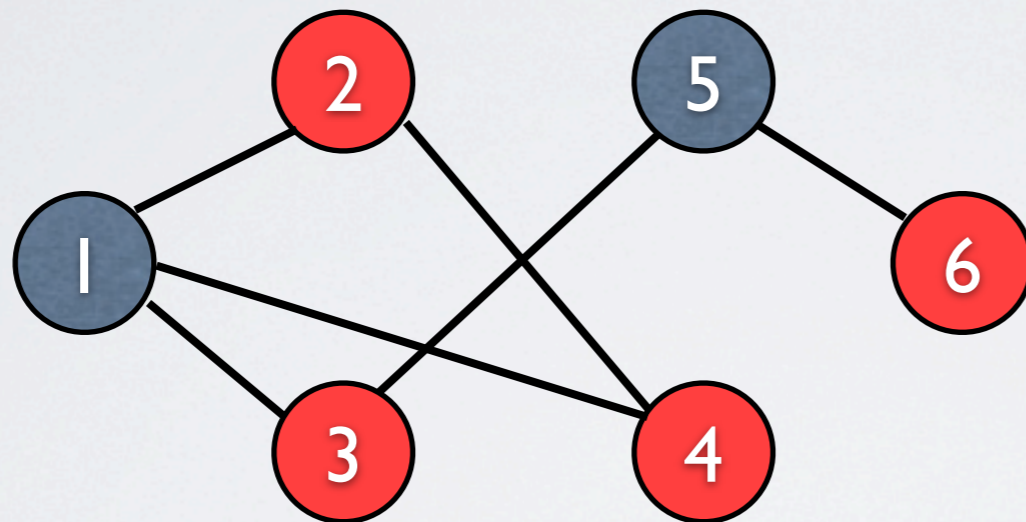


MINIMUM NODE COVER

- ▶ **Input:** A network of nodes
- ▶ **Output:** A subset of the nodes that **touch** every
- ▶ **Cost:** Size of the subset

