1.1
1/6

example 1

$$
\begin{pmatrix}
0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0\\
0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0\\
0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0\\
0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0\\
0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0\\
0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0\\
0&1&1&1&1&1&1&1&1&1&1&1&1&1&1&1&0&0&0&0&0&0&0&0&0&0&0&0&0&0\\
1&1&1&1&1&1&1&1&1&1&1&1&1&1&1&1&1&1&0&0&0&0&0&0&0&0&0&0&0&0\\
1&1&1&1&1&1&1&1&1&1&1&1&1&1&1&1&1&1&1&1&0&0&0&0&0&0&0&0&0&0\\
1&1&1&1&1&1&1&1&1&1&1&1&1&1&1&1&1&1&1&1&1&1&1&1&1&1&1&0&0&0\\
1&1&1&1&1&1&1&1&1&1&1&1&1&1&1&1&1&1&1&1&1&1&1&1&1&1&1&1&0&0\\
1&1&1&1&1&1&1&1&1&1&0&0&0&0&0&1&1&1&1&1&1&1&1&1&1&1&1&1&1&0\\
0&1&1&1&1&1&1&0&1&1&0&1&1&1&1&0&1&1&1&1&0&0&0&0&1&1&1&1&1&1\\
0&0&0&0&0&0&0&0&1&1&1&1&1&1&1&1&0&1&1&1&0&0&0&0&0&1&1&1&1&1\\
0&1&1&1&1&1&1&0&1&0&0&1&1&1&1&0&1&1&1&1&0&0&0&0&0&0&1&1&1&1\\
1&1&1&1&1&1&1&1&1&1&1&1&1&1&1&1&1&1&1&0&0&0&0&0&0&0&1&1&1&1\\
1&1&1&1&1&1&1&1&1&1&1&1&1&1&1&1&1&1&0&0&0&0&0&0&0&0&1&1&1&1\\
1&1&1&1&1&1&1&1&1&1&1&1&1&1&1&1&1&1&1&1&1&1&1&1&0&0&1&1&1&1\\
1&1&1&1&1&1&1&1&1&1&1&1&1&1&1&1&1&1&1&1&1&1&1&1&1&0&1&1&1&1\\
0&1&1&1&1&1&1&1&1&1&1&1&1&1&1&1&1&1&1&1&1&1&1&1&1&1&1&1&1&0\\
0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&1&1&0\\
0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&1&0&0\\
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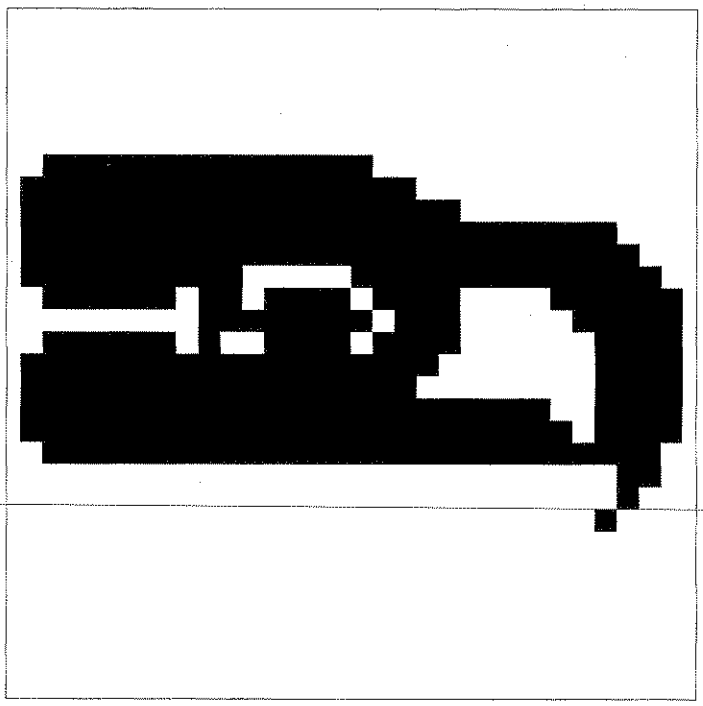
0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0\\
0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0\\
0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0\\
0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0\\
0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0\\
0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0\\
0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0&0
\end{pmatrix}
$$

A matrix is an array (table) of numbers. It doesn't have an inherent interp.

Q: What does this matrix represent.



example 2

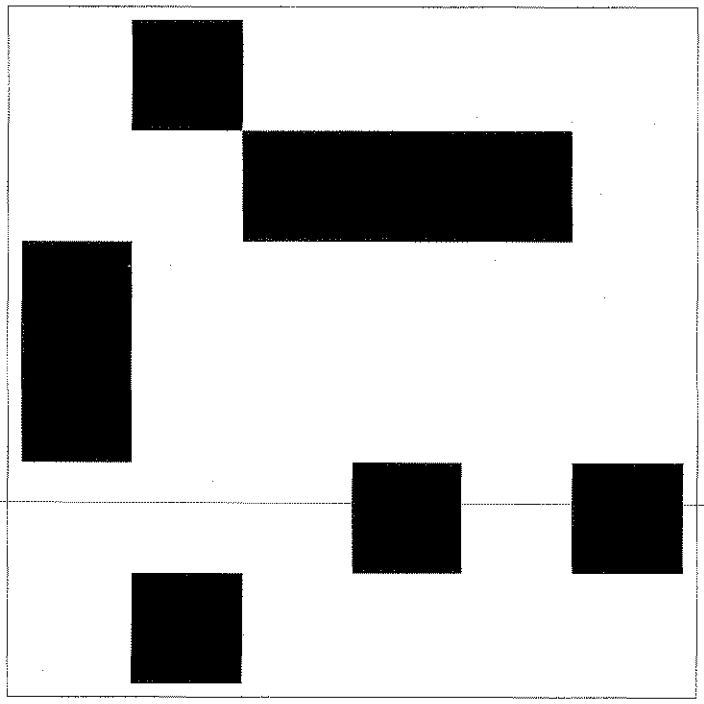
Out[1]//MatrixForm=

$$\begin{pmatrix} 0 & 1 & 0 & 0 & 0 & 0 \\ 0 & 0 & 1 & 1 & 1 & 0 \\ 1 & 0 & 0 & 0 & 0 & 0 \\ 1 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 & 1 \\ 0 & 1 & 0 & 0 & 0 & 0 \end{pmatrix}$$

A new matrix

w/ a new interp.

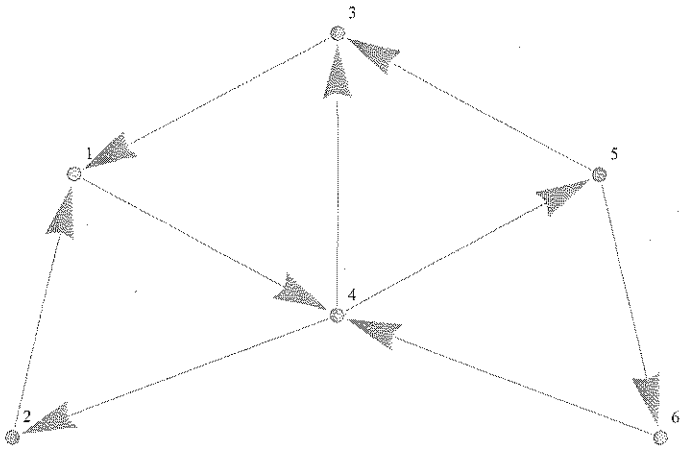
Out[67]=



1.1
5/6

Graph Theory

Out[64]=



The start of a $1,000,000,000 problem. (Page Rank)

1.1
#6

Out[58]//TableForm=

	1	4	2	3	5	6
1	0	1	0	0	0	0
4	0	0	1	1	1	0
2	1	0	0	0	0	0
3	1	0	0	0	0	0
5	0	0	0	1	0	1
6	0	1	0	0	0	0

connecting the matrix to the graph.

