MuscleHub

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Codecademy Capstone Project #1
A/B test for fitness center

Kevin Albert
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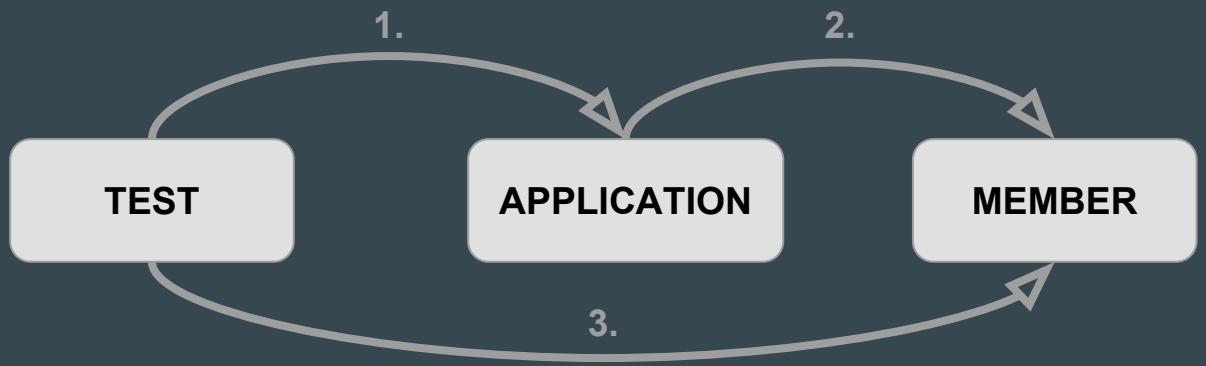
Objectives

We want to answer the following three questions (order):

1. giving new visitors a fitness test with a personal trainer influence the amount of filled application forms
2. does filling out application forms influence the amount of membership payments
3. giving new visitors a fitness test with a personal trainer influence the amount of membership payments



DEFINITIONS

- VISITOR
  potential customers who visited the gym
- TEST
  potential customers who did a fitness test
  - WITH TEST is called **group A**
  - NO TEST is called **group B**
- APP
  potential customers who filled out an application
- MEMBER
  customers who payed the membership

Presumptions

- Statistical significance threshold (α)
  5%

- Sample Size (A/B test)
  5004
  Chi Square Model will take the sample size into account
  Equal sample distribution group A vs B

