Welcome Back!
Winter break was much too short, but now we must begin our long, treacherous trek through the Winter semester with hopes of the coming spring on our minds. A new year has begun, and with it many resolutions that will not be kept. Amidst the ice and snow, let the cold bring us together to form strong bonds that will last a lifetime. This is the last semester for many of us, so we have to make the best of it!

Thanks!
~ Stephen Caren
### Officer Emails

<table>
<thead>
<tr>
<th>Officer</th>
<th>Position</th>
<th>Email</th>
</tr>
</thead>
<tbody>
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<td>Membership Vice President</td>
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**List Emails***
- All Officers  tbpoffs@eng.wayne.edu
- All Members   tbpmem@eng.wayne.edu
- All Alumni    tbpalum@eng.wayne.edu
- All Advisors  tbpadvise@eng.wayne.edu
- All Lists!    tbpall@eng.wayne.edu

*Please only use these lists after consulting with an officer.
BIRTHDAYS!
Mike Lim 1/14
Sahadev Parajuli 1/17
Tan Son 1/17
Fouad Karum 1/28
Officer Goals for the Semester

- Organize more free events
- Cater more events to the members
- Deepen connection with COE and Alumni Network
- Set up a voluntary open research catalog with members
- Establish Alumni networking framework
- Coordinate with Erin Rook to encourage use to career services
- Host successful fundraising events such as Penny Wars, Road Rally, and Tau Beta Pi(e)-a-Senior Day
- Initiate even more new members than last semesters large number
- Connect and plan events with other engineering orgs
- Have a well-done Project Report to submit to National Office
- Make sure members are well aware of Volunteer Events
- Create of good mix of social events that take place on and off campus
- Improve the TBP room with potentially new chairs

This is a short list of the goals that each of the officers of MI-E have presented for the semester. If you, as a member of Tau Beta Pi, have anything else to add, please come by the room and talk to any of the officers there. We fully appreciate your contributions to the chapter, and we welcome any and all suggestions.

In future local bents, we would like to include member-submitted:

Comics
Short stories
Art
Etc.

These submissions can have any subject, it is not narrowed down to just engineering puns (although they are always appreciated). Our members are all very talented, and we would like to see more of their talent!
TBP Store

January Specials

**ON SALE!**

- 25¢ OFF Starbucks Frappuccino
  (only $1.50, regularly $1.75)
- Microwave Popcorn
  (only 50¢, regularly 75¢)
- Laffy Taffy
  (NOW 3 for 25¢)

**WHAT’S NEW?**

- Jimmy Dean Sausage Egg & Cheese Croissant ($1.25)
- Cherry Pepsi (50¢)
- Orange Crush (50¢)
- Mug Root Beer (50¢)
This month’s issue of the Local Bent:

THEY DID THE MATH

**QUESTION:** How much guacamole could you make with Avogadro’s number of avocados?

According to [http://ucavo.ucr.edu/General/Ratios.html](http://ucavo.ucr.edu/General/Ratios.html), an avocado is typically 60%-70% usable flesh. Going with Wolfram’s figure of 214g per average avocado, that gives us 139.1g (65%) per average avocado. That’s $8.377 \times 10^{22}$ kg.

When considering volume, according to the California Avocado Society, the volume of an avocado is about 220 cm³. 65% of that is 143 cm³. That is $8.6086 \times 10^{25}$ cm³ or $8.6086 \times 10^{10}$ km³.

The moon is $7.3477 \times 10^{22}$ kg and $2.1958 \times 10^{10}$ km³. There would be more Guacamole than the moon.
**QUESTION:** How many men would you need to kill to forge a sword from the iron in their blood?

The average man has 4 grams of iron in his blood.  