Introductions (Linear Algebra, Winter 2016)

I want to welcome you back from the holiday to what should be a delightful quarter of linear algebra. This was perhaps my favorite course as a community college student and I am excited to be able to share it with you.

Before going through the syllabus, I wanted to tell you a bit about myself:

- I grew up in this area. I home schooled, did two years of Running Start in Olympia. After this I earned my BA from TESC in political science, literature, and mathematics. In 2001 I completed my MS at WWU in mathematics. I am in my second decade at Highline College and recently was elected chair of science and math at Highline.
- I enjoyed teaching when I came to Highline and love it more each year as I grow as a teacher and get the privilege of working with students and impacting our culture through education.
- I enjoy teaching mathematics at all levels, last quarter I taught intermediate algebra. I've taught most of the classes we offer at Highline and I guess that is because I am amazed by all of mathematics!
- A few years back, I was privileged to take a sabbatical (time off of teaching) to research the philosophy of mathematics (what is math, where does it come from, and what is its purpose). I've continued to work on this question and recently have given a number of talks on what I call a triune philosophy of mathematics.
- I am the faculty adviser to a student group called Cru. Cru is a caring community passionate about connecting people to Jesus Christ. Cru is open to all students regardless of religious belief and meets Wednesdays at 12:20 pm in 14-104.
- My beautiful wife Charlene and I have been married for 5,777 days. We have three children and zero televisions. I enjoy reading, boomerangs, budgeting, facebook, and remodeling.
- We are planning a movie night on February 26th where we will watch a film and eat pizza. This is a great chance to meet my family in person.
- I am also a Christian which means much more than attending church on Sundays. It impacts every area of my life and I hope you will see that it makes a difference in the way a serve you.
- If you want to know the rest of my story, you can read about it at www.meettheprof.com or on my facebook at www.facebook.com/dustywwilson.

I am interested in you as well and would ask that you tell me a bit about yourselves through these notecards:

- Your name (and what you want to be called)
- Quarter, major, last math class at Highline (and grade)
- Where you were born and the language you speak at home☺.
- Where you are in your families birth order
- One interesting fact about yourself.
- One question you have for me.

Why is linear algebra in the curriculum?

- Applications
    - Engineering (It is used all the time in statics to solve systems).
    - Physical chemistry (a friend and former student was a Chem major and told me he regretted not taking linear algebra as it was all through his P.Chem courses).
    - Business (I recently got to make edits to a chapter in a business text that shows the cool business applications of linear algebra in Excel).
    - Computers (We had a great speaker from S.U. talk about the amazing applications of linear algebra to image compression. It is also hugely valuable when doing graphics transformations … more on this throughout the quarter).
    - Modeling (linear algebra is behind least squares regressions and it can also be used to model some dynamical systems)
- Linear algebra challenges common conceptions of mathematics such as the commutative property of multiplication. It is self-contained and requires little prereq knowledge. Yet it challenges intuition in part because it is not typically a visual topic.
- It is a valuable introduction to mathematical abstraction and logical reasoning. It is likely the 1st course since high school geometry where you will be required to perform proofs.
- I hope that you will get a taste for this topic – the big picture, details, and intuition that are a part of this delightful little course.

Two Mathematica images from linear algebra … a bit map and an adjacency graph.

Structure and Pace of the course

- Winter: 49 class days
    - 3 exams
    - 9 homework days
    - 27 sections
    - Lots of good times
- Our book is challenging but good. It even begins with a joke! To get the most from the class, it is important that you pre-read sections, stay on top of homework, and take advantage of resources (such as lecture notes and videos).
- For tomorrow: read do the prereading assignment for 1.2
- Collect note cards.