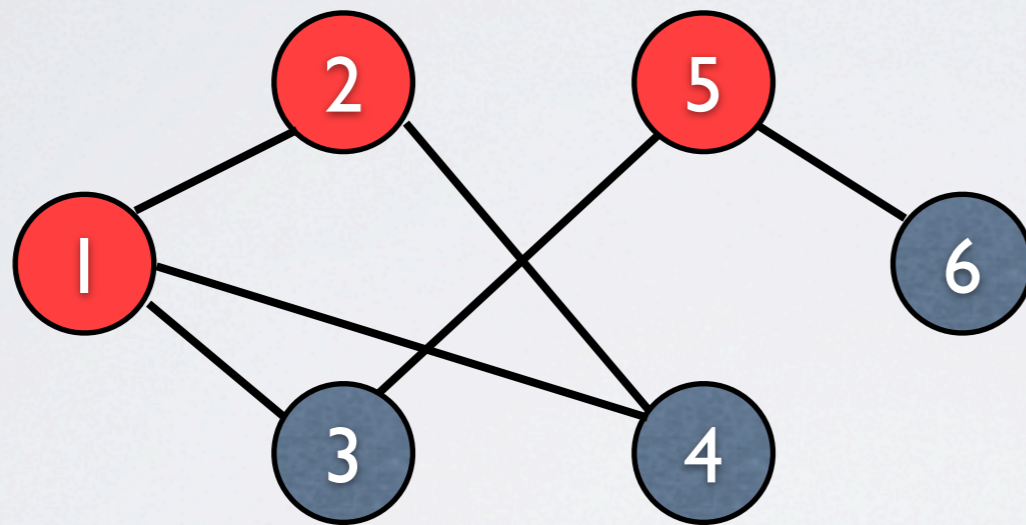


MINIMUM NODE COVER



$V = \{2, 3, 4, 6\}$
 $Cost(V) = 4$

MINIMUM NODE COVER

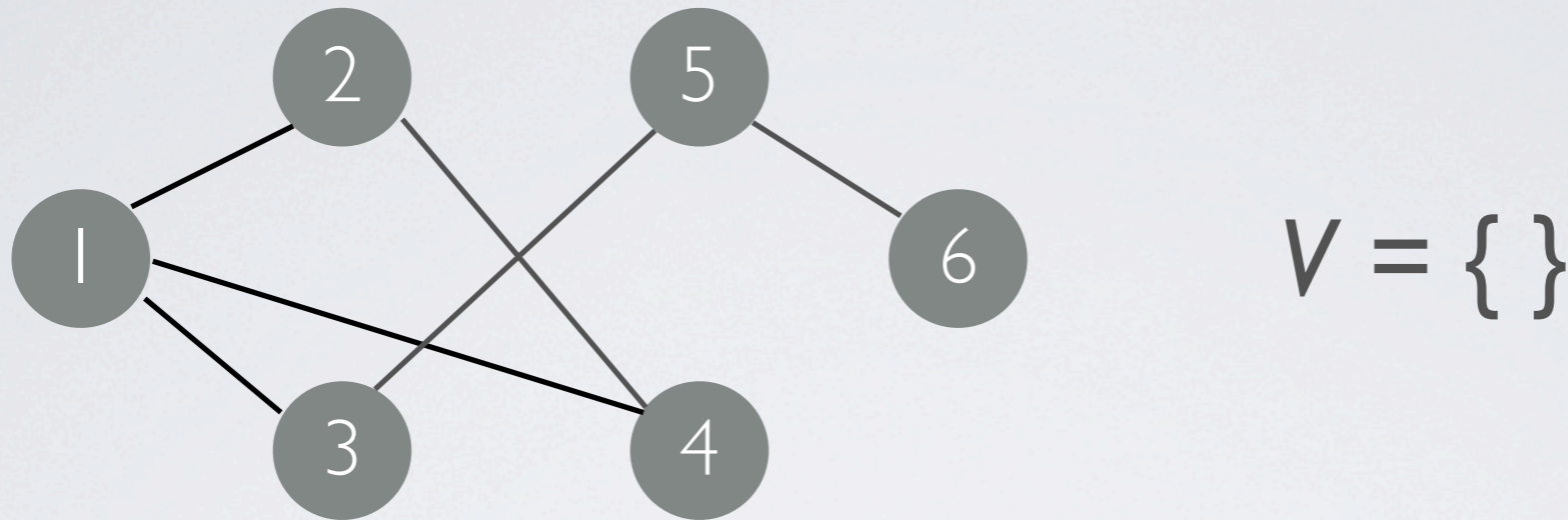


$$V = \{1, 2, 5\}$$
$$\text{Cost}(V) = 3$$

MINIMUM NODE COVER

- ▶ **Best algorithm for finding Min Node Cover:**
 - ▶ n nodes $\sim 2^n$ work
 - ▶ 10 vertices / 1 second
 - ▶ 30 vertices / 12 days
 - ▶ 50 vertices / 34 millennia
- ▶ **Intractable**
- ▶ **Approximation algorithms:**
 - ▶ Can we find provably good (but not necessarily optimal) solutions quickly?

MINIMUM NODE COVER



$V \leftarrow \{\}$

Repeat until no edges left

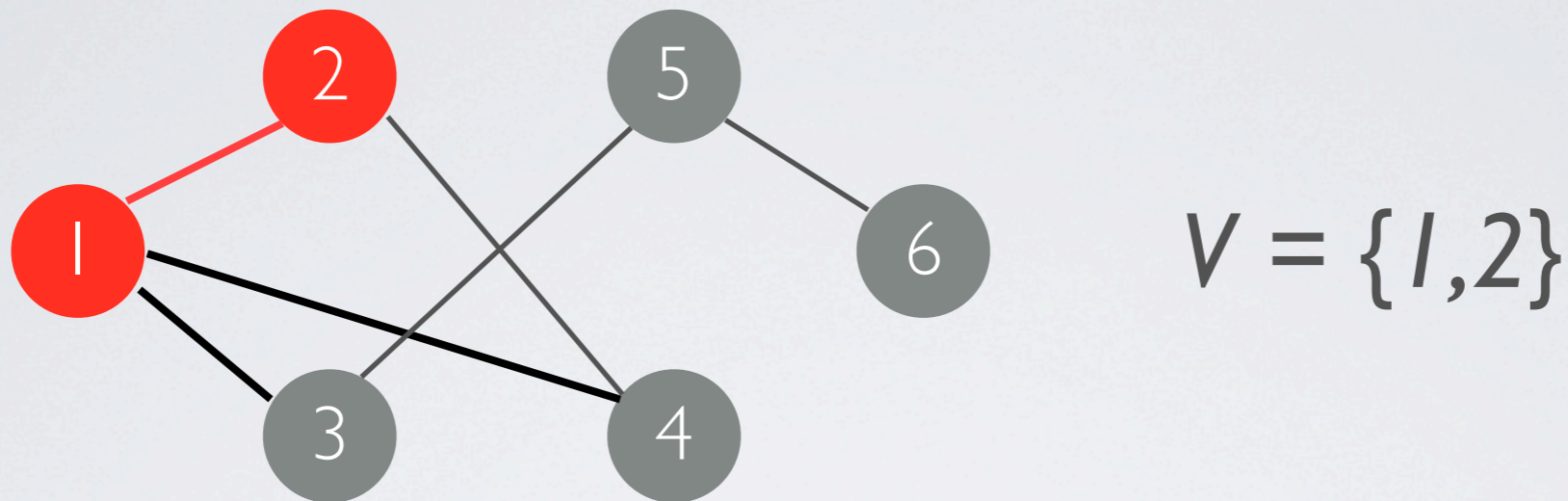
Choose an arbitrary edge (u,v)

