

Assignment 11: Due Dec 16, 2019

**** Please print your assignment and submit it to the lecturer on the due date, thanks for your cooperation.**

1. Read paper titled as "Genomic Analyses from Non-invasive Prenatal Testing Reveal Genetic Associations, Patterns of Viral Infections, and Chinese Population History," by S. Liu et al. Cell, 2018. List the statistical methods used in this paper, and give your comments for the significance of this study.

2. A researcher believes that there is a linear relationship between BMI (Kg/m²) of pregnant mothers and the birth-weight (BW in Kg) of their newborn. The following data set provide information on 15 pregnant mothers who were contacted for this study.
 - (a) Is there linear correlation relationship between BMI and BW?
 - (b) And is there a linear regression relationship between BMI and BW?
 - (c) Determine the Spearman correlation coefficient for these data.

BMI (Kg/m ²)	Birth-weight (Kg)
20	2.7
30	2.9
50	3.4
45	3.0
10	2.2
30	3.1
40	3.3
25	2.3
50	3.5
20	2.5
10	1.5
55	3.8
60	3.7
50	3.1
35	2.8

3. In Natural Inheritance, Galton (1894) provided data, which contained a list of frequencies of daughter seeds of various sizes organized in rows according to the size of their parent seeds.
 - (a) Generate a scatterplot of these data.
 - (b) Please perform a simple linear regression analysis on these data using parent seed size to predict filial seed size.

Diameter of Parent Seed(0.01 inch)	Diameter of Daughter Seed(0.01 inch)	Frequency
21.00	14.67	22

21.00	15.67	8
21.00	16.67	10
21.00	17.67	18
21.00	18.67	21
21.00	19.67	13
21.00	20.67	6
21.00	22.67	2
20.00	14.66	23
20.00	15.66	10
20.00	16.66	12
20.00	17.66	17
20.00	18.66	20
20.00	19.66	13
20.00	20.66	3
20.00	22.66	2
19.00	14.07	35
19.00	15.07	16
19.00	16.07	12
19.00	17.07	13
19.00	18.07	11
19.00	19.07	10
19.00	20.07	2
19.00	22.07	1
18.00	14.35	34
18.00	15.35	12
18.00	16.35	13
18.00	17.35	17
18.00	18.35	16
18.00	19.35	6
18.00	20.35	2
17.00	13.92	37
17.00	14.92	16
17.00	15.92	13
17.00	16.92	16
17.00	17.92	13
17.00	18.92	4
17.00	19.92	1
16.00	14.28	34
16.00	15.28	15
16.00	16.28	18
16.00	17.28	16
16.00	18.28	13
16.00	19.28	3
16.00	20.28	1
15.00	13.77	46
15.00	14.77	14
15.00	15.77	9
15.00	16.77	11
15.00	17.77	14
15.00	18.77	4
15.00	19.77	2