**Assignment**

For each of the following questions, outline how you could use an A/B test to find an answer. Be sure to identify all five key components of an A/B test we outlined above.

* Does a new supplement help people sleep better?
* Will new uniforms help a gym's business?
* Will a new homepage improve my online exotic pet rental business?
* If I put 'please read' in the email subject will more people read my emails?

**Responses**

General remark: in order to avoid biases, when sampling, one should take into account factors that could lead to biases and try to control for those.

Does a new supplement help people sleep better?

1. 2 versions
   1. old supplement
   2. new supplement
2. sample
   1. assumption: sleep patterns determined most by age and work schedules (e.g. doctors vs teachers)
   2. construct two samples with same number of individuals from each age group and work type combination
3. hypothesis
   1. new supplement helps people sleep better
4. outcomes/key metric
   1. total number of hours slept
5. other measured variables
   1. how many times did person wake up during sleep period?

Will new uniforms help a gym's business?

Remarks:

1. “New uniforms” is rather undefined and the “new” could mean many things (e.g. colors, type of uniform).
2. I will focus on a particular type of new uniform (say brighter colors).
3. I would likely conduct a set of tests, not just one, where I change one feature of the uniform at a time to see what the impact is.
4. Given that a uniform has many degrees of freedom this exercise could become long and complicated (if you want to get an ordering on what helps business)
5. “Help” is also undefined. Does it mean “attract new customers”? Does it mean “more visits from existing members”?
6. For simplicity I will focus on “attract new customers” and think of it as an advertising exercise.
7. 2 versions
   1. current uniforms
   2. brighter colors uniform
8. sample
   1. Assumptions
      1. need to control for advertisement consumption patterns (e.g. TV, social media, newspapers)
      2. need to control for seasonality in signing up for gym membership
   2. find 2 weeks with similar seasonality pattern (in terms of both gym membership and advertisement consumption) and run the adds with the different uniforms.
9. hypothesis
   1. Brighter colors lead to higher new member application numbers
10. outcomes/key metric
    1. number of new member application number in the 2 weeks after the advertising campaign
11. other measured variables
    1. ask people to tell you when they decided to enroll (a bit subjective)

Will a new homepage improve my online exotic pet rental business?

Remarks:

1. unclear what “new” means
2. I do not know what drives exotic pet rental
3. 2 versions:
   1. original
   2. website with the features you want to change
4. sample:
   1. randomly assign type of page based on IP address
5. hypothesis:
   1. new website will lead to more quotes
6. outcomes/key metrics:
   1. number of quotes
7. other measured variables:

If I put 'please read' in the email subject will more people read my emails?

1. 2 versions
   1. email
   2. email with “please read”
2. sample:
   1. divide recipients into two categories
   2. control for the level in the organization (e.g. average guy vs. CEO)
3. hypothesis:
   1. “please read” will have more reads
4. key metric:
   1. number of instances e-mail opened
5. other measured variables: