



EEMT5990 Problem Solving for Engineering Managers

Networking & Team Building

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Residential Program Objectives



- Know more people in your EEM community
- Understand how networks support learning
- Practice teamwork and communication
- Feel more prepared for the EEM journey

Agenda

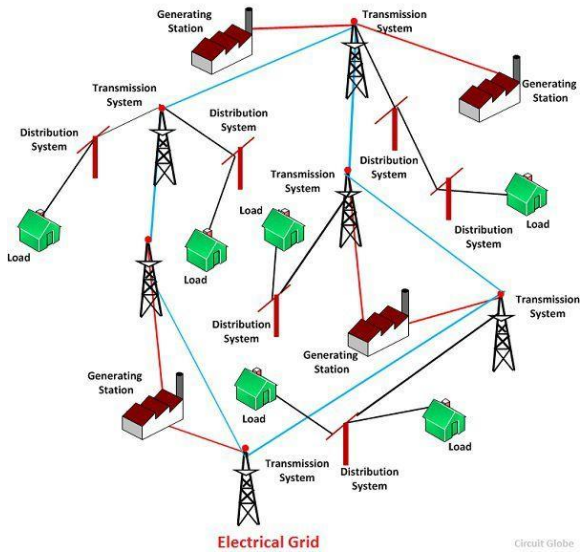


Networking & Teamwork

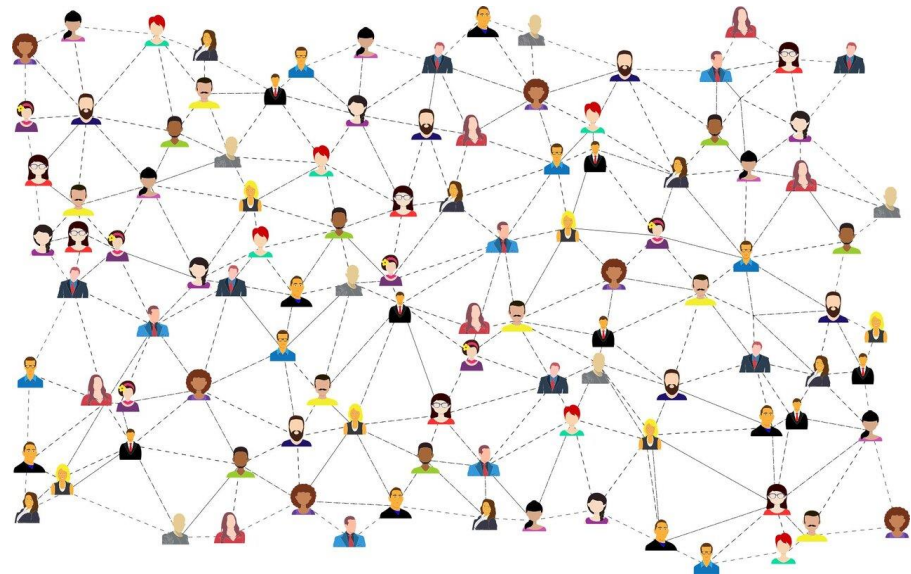
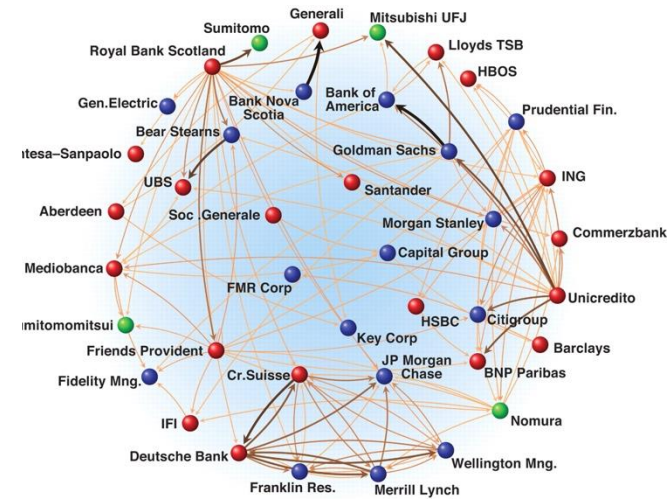


Team Building LEGO Game

Networks



Nature Reviews | Genetics



Networks: Opportunities and Risks

- Think of any network:

Social networks; transportation networks; power grids; financial systems...