$V \leftarrow V \cup \{u,v\}$

Delete all edges adjacent to u or v

Return V

MINIMUM NODE COVER



$V \leftarrow \{\}$

Repeat until no edges left

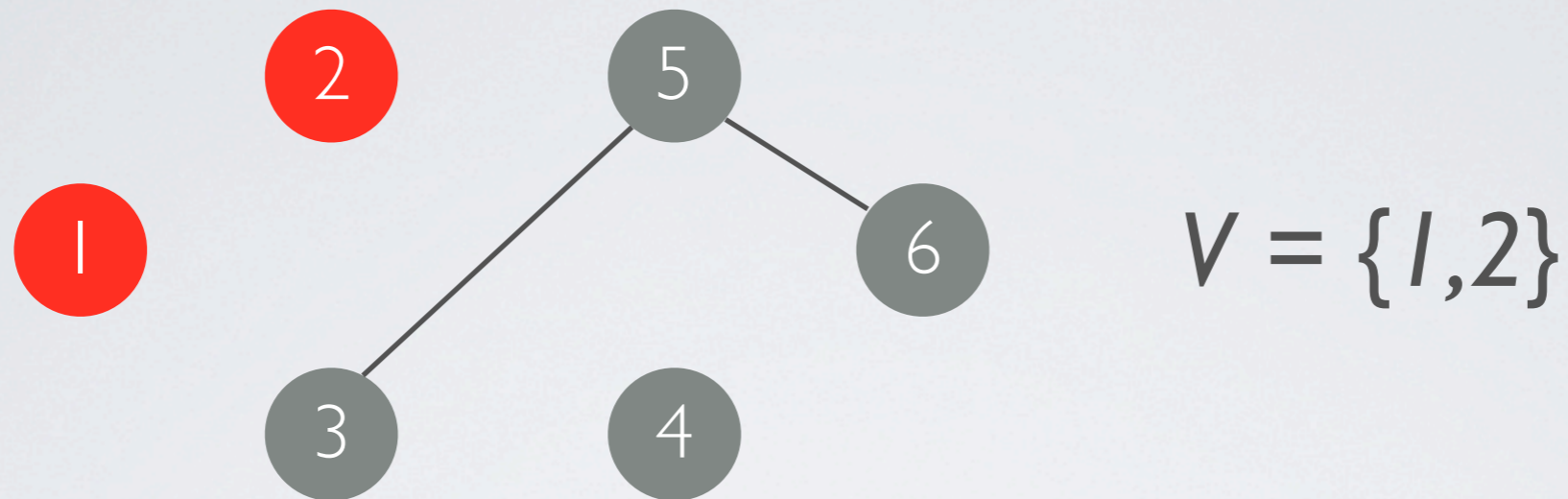
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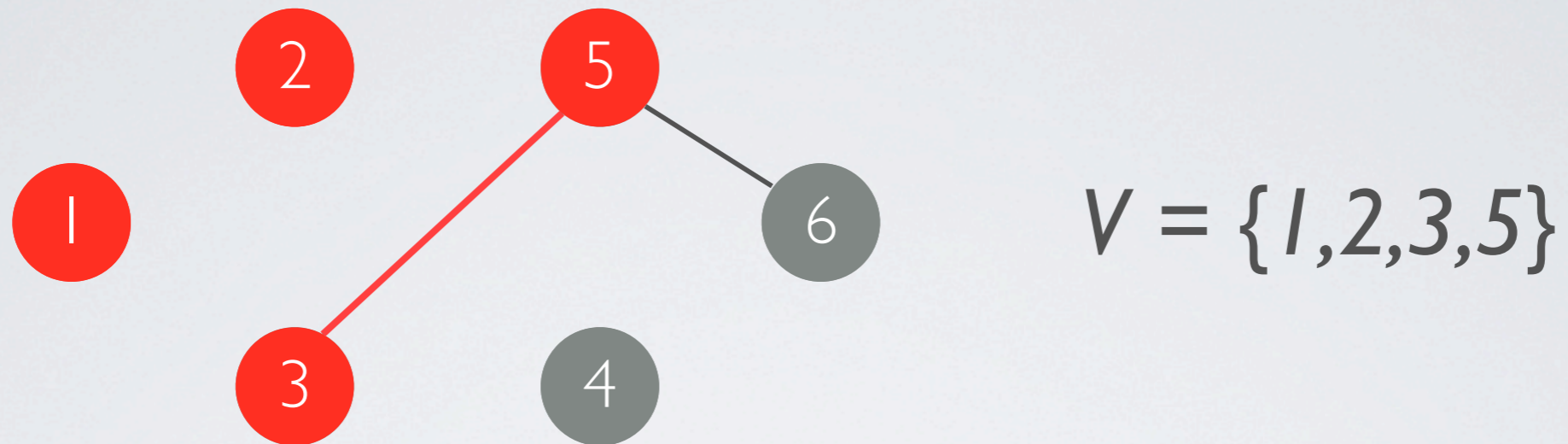
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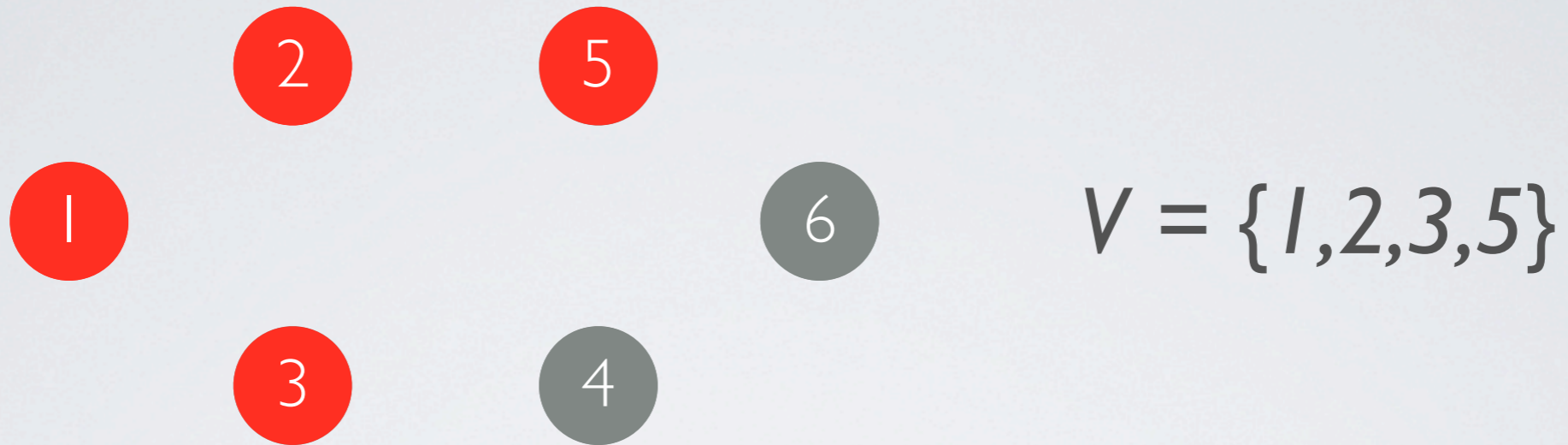
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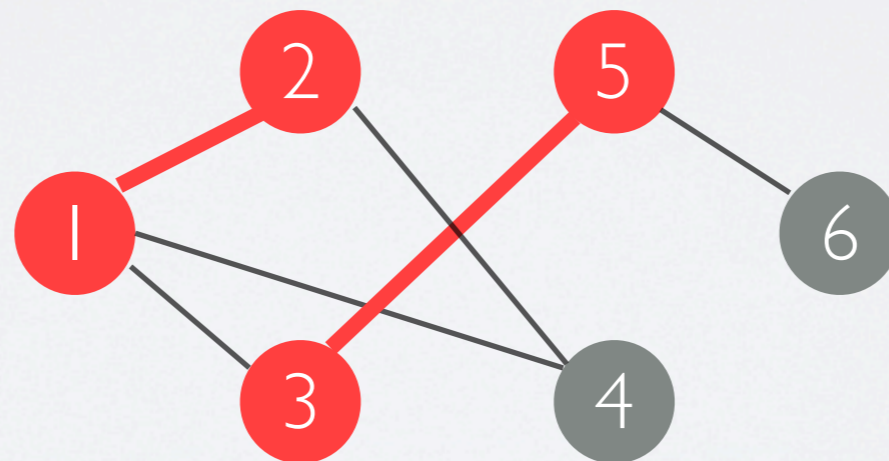
Delete all edges adjacent to u or v