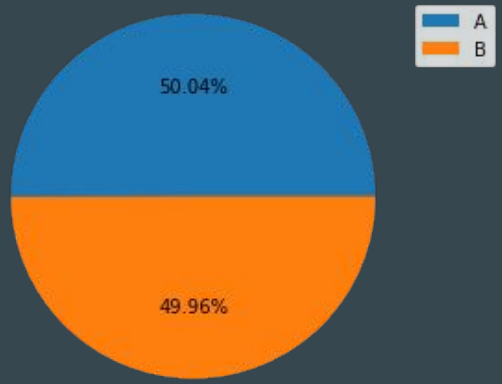
Dataset

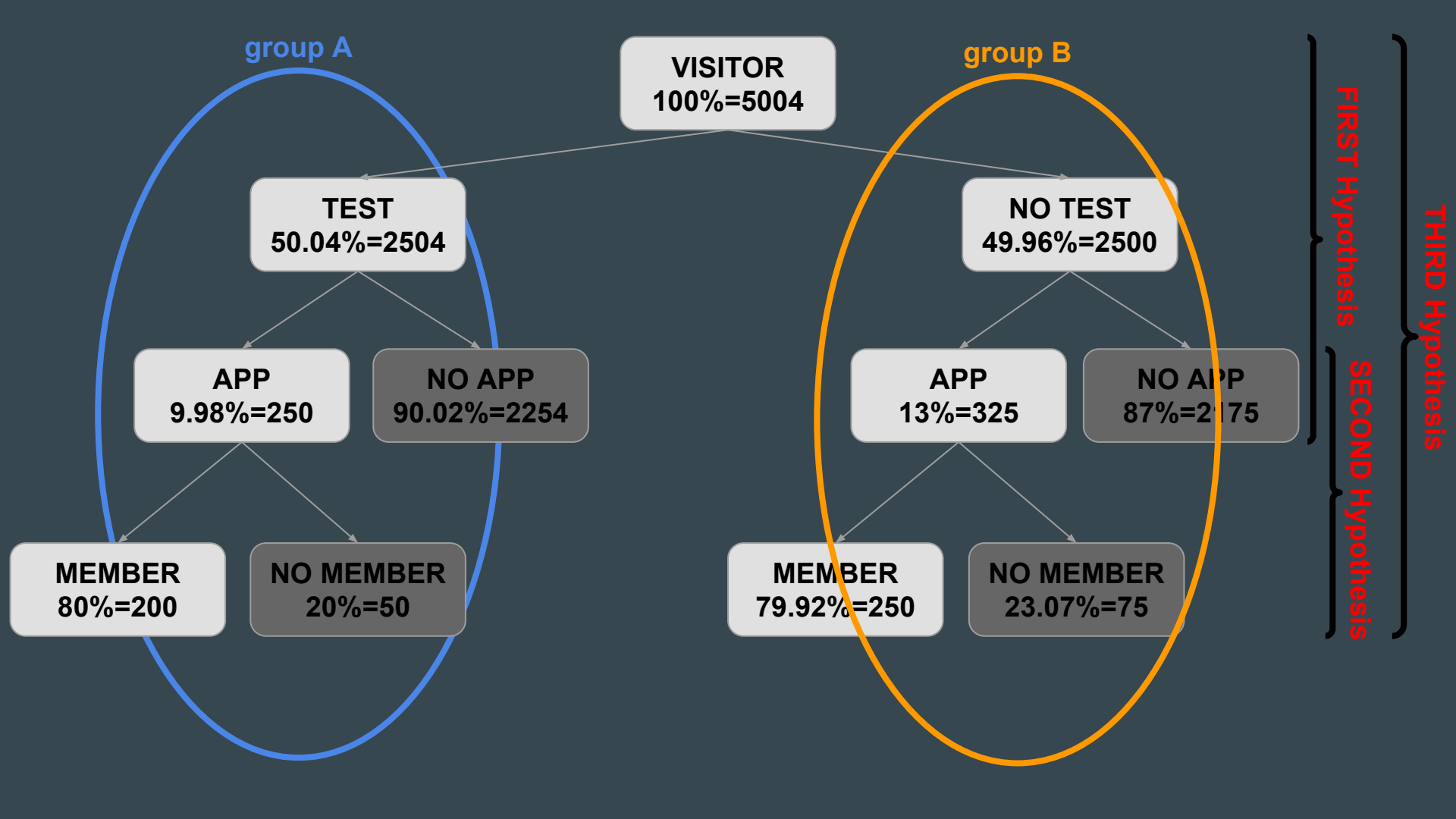
	first_name	last_name	gender	email	visit_date	fitness_test_date	application_date	purchase_date
0	Kim	Walter	female	KimWalter58@gmail.com	7-1-17	2017-07-03	None	None
1	Tom	Webster	male	TW3857@gmail.com	7-1-17	2017-07-02	None	None
2	Edward	Bowen	male	Edward.Bowen@gmail.com	7-1-17	None	2017-07-04	2017-07-04
3	Marcus	Bauer	male	Marcus.Bauer@gmail.com	7-1-17	2017-07-01	2017-07-03	2017-07-05
4	Roberta	Best	female	RB6305@hotmail.com	7-1-17	2017-07-02	None	None

8 columns

5004 rows (equal distribution between A and B)

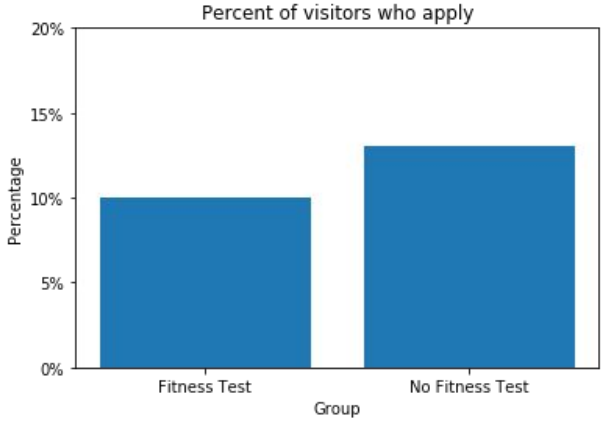
COUNTS	VISITOR	TEST	APP	MEMBER
group A	2504	2504	250	200
group B	2500	0	325	250




group A
VISITOR
100%=5004
group B
TEST
50.04%=2504
NO TEST
49.96%=2500
APP
9.98%=250
NO APP
90.02%=2254
APP
13%=325
NO APP
87%=2175
MEMBER
80%=200
NO MEMBER
20%=50
MEMBER
79.92%=250
NO MEMBER
23.07%=75
FIRST Hypothesis
SECOND Hypothesis
THIRD Hypothesis