1. What can networks help us do?
2. What problems can networks create?

Social Network

- A social network connects people through relationships: friends, classmates, family, co-workers, online contacts, business cooperation, etc.
- Guess: How many friendship steps separate two random people in the world?

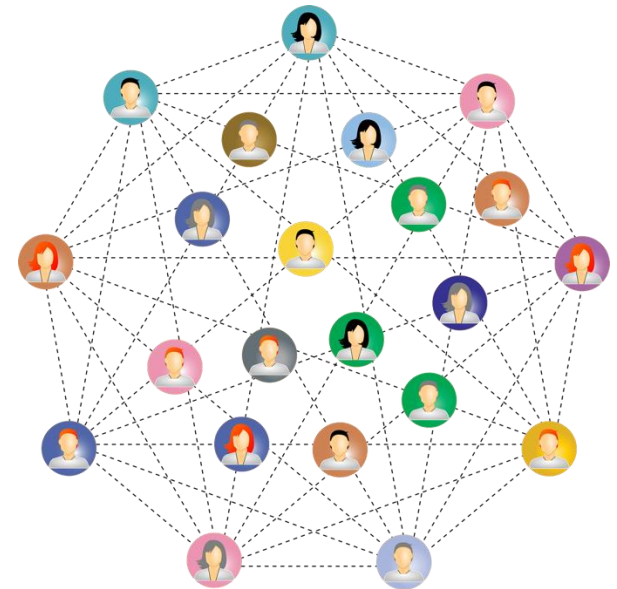
A: 3-5

B: 6-8

C: 10-20

D: more than 20

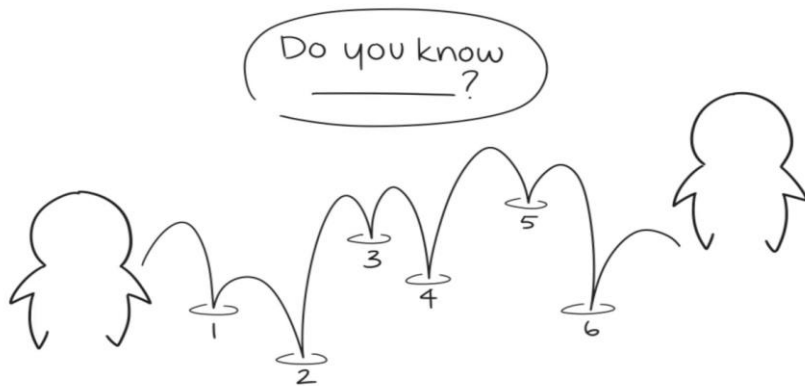
- 1 step: you $\rightarrow$ your friend
- 2 steps: you $\rightarrow$ your friend $\rightarrow$ your friend's friend



Small World Experiment

■ Milgram's Social Experiment

- In the 1960s, Stanley Milgram at Harvard University found that the average number of friends in between two randomly selected persons was only **6**!



“six degree of separation”

Would the number be smaller today? Why?

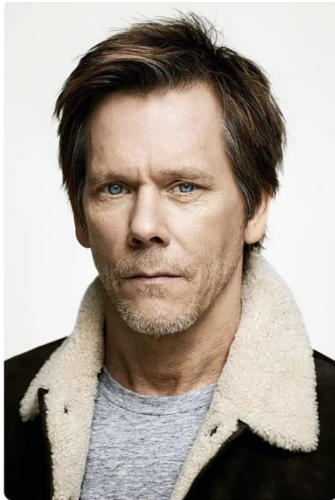


It's a Small World after all

A Movie Version of the Small World Problem

■ Bacon's Oracle

- Number of co-star steps to Kevin Bacon
- 0: Kevin Bacon
- 1: acted with Kevin Bacon
- 2: acted with someone who acted with Kevin Bacon
-



Kevin Bacon

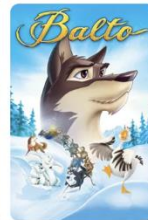
Biography

Kevin Norwood Bacon (born July 8, 1958) is an American film and theater actor whose notable roles include Animal House, Diner, Footloose, Flatliners, A Few Good Men, Apollo 13, Mystic River, The Woodsman, Friday the 13th, Hollow Man, Tremors and Frost/Nixon.