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MINIMUM NODE COVER

Theorem

Our solution is not more than double the size of an optimal solution



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HEAPABLE SEQUENCES AND SUBSEQUENCES

HEAPABLE SEQUENCES AND SUBSEQUENCES

JOHN BYERS¹, BRENT HEERINGA², MICHAEL MITZENMACHER³, AND GEORGIOS ZERVAS¹

ABSTRACT. Let us call a sequence of numbers heapable if they can be sequentially inserted to form a binary tree with the heap property, where each insertion subsequent to the first occurs at a leaf of the tree, i.e. below a previously placed number. In this paper we consider a variety of problems related to heapable sequences and subsequences that do not appear to have been studied previously. Our motivation for introducing these concepts is two-fold. First, such problems correspond to natural extensions of the well-known secretary problem for hiring an organization with a hierarchical structure. Second, from a purely combinatorial perspective, our problems are interesting variations on similar longest increasing subsequence problems, a problem paradigm that has led to many deep mathematical connections.

We provide several basic results. We obtain an efficient algorithm for determining the heapability of a sequence, and also prove that the question of whether a sequence can be arranged in a complete binary heap is NP-hard. Regarding subsequences we show that, with high probability, the longest heapable subsequence of a random permutation of n numbers has length $(1 - o(1))n$, and a subsequence of length $(1 - o(1))n$ can in fact be found online with high probability. We similarly show that for a random permutation a subsequence that yields a complete heap of size αn for a constant α can be found with high probability. Our work highlights the interesting structure underlying this class of subsequence problems, and we leave many further interesting variations open for future work.

(in submission)

John Byers (BU)

Giorgos Zervas (BU)

Michael Mitzenmacher (Harvard)

Brent Heeringa

Available at

<http://arxiv.org/abs/1007.2365>

¹DEPARTMENT OF COMPUTER SCIENCE, BOSTON UNIVERSITY

²DEPARTMENT OF COMPUTER SCIENCE, WILLIAMS COLLEGE

³DEPARTMENT OF COMPUTER SCIENCE, HARVARD UNIVERSITY

E-mail addresses: byers@cs.bu.edu, heeringa@cs.williams.edu, michaelm@eecs.harvard.edu, zg@bu.edu.

John Byers and Georgios Zervas are supported in part by Adverplex, Inc. and by NSF grant CNS-0520166.

Brent Heeringa is supported by NSF grant IIS-08125414.

Michael Mitzenmacher is supported by NSF grants CCF-0915922 and IIS-0964473, and by grants from Yahoo! Research and Google Research.

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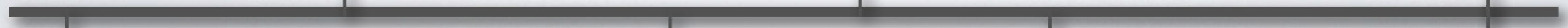
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Sabbatical - Visiting Scholar



A mobile, scalable iPhone app that intelligently aggregates, organizes, and caches news stories from 40 different sources





Founded in 2008 by Micah Adler
Headquartered in Boston, MA
20 employees



FLUENT
MOBILE
WOBI
EGN

Gadgetwise



Getting Smart About Personal Technology

July 7, 2009, 6:43 PM

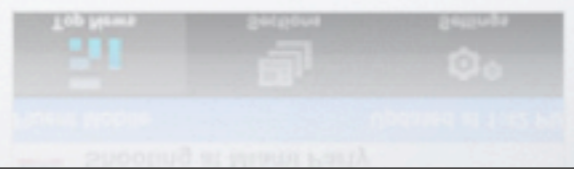
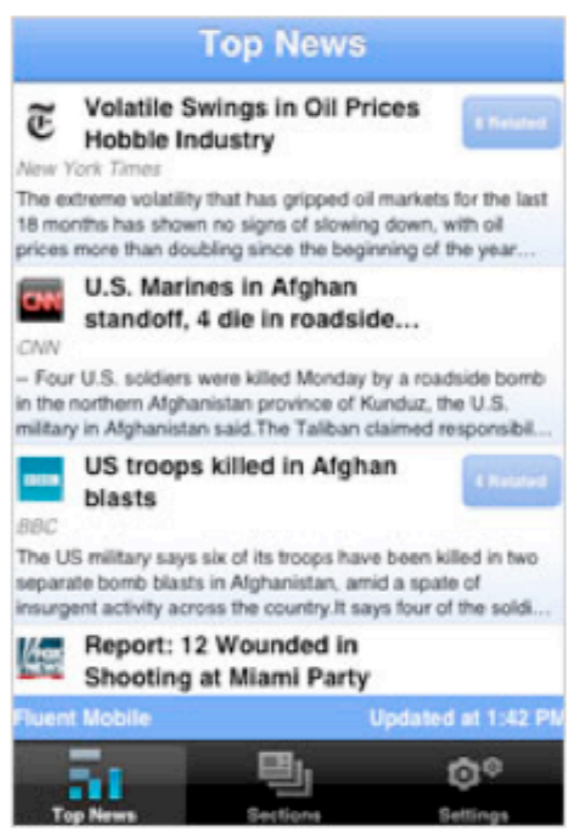
App of the Week: A Reader Fluent in News

