

ISyE 2028, Fall 2015

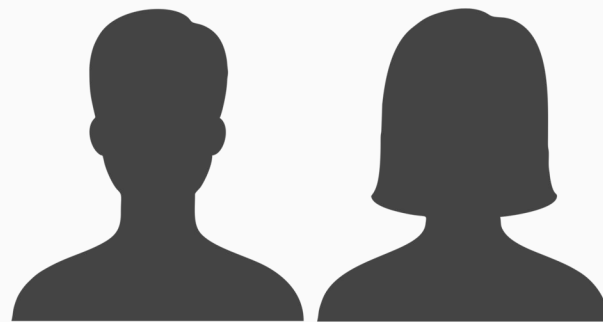
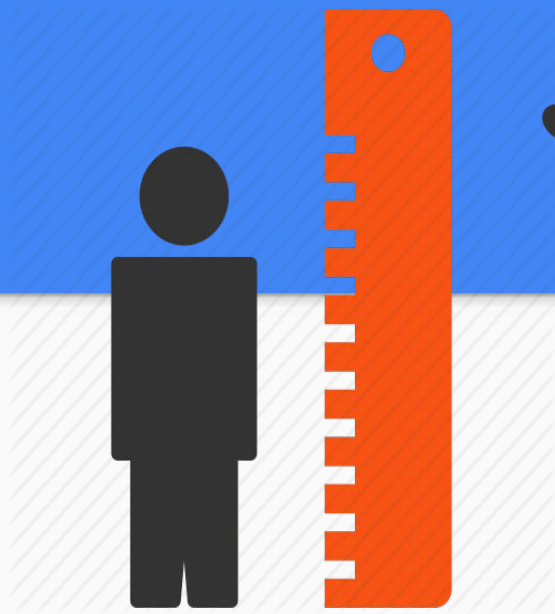
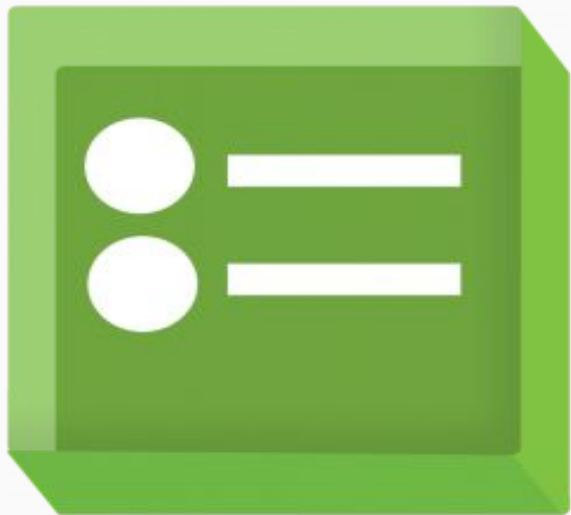
Bonus Project