difference between group A and B at each process state

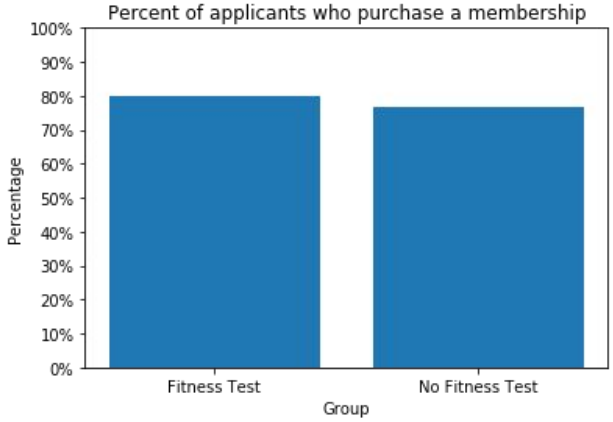
FIRST Hypothesis



A = 9.98%

B = 13.00%

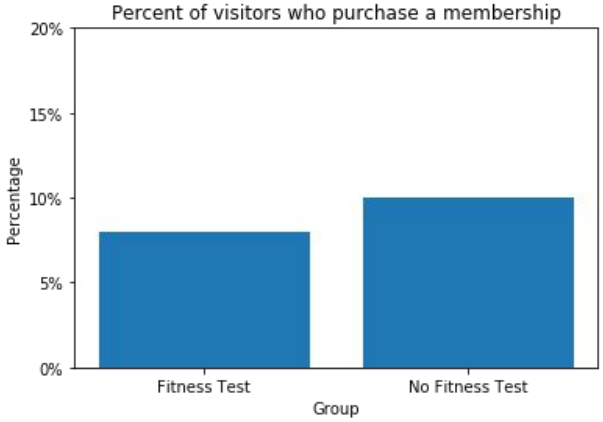
SECOND Hypothesis



A = 80.00%

B = 79.92%

THIRD Hypothesis



A = 7.99%

B = 10.00%

First Hypothesis:

- null-hypothesis
  the amount of visitors filling in the application form after doing a fitness test has no significant difference against the amount of visitors filling in the application form without a fitness test
  Ho: VISITOR to APP A = VISITOR to APP B

- alternative hypothesis
  the amount of visitors filling in the application form after doing a fitness test has a significant difference against the amount of visitors filling in the application form without a fitness test
  Ha: VISITOR to APP A != VISITOR to APP B

First Hypothesis (cont.)

Is the observed data in the table significantly different from expected data ?

We use the Chi-Square method
Probability Value (pval) = 0.000964

pval < alpha (0.05) (Ho is rejected)

First Hypothesis	visitor ↓ application	visitor ↓ no application
group A (TEST)	250	2254
group B (NO TEST)	325	2175

We can say that there is a significant difference between group A and B when applications are filled, so doing a test has an impact in the outcome.

Second Hypothesis:

- null-hypothesis
  the amount of memberships after filling in the application form in group A has no significant difference against the amount of memberships after filling in the application form in group B
  Ho: APP to MEMBER A = APP to MEMBER B

- alternative hypothesis
  the amount of memberships after filling in the application form in group A has a significant difference against the amount of memberships after filling in the application form in group B
  Ha: APP to MEMBER A != APP to MEMBER B

Second Hypothesis (cont.)

Is the observed data in the table significantly different from expected data ?

We use the Chi-Square method
Probability Value (pval) = 0.4325

pval > alpha (0.05) (Ho is accepted)

First Hypothesis	application ↓ member	application ↓ no member
group A (TEST)	200	50
group B (NO TEST)	250	75

We can say that there is no significant difference between group A and B when memberships are purchased after filling in the applications, so doing a test has no impact in the outcome.

Third Hypothesis:

- null-hypothesis
  the amount of visitors paying their membership after doing a fitness test has no significant difference against the amount of visitors paying their membership without a fitness test
  Ho: VISITORS to MEMBERS A = VISITORS to MEMBERS B

- alternative hypothesis
  the amount of visitors paying their membership after doing a fitness test has a significant difference against the amount of visitors paying their membership without a fitness test
  Ha: VISITORS to MEMBERS A != VISITORS to MEMBERS B

Third Hypothesis (cont.)