By ROY FURCHGOTT

The ability to check news at any time is one of the joys of the mobile phone, but trying to read tiny type and busy layouts on a two-inch screen isn't.

A recently released free iPhone app called [Fluent News](#) does a nice job of addressing that problem (a mobile Web version is available to any phone with a browser at www.fluentnews.com). It aggregates news from top sources, collecting only stories that are formatted for the mobile phone, then recasts them into its easy to use news browser.

No account is required, you just load the app, fire it up, and the screen shows a list of headlines and a summary. Tap the headline to read the full story. Fluent cuts clutter by showing just one story on any particular

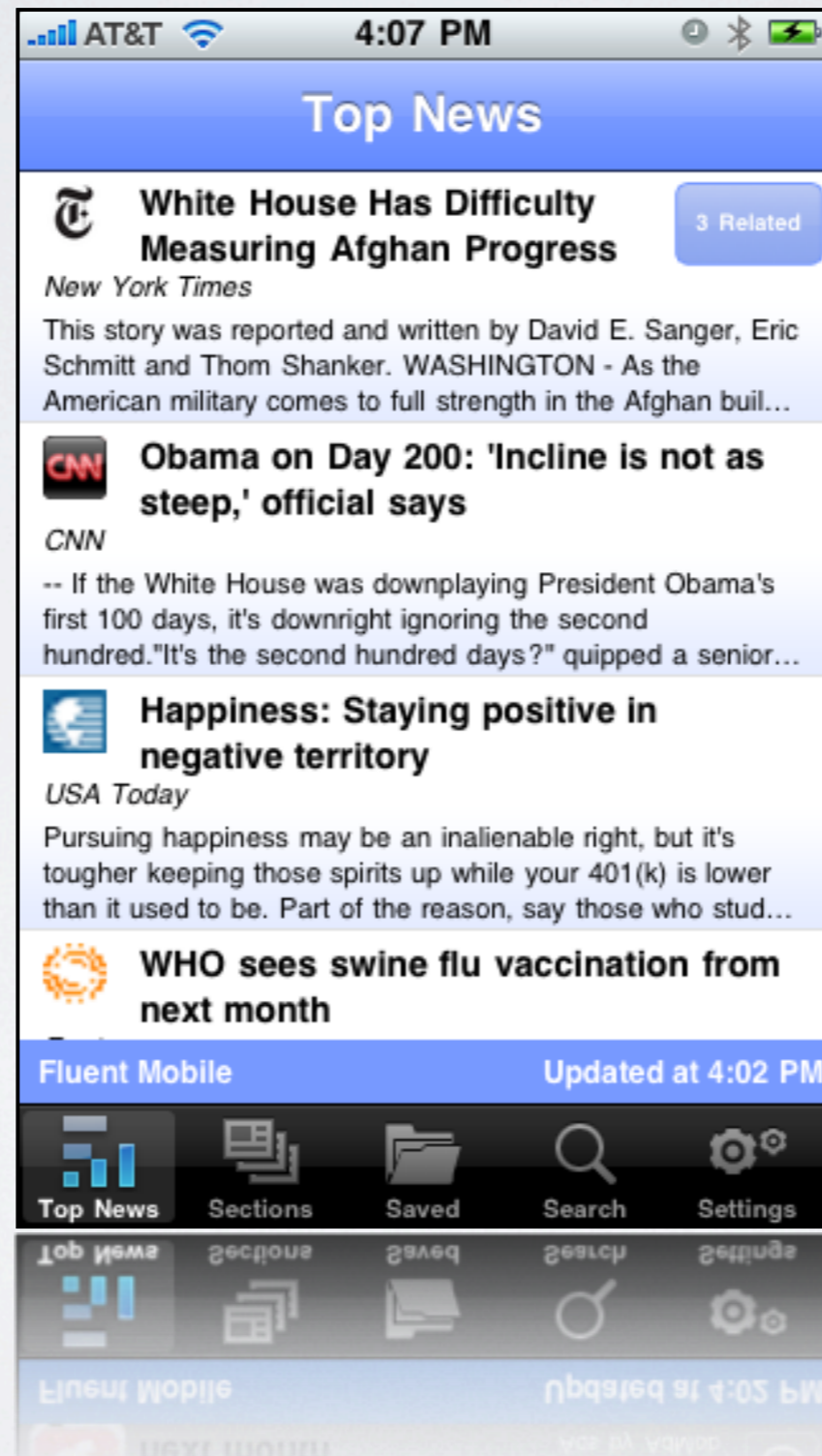




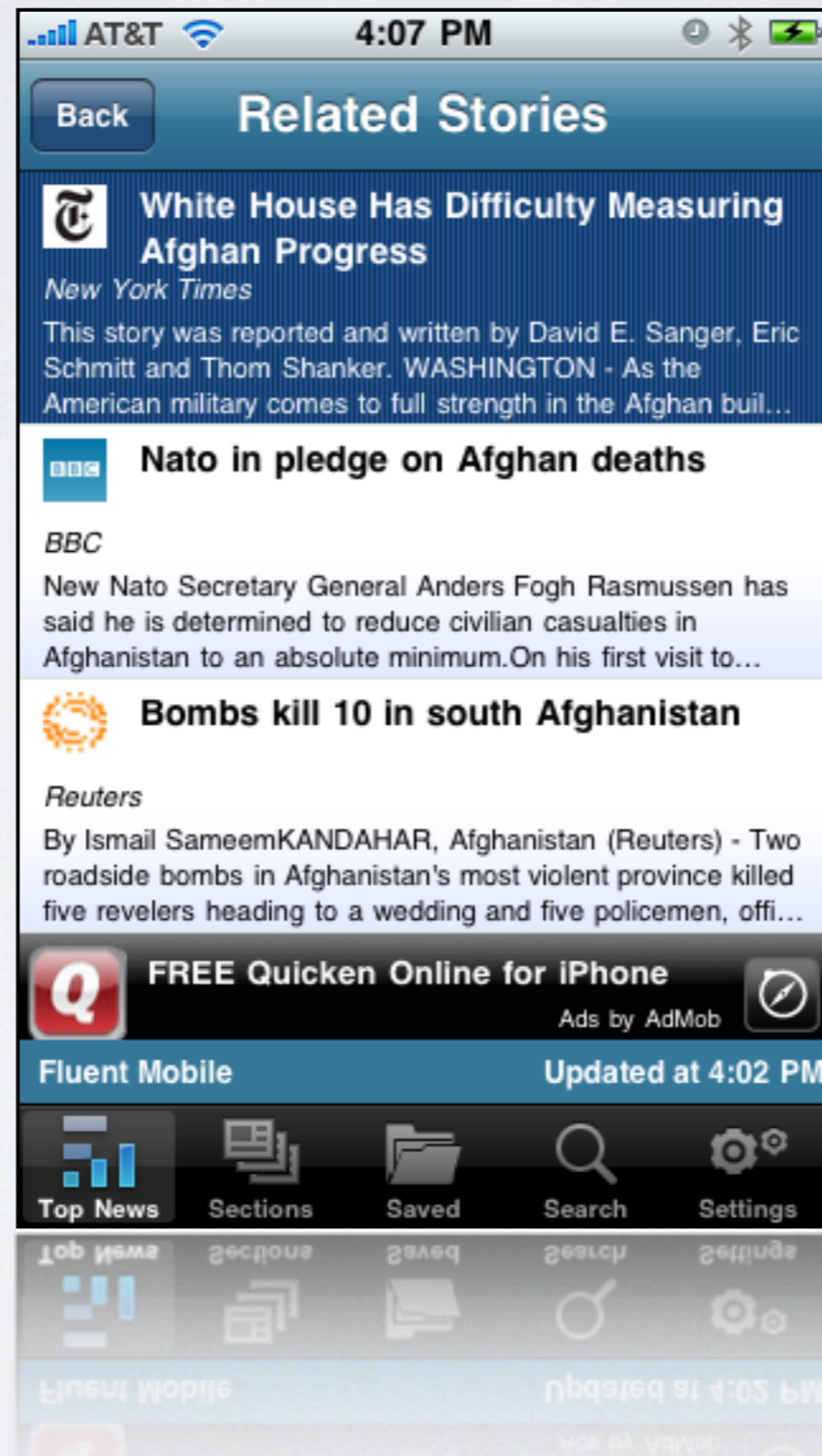
FLUENT
MOBILE
WOBIGE
EGADGET



CLUSTERING NEWS



CLUSTERING NEWS



CLUSTERING NEWS

ARTICLE 1

turtle

cafe

cafe

turtle

cafe

ARTICLE 2

mountain
cafe