According to Wikipedia, the average British longsword was between 1.1 and 1.8 kg. We'll use 1.45, the median value.  
[http://en.m.wikipedia.org/wiki/Longsword](http://en.m.wikipedia.org/wiki/Longsword)

Also according to Wikipedia, the carbon content of steel is anywhere between .002% and 2.1%. Averaged, the carbon percentage of steel is 1.051%, though I doubt the percentage was anything approaching consistent.  
[http://en.m.wikipedia.org/wiki/Steel](http://en.m.wikipedia.org/wiki/Steel)

So 1.45kg - (1.45kg * 1.051%) = 1.4347605kg of iron in the average longsword. At .004kg of iron in the average man, and assuming complete iron extraction from each corpse, forging a sword from blood-iron would have taken 358.69, or 359 dead men.

**QUESTION:** Other than the magic carpet itself, does Aladdin's Magic Carpet Ride make sense?

At one point in their “Whole New World” magic carpet ride, Aladdin and Jasmine went from Cairo to Athens (about 1100 kilometers apart) in the space of 1 second. That is 1,100,00 m/s and considering that they were floating above galloping horse in Cairo (40 km/h = 40*1000/(60*60)=11 m/s) and the combined mass of Jasmine and Aladdin is around 90 kg, F=ma => F=90*(1100000-11)= 99 MILLION NEWTONS!

Their skin would be ripped of their bones in they managed to hold on. So no, it doesn't make sense, even if the magic carpet was real.
**QUESTION:** How far did Frodo and Sam go in the Lord of the Rings?

Wooo!!! Road Trip!!!

**QUESTION:** Who would win: 1 waterfall or 100 billion paper towel rolls?

According to Consumer Reports as of September 2014, a 1-foot square paper towel absorbs between ½ ounce and 2 ½ ounces of fluid. A Bounty paper towel roll contains 56 1-foot by 1-foot sections. The brand claims it is the most absorbent, so let’s say a 1-by-1 foot sections absorbs 2.5 oz of fluid. 2.5 oz is 74 mL of water. 74 mL per roll means a roll of 56 would absorb 4,144 mL, assuming the relationship between absorption and number of paper towels is constant. 100 Billion paper towels would absorb 414.4 Billion Liters of water. Niagara falls has a flow rate of 567.811 Liters per second. By dividing the amount of absorbable water by the flow rate, it would take about 8 ½ days for the waterfall to finally beat the paper towels.
**QUESTION**: How much would it actually cost to produce a real life Truman Show?

Things to consider:

- Small town worth of extras
- Up to a hundred actual actors
- We need actual town - even if adapted from existing one, still the property would need to be rented/purchased.
- If we’re going for the full shebang, the Dome. This is mostly in sci-fi realm though, a hemisphere with diameter of a small town is probably beyond our current construction capabilities (or at least in no way feasible, i.e. carbon fiber or carbon nanotubes).
- We could probably go for natural weather, sky etc., and just border the city.
- At this point equipment cost is probably negligible - if we have to own/rent/build all property in a town, adding cameras to each one/most of them will probably increase the cost by several percent at most.

Let’s see...

**Housing**

With so many “small towns,” the average local jurisdiction population in the United States is 6,200. ([http://www.newgeography.com/content/00242-america-more-small-town-we-think](http://www.newgeography.com/content/00242-america-more-small-town-we-think))

And


It sums up to ~2357 households in town. Not being USA citizen I don't really know how popular in this typical small town would blocks of flats or other multi-family housing be. The actual filming location (Seaside, FL) - at least from satellite imaging shows nearly only detached houses. So, we can assume 2357 houses to obtain.

Those people have to work somewhere. In such town we can probably limit ourselves to small and medium enterprises, so from 1 to 250 employees. I'll "wave my hands" and just take average of 125 and call it a day.

How many are employed? Well, from those 6200 people, if they follow USA age distribution, 66% would fall between 15 and 64 years of age (so, your extended working age) ([http://www.indexmundi.com/united_states/age_structure.html](http://www.indexmundi.com/united_states/age_structure.html)). It gives us 4092 working people and about 32 workplaces. It's negligible, but let's add it to the amount of houses we need, ending with total of 2389, and we can round it up to 2400 if we add a school, town hall etc.