*Height and Shoe Size for
Males and Females*

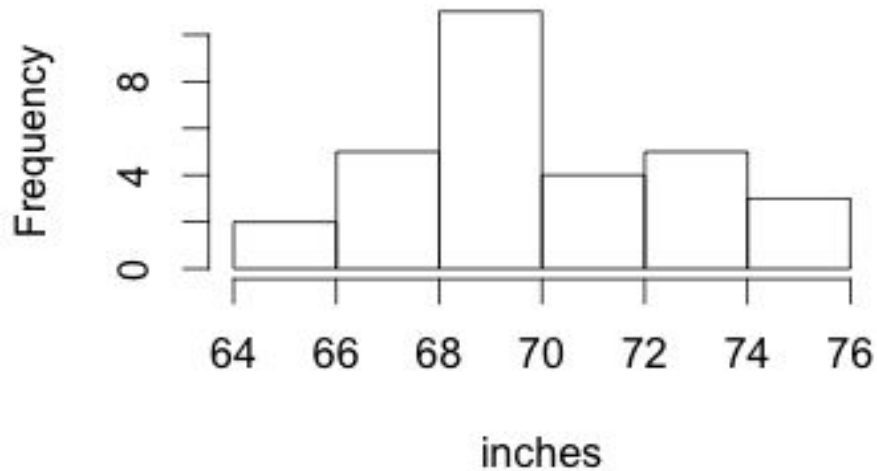
Aditya Sehgal

DATA

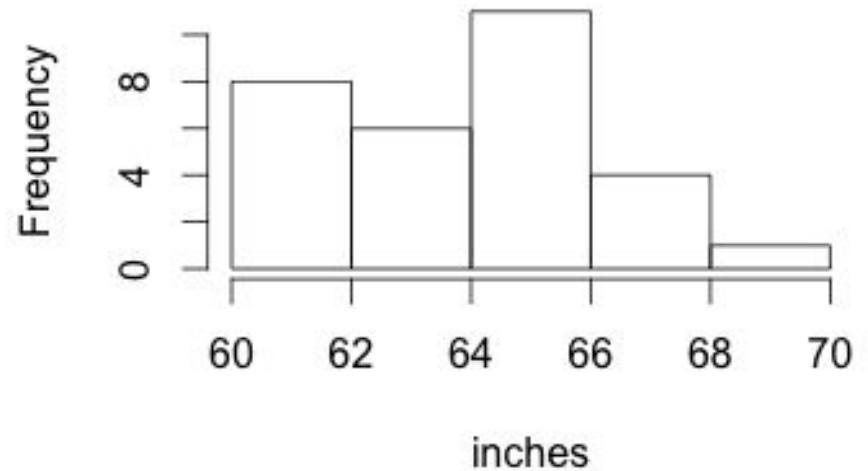


Height Distributions

Male Height

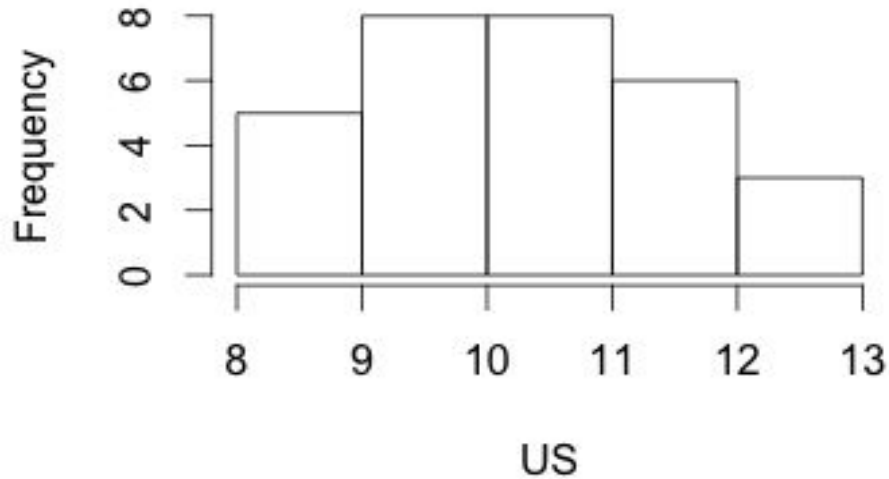


Female Height

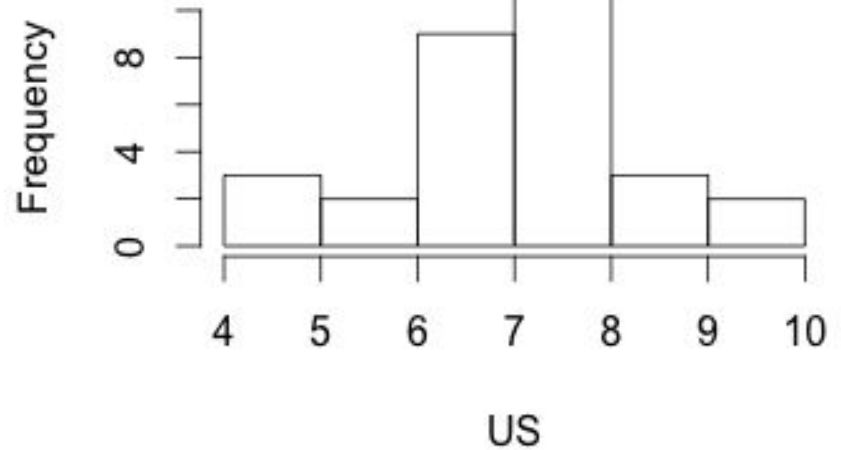


Shoe Size Distributions

Male Shoe Size



Female Shoe Size



Data Summary

	Male Height (inches)	Male Shoe Size (US)	Female Height (inches)	Female Shoe Size (US)
mean (x)=	70.2	10.6	64.3	7.2
median =	70.4	10.4	64.6	6.9
std deviation (s) =	2.17	1.66	2.54	1.31
n =	30	30	30	30

Hypothesis Tests

α

Upper critical values of Student's t distribution with ν degrees of freedom

ν	Probability of exceeding the critical value					
	0.10	0.05	0.025	0.01	0.005	0.001
1.	3.078	6.314	12.706	31.821	63.657	318.313
2.	1.886	2.920	4.303	6.965	9.925	22.327
3.	1.638	2.353	3.182	4.541	5.841	10.215
4.	1.533	2.132	2.776	3.747	4.604	7.173
5.	1.476	2.015	2.571	3.365	4.032	5.893
6.	1.440	1.943	2.447	3.143	3.707	5.208
7.	1.415	1.895	2.365	2.998	3.499	4.782
8.	1.397	1.860	2.306	2.896	3.355	4.499
9.	1.383	1.833	2.262	2.821	3.250	4.296
10.	1.372	1.812	2.228	2.764	3.169	4.143
11.	1.363	1.796	2.201	2.718	3.106	4.024
12.	1.356	1.782	2.179	2.681	3.055	3.929
13.	1.350	1.771	2.160	2.650	3.012	3.852
14.	1.345	1.761	2.145	2.624	2.977	3.787
15.	1.341	1.753	2.131	2.602	2.947	3.733
16.	1.337	1.746	2.120	2.583	2.921	3.686
17.	1.333	1.740	2.110	2.567	2.898	3.646
18.	1.330	1.735	2.101	2.553	2.878	3.611
19.	1.327	1.731	2.093	2.541	2.860	3.580
20.	1.325	1.728	2.086	2.531	2.845	3.552
25.	1.319	1.720	2.071	2.512	2.823	3.512
30.	1.315	1.715	2.058	2.496	2.805	3.479
40.	1.311	1.710	2.045	2.480	2.790	3.450
50.	1.308	1.707	2.033	2.470	2.780	3.430
60.	1.306	1.705	2.025	2.463	2.773	3.418
70.	1.304	1.703	2.019	2.457	2.768	3.410
80.	1.303	1.702	2.015	2.453	2.764	3.405
90.	1.302	1.701	2.012	2.450	2.761	3.402
100.	1.301	1.700	2.010	2.448	2.759	3.400