CLUSTERING NEWS

ARTICLE 1

turtle
cafe

ARTICLE 2

mountain

CLUSTERING NEWS



CLUSTERING NEWS



CLUSTERING NEWS

	ARTICLE 1	ARTICLE 2
turtle	2	0
cafe	0	1
mountain	3	1

CLUSTERING NEWS

	ARTICLE 1	ARTICLE 2
turtle	2	0
cafe	0	1
mountain	3	1

Term Frequencies

CLUSTERING NEWS

	ARTICLE 1	ARTICLE 2	ARTICLE 3	ARTICLE 4
turtle	2	0	0	0
cafe	0	1	0	0
mountain	3	1	2	3

Term Frequencies

CLUSTERING NEWS

	ARTICLE 1	ARTICLE 2	ARTICLE 3	ARTICLE 4
turtle	2	0	0	0
cafe	0	1	0	0
mountain	3	1	2	3

Term Frequencies

CLUSTERING NEWS

	ARTICLE 1	ARTICLE 2	ARTICLE 3	ARTICLE 4
turtle	2	0	0	0
cafe	0	1	0	0
mountain	3	1	2	3

Term Frequencies

CLUSTERING NEWS

	ARTICLE 1	ARTICLE 2	ARTICLE 3	ARTICLE 4
turtle	2 4/1	0 4/1	0	0
cafe	0 4/1	1 4/1	0	0
mountain	3 4/4	1 4/4	2	3

Term Frequencies

Inverse Doc Frequency

CLUSTERING NEWS

	ARTICLE 1	ARTICLE 2	ARTICLE 3	ARTICLE 4
turtle	$2 \times 4/1$	$0 \times 4/1$	0	0
cafe	$0 \times 4/1$	$1 \times 4/1$	0	0
mountain	$3 \times 4/4$	$1 \times 4/4$	2	3