Bacon has won Golden Globe and Screen Actors Guild Awards, was nominated for an Emmy Award, and was named by The Guardian as one of the best actors never to have received an Academy Award nomination.

In 2003, Bacon received a star on the Hollywood Walk of Fame.

Known For

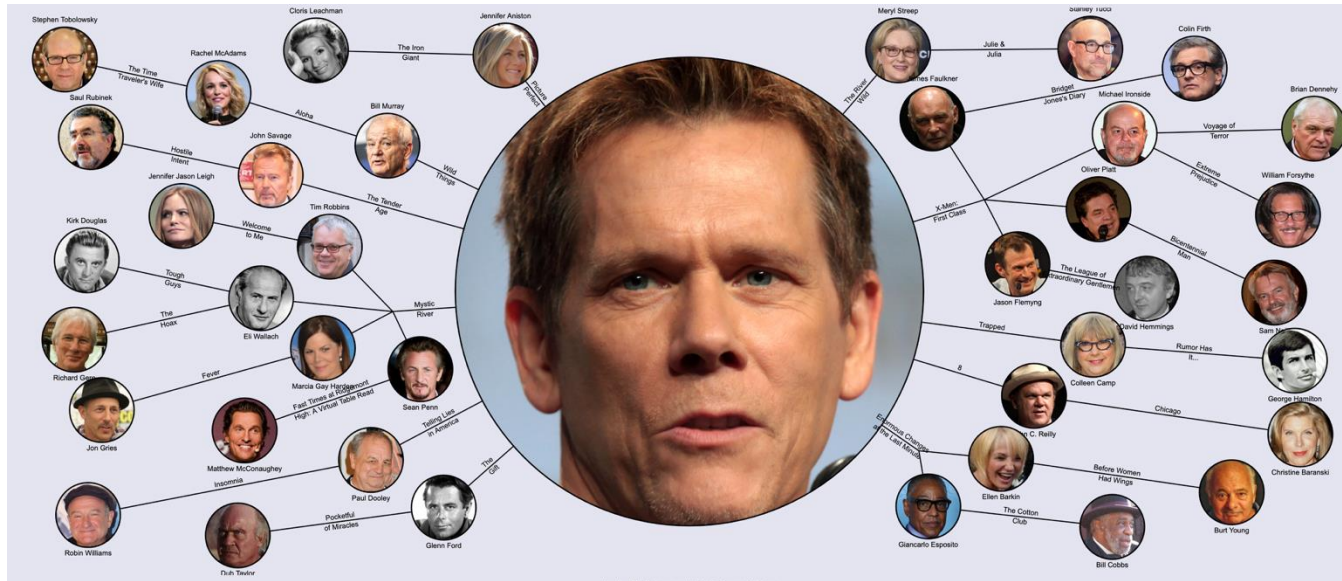


Guess the Bacon number:

- Jackie Chan
- Tony Leung Chiu-wai
- Leonardo DiCaprio
- Elon Musk

A Movie Version of the Small World Problem

- Bacon's Oracle (<https://oracleofbacon.org/>)



Bacon Number	# of People
0	1
1	2634
2	293,392
3	977,830
4	372,129
5	54,758
6	11,377
7	2,945
8	875
9	297
10	65
11	20
12	4
13	3
14	1
15	1

- Amongst the very large number of near 1.7 million actors and actresses, the average Bacon number is very small – only about 3 – a small world of movie stars indeed!

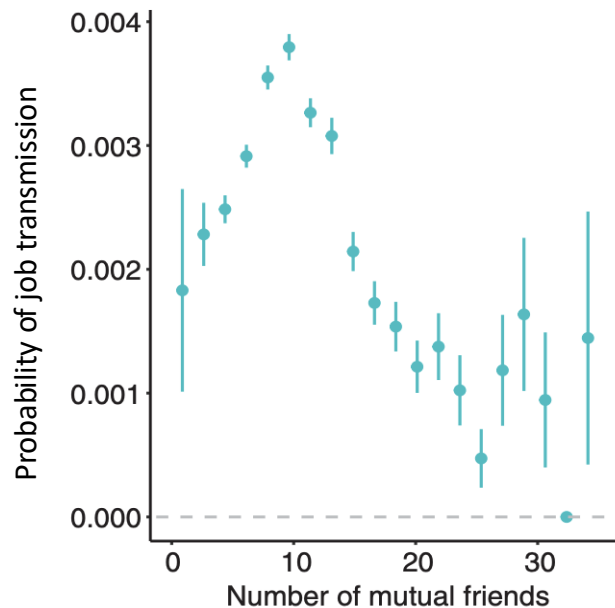
Strengths of Weak Ties

- How do most people find their jobs?
 - Namely, do they rely on their close relatives, or send out letters of application at random, or try the job fairs?
- **Investigations:**
 - In 1960s, Stanford sociologist Mark Granovetter interviewed around 100 people in the greater Boston area, and sent out more than 200 questionnaires, investigating a variety of technical people who had either just been offered a new job or had just lost the old job.
- **Results:**
 - In people's job hunting, usually not those close family ties but **new friends or even occasionally encountered strangers linked them to the new job positions.**

Strengths of Weak Ties

- Weak connections usually lead to strong interactions
- **Strength of weak ties theory** (Mark Granovetter, 1973):
your relatives and best friends typically have the same groups of common friends; therefore, they usually do not provide new connections and additional information to your own knowledge.

Are weaker ties always better?



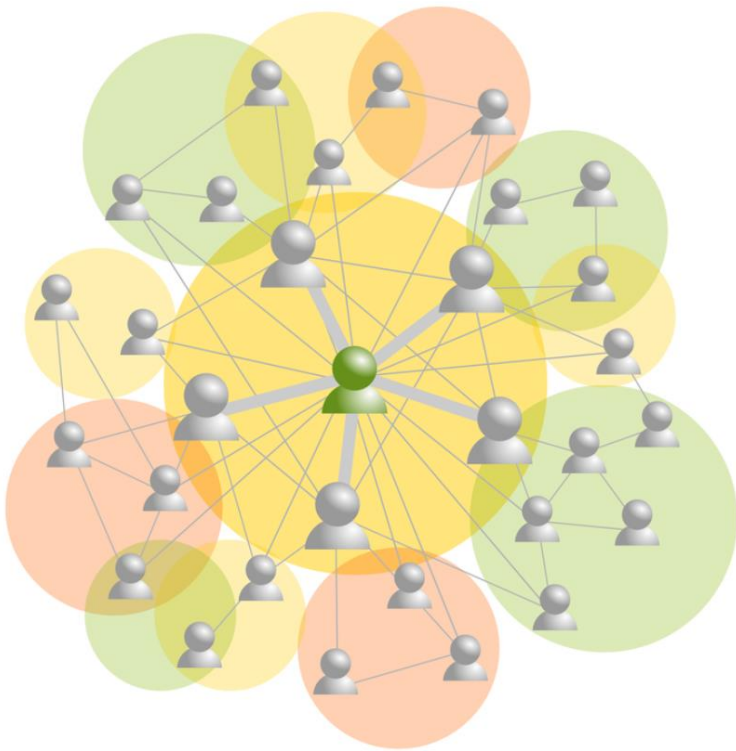
Rajkumar, Karthik, et al. "A causal test of the strength of weak ties." *Science*, 377.6612 (2022): 1304-1310.

- Five-year set of experiments on LinkedIn
- 20 million people
- 600,000 new jobs

The strength of weak ties varies by industry: weak ties boost job mobility in digital sectors, while strong ties are more important in traditional industries.

Weak Ties in the AI Era

- Before AI



- AI Era



Are weak ties still useful in the AI era?

Weak Ties in the AI Era

- Discuss with your classmates in 2-3 mins:
 - What can AI provide?
 - What can people provide?
 - What can weak ties provide that AI cannot easily provide?

Importance of Teamwork



Williams' pit crew set the quickest pit stop times at 14 of the 21 races, with their **1.92s tire change** on Felipe Massa's car in Baku the quickest pit stop ever seen in F1 racing.