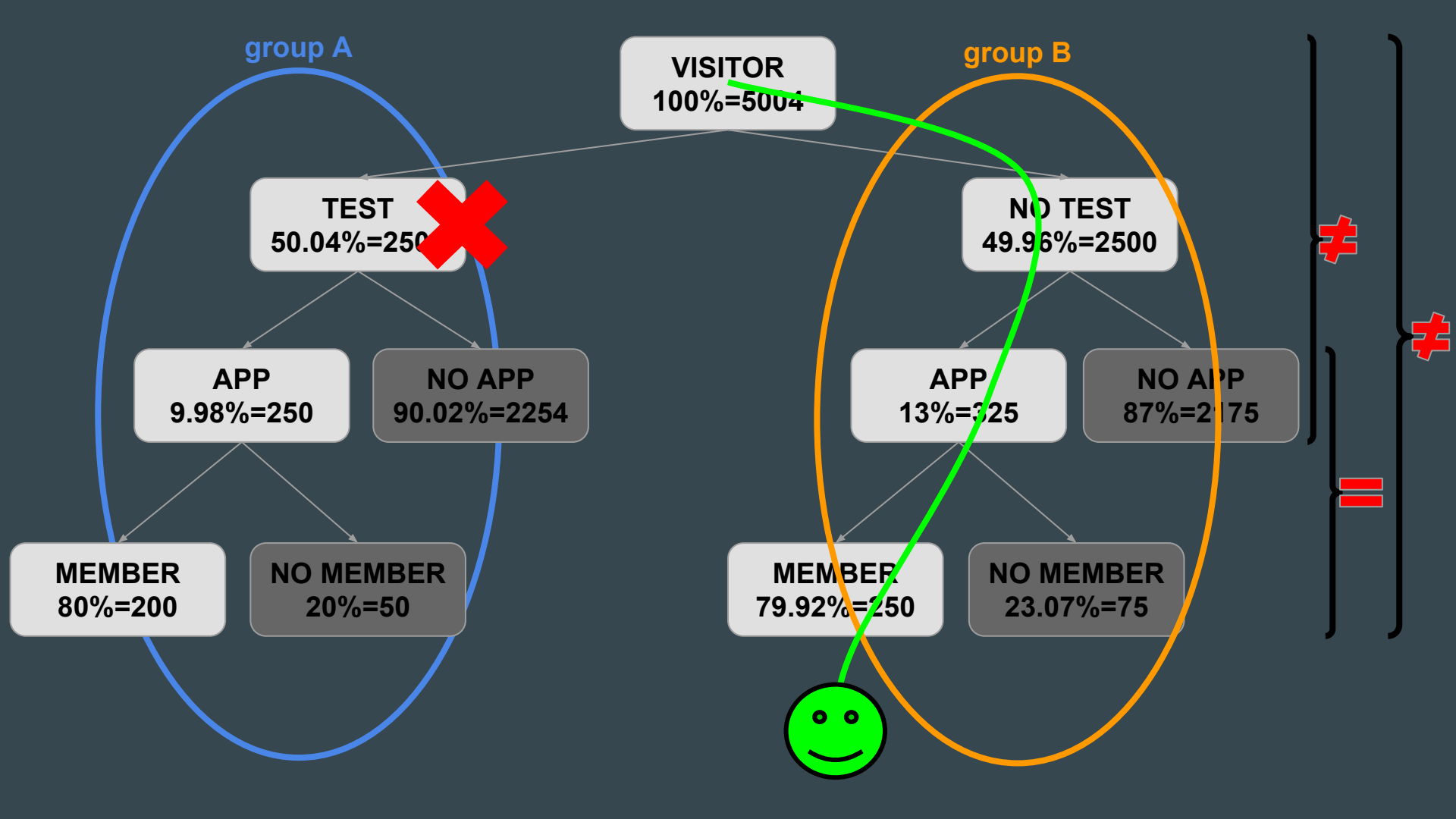
Is the observed data in the table significantly different from expected data ?

We use the Chi-Square method
Probability Value (pval) = 0.0147

pval < alpha (0.05) (Ho is rejected)

First Hypothesis	visitors ↓ member	visitors ↓ no member
group A (TEST)	200	2304
group B (NO TEST)	250	2250

We can say that there is a significant difference between group A and B when memberships are purchased from visitors, so doing a test has an impact in the outcome.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87%=2175
MEMBER
80%=200
NO MEMBER
20%=50
MEMBER
79.92%=250
NO MEMBER
23.07%=75
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Qualitative data

Interview 1: took the test, subscribed

Interview 2: no test, not subscribed

Interview 3: took the test, not subscribed

Interview 4: no test, subscribed

	member	not member
group A (TEST)	Interview 1	Interview 3
group B (NO TEST)	Interview 4	Interview 2

	member	not member
group A (TEST)	200 8%	2304 92%
group B (NO TEST)	250 10%	2250 90%
difference	Δ 2%	Δ 2%

Recommendation for MuscleHub

- Taking a fitness test with a personal trainer can cause 2% reduction in memberships
  - added cost of personal trainer taking visitor tests
- Taking application forms has no impact on memberships
- I advise to analyze membership durations before taking conclusions
  - members who took the test could be long-term customers
  - members who took no test could be short-term customers