Term Frequencies \times Inverse Doc Frequency

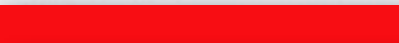
CLUSTERING NEWS

	ARTICLE 1	ARTICLE 2
turtle	8	0
cafe	0	4
mountain	3	4

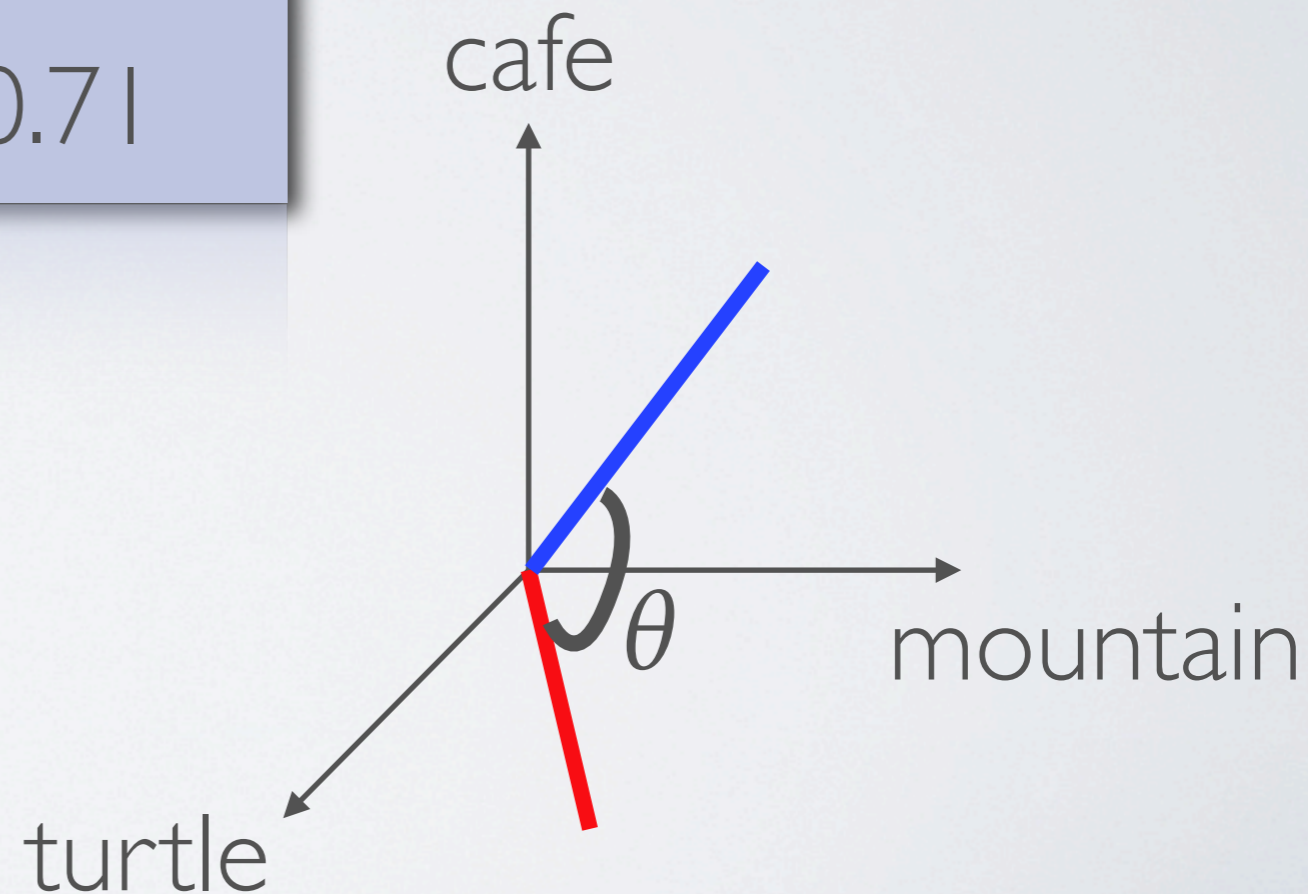
CLUSTERING NEWS

	ARTICLE 1	ARTICLE 2
turtle	0.94	0
cafe	0	0.71
mountain	0.35	0.71

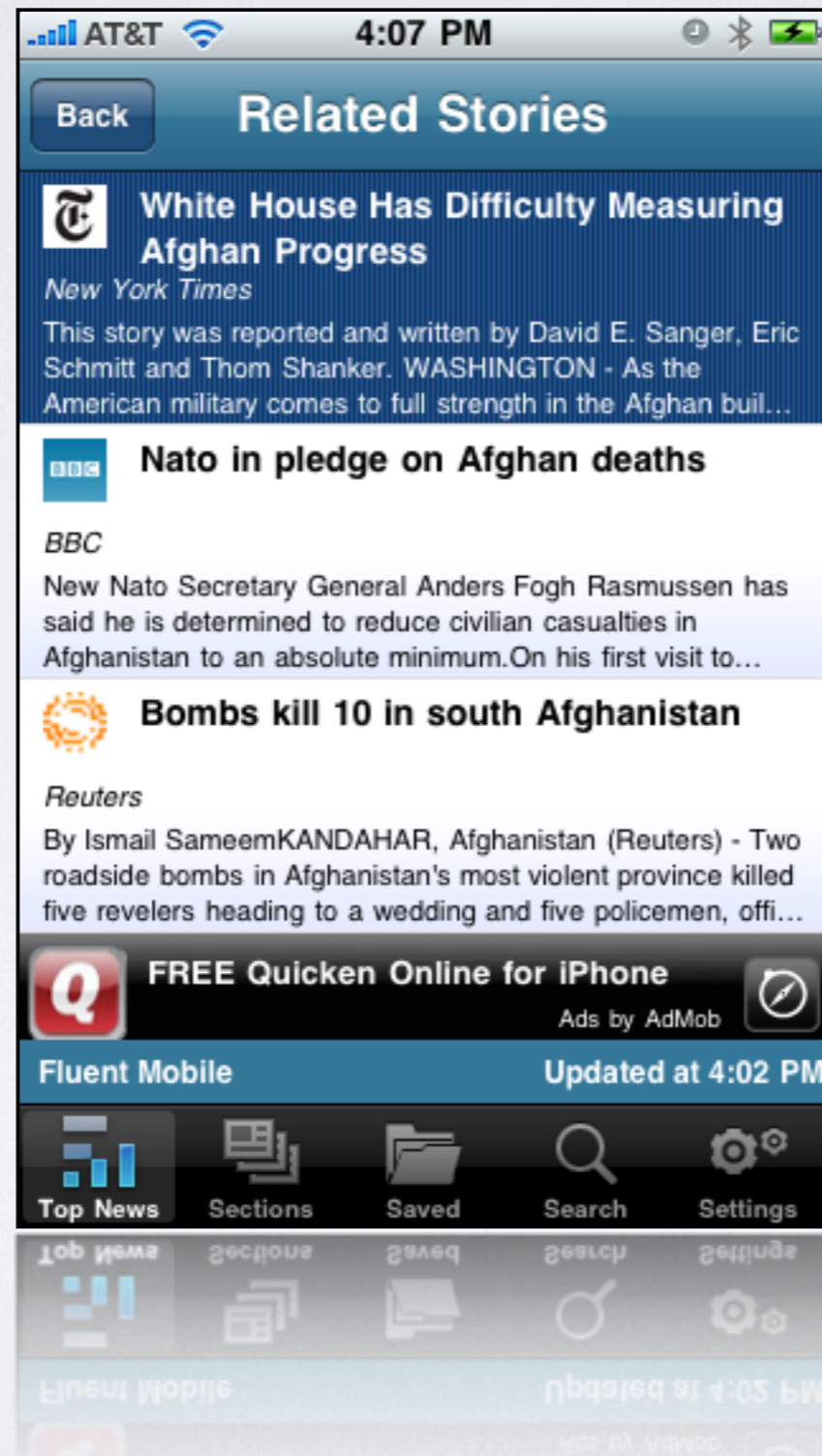
CLUSTERING NEWS

		
turtle	0.94	0
cafe	0	0.71
mountain	0.35	0.71

$$\text{similarity}(\text{red}, \text{blue}) = \cos(\theta)$$



