

Assignment 7: Due Nov 5, 2017

* Please name your homework file as 'Assignment7_Your name.pdf' in pdf format and send it at biostat_sjtu@163.com, thanks for your cooperation.

1. A study was designed to compare changes in the length of steady run before and after two 2-min training blocks from 9 mice (Nature 520, 180–185, 2015). Normalized average stride lengths are as follows:

Table. The normalized length of steady run after training (cm)

Mice	