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LEGO Game

Objective: build a LEGO animal creatively through teamwork and inter-group exchange

- Each group receives
 - 1 LEGO package
 - 1 reference diagram
 - 5 exchange tokens with your group number
- Important:
 - Your package may be missing some key pieces
 - Exchange LEGO pieces with other groups **up to 5 times**
 - Colours do not need to match exactly
 - Creative adaptations are allowed
 - Time limit: **30 mins**

LEGO Game

Game Steps:

Step 1: Review

- Open your LEGO package and review the diagram
- Identify what you can build and what may be missing

Step 2: Build + Exchange

- Use the diagram to build your LEGO animal
- Exchange pieces with other groups when you need
- Each group can make up to 5 exchanges

1 exchange =

- ✓ use 1 token
- ✓ give 1 LEGO piece from your group
- ✓ receive 1 LEGO piece from another group

Step 3: Walk around and look at other groups' design

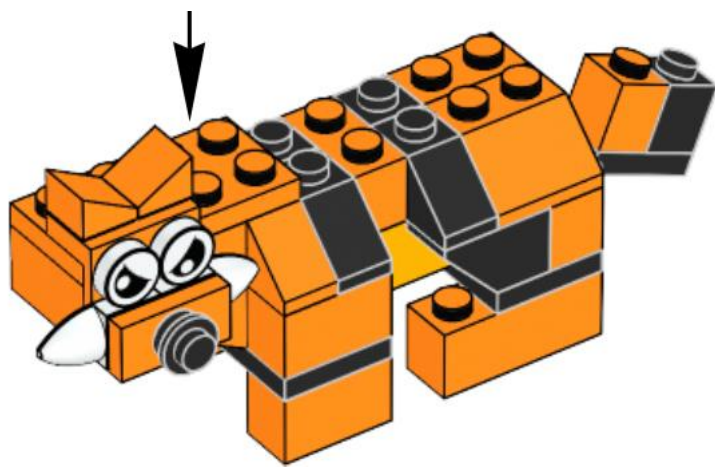
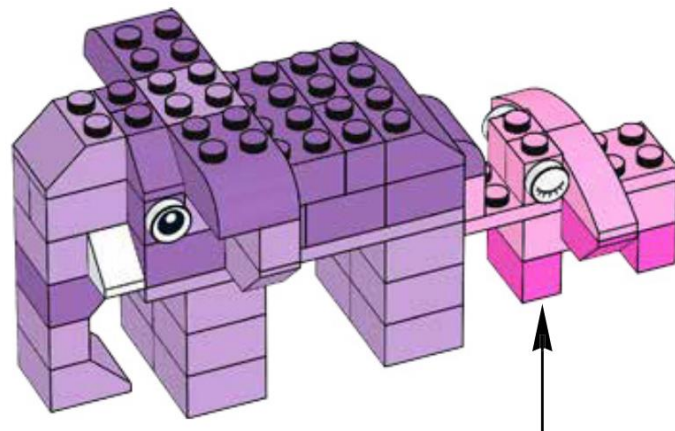
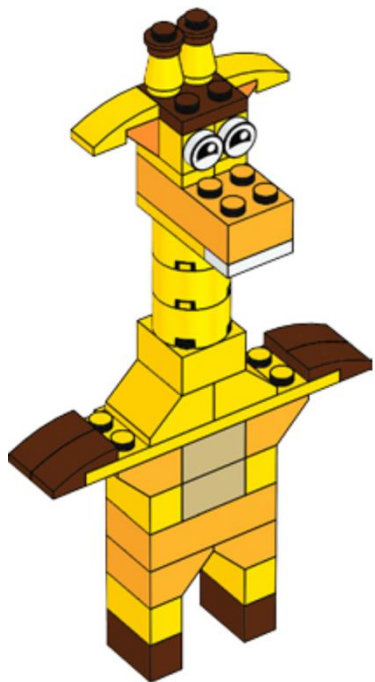
LEGO Game

Reminder:

- Only one representative from each group may exchange at a time
- No borrowing, or gifting
- Use tokens to track your exchanges
- Colors do not need to match exactly.

Be Creative!

You may add one imaginative feature not shown in the diagram.



LEGO Game - Debrief

Reflection:

- Did your group exchange any pieces? Why or why not?
- What was the hardest piece to find or replace?
- What creative feature did your group add?

COFFEE BREAK