CLUSTERING NEWS



Graduate School

UMass

1999

Vice-President of Technology

Adverplex

2005

Consultant

Fluent Mobile

2009

1995

UMM

2003

Williams

Visiting Instructor

2006

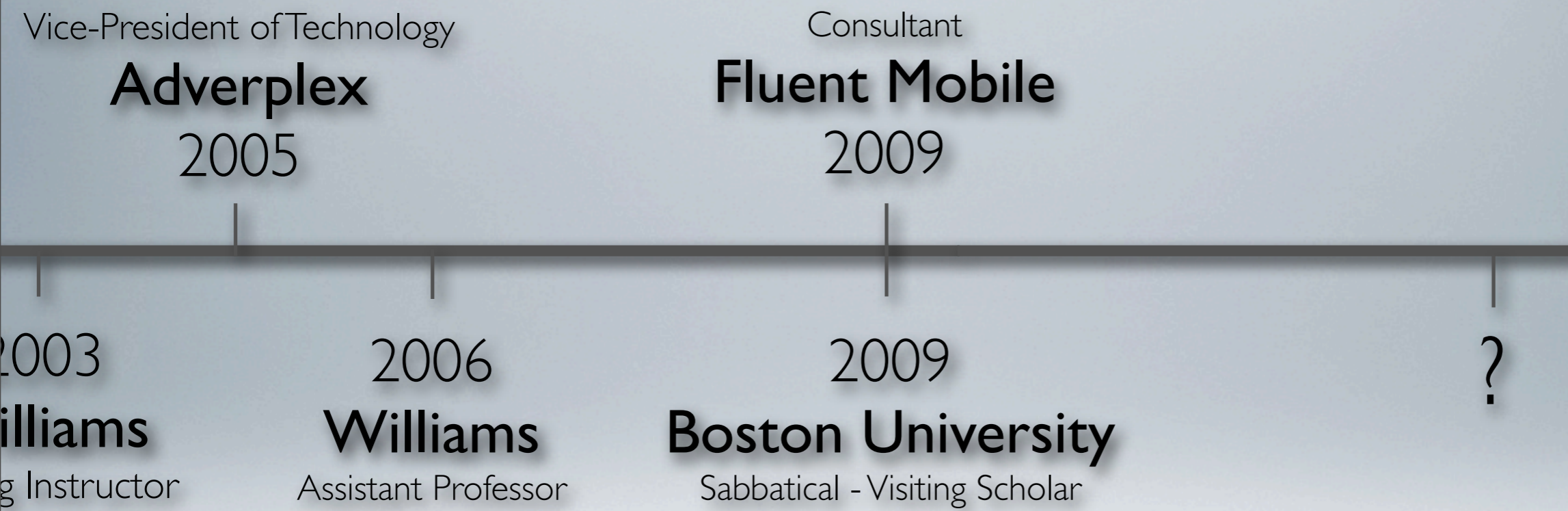
Williams

Assistant Professor

2009

Boston University

Sabbatical - Visiting Scholar





Thanks!

Brent Heeringa

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