Average house costs now $152,000, so we can end up in the realm of $364,800,000. To be honest, it's not that much. Coca-Cola has $3,000,000,000 marketing annual budget, so an order of magnitude more.

Ok, what about that equipment? A GoPro Hero3+ Black Edition can be bought for $400. It's a very decent, small camera, and similar equipment could be used to be placed everywhere. In Truman I think they didn't bother putting them in every single house in town (a lot of those places were
only mock-ups), but let's go crazy: each house with 3 bedrooms, 2 bathrooms, kitchen, living room, cellar, attic and garage, 2 cameras per each room gives us 20 cameras per house. A camera in each car (2 per house), one facing each direction outside (4 per house), in general round it up to additional 10 cameras per house. 2400 * 30 * $400 = ~$30,000,000. Not even 10% of the houses cost. I'll just wave my hands again and double it to include microphones, cabling and another $30M for software and hardware to record from so many sources.
Sum: $364,800,000 + $120,000,000 = $484,800,000 ~$500M

**Crew cost**

If we pay extras something above minimum non-taped wage for each hour they spend there (so, 24/7) - let's say, $10/h, with 6100 of extras we have annual cost of 365 * 24 * $10 * 6100 = $534,360,000.

According to some unsubstantiated googling Broadway actor can earn from $1500 to $35,000 per week. If we hire decent actors at $20,000/week, a hundred of them per year will cost us 51 * 100 * $20,000 = $102,000,000. Hell, make it $500M, as they have to perform at any time of day and night, and I cannot be bothered at this point (I'll get to why in a moment).
Sum: $1,000,000,000 = $1B

**Other**

We skip the dome, it's too unreal for now. We can assume the company running this will have its own share of expenses (from cleaning through accounting to executive pay, marketing etc.). A large national telco I worked for had about $2B expenses each year, and that included infrastructure cost. I'll stick to it, because...

...because the total cost of running Truman Show, EVEN if we were to buy houses each year (well, let's call it the annual cost of food, props, repairs, the city infrastructure cost), if we pay 6100 extras and 100 Broadway actors, if we run a company with full blown operations, we arrive at total expenses of: (Town)$500M + (Crew)$1B + (Company and misc) $2B = $3.5B/year.

And that is a little more than Coca-Cola annual marketing budget ($2.9B to be exact).

So yeah, it's perfectly doable for Coke to run Truman Show.

How much they could earn? In Truman Show EVERYONE was watching it. A primetime 30s commercial spot costs up to $4M (we're talking Super Bowl here, but yeah, in the movie it was about THAT popular of a show). To break even we need to air $3.5B/($4M * 2 * 365) minutes of ads per day, so... 1.2 minutes. Per day. And as we know, we can air easily 10 minutes of ads/hour. Even if we were to air 12 minutes of primetime ads (or more of less expensive ones) we would get tenfold return on our investment.

So yes, running Truman Show is possible, doable and profitable. Maybe we actually are?
Odds of winning the most recent Powerball:  
1 in 292,000,000

Odds of being attacked by a shark  
1 in 11,500,000

Odds of being struck by lightning this year  
1 in 700,000

I’m sorry you didn’t win. Good luck with the sharks though! And don’t go outside in the rain!

Credits:
Na: https://xkcd.com/851/
Guacamole Calculation: https://www.reddit.com/r/theydidthemath/comments/3nupci/request_how_much_guacamole_could_you_make_with/
Sword: https://www.medieval-weaponry.co.uk/acatalog/S5704M-920-1.jpg
Sword Calculation: https://www.reddit.com/r/theydidthemath/comments/27na8y/request_how_many_men_would_you_need_to_kill_to/ci2pwhbr
Aladdin Images: https://www.youtube.com/watch?v=qJJog4BJrUw
Truman Show: https://www.reddit.com/r/theydidthemath/comments/1xyfa5/request_how_much_would_it_actually_cost_to/cffx5op
Odds: http://graphics.wsj.com/lottery-odds/
Increased Risk: https://xkcd.com/1252/
After GBM I Dinner!
Traffic Jam & Snug
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