$$t = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{\frac{s_1^2}{N_1} + \frac{s_2^2}{N_2}}}$$

1. Mean Height

$$H_0: \mu_m = \mu_f$$

$$H_1: \mu_m > \mu_f$$

$$9.673214 > 1.697$$

2. Mean Shoe Size

$$H_0: \mu_m = \mu_f$$

$$H_1: \mu_m > \mu_f$$

$$8.806497 > 1.697$$

Correlation

α

$$r = \frac{N\sum xy - (\sum x)(\sum y)}{\sqrt{[N\sum x^2 - (\sum x)^2][N\sum y^2 - (\sum y)^2]}}$$

Where:

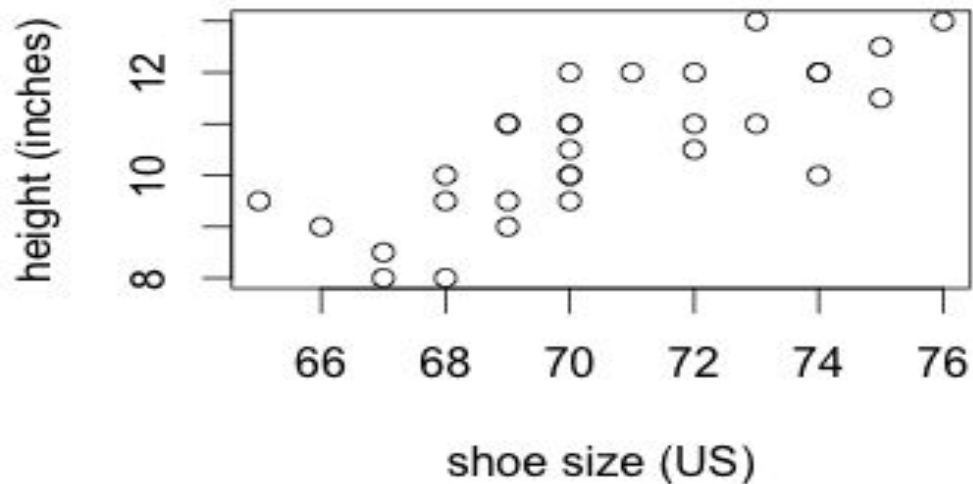
- N = number of pairs of scores
- $\sum xy$ = sum of the products of paired scores
- $\sum x$ = sum of x scores
- $\sum y$ = sum of y scores
- $\sum x^2$ = sum of squared x scores
- $\sum y^2$ = sum of squared y scores



Height and Shoe Size Correlation

Male

Male height vs Male shoe size

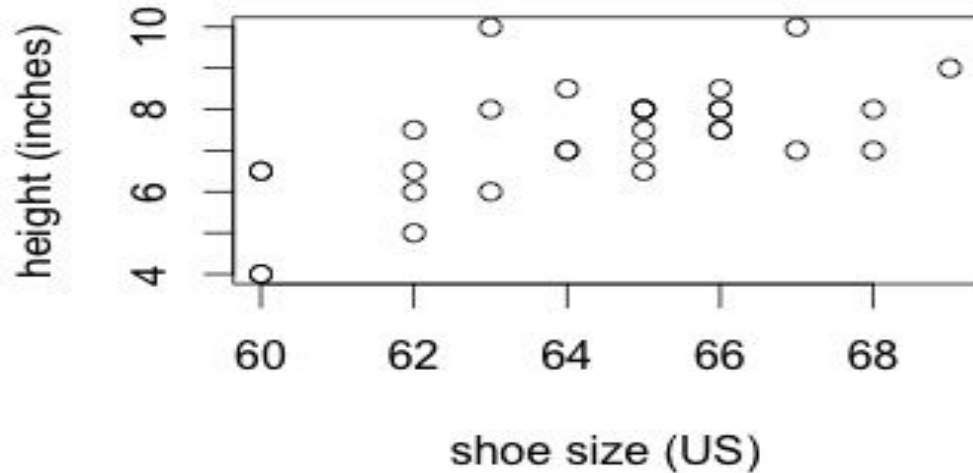


$0.7653334 > 0.37$

$$y = 1.555x + 54.072$$

Height and Shoe Size Correlation Female

Female height vs Female shoe size



$0.7653334 > 0.37$

$$y = 1.555x + 54.072$$

Conclusion & Learnings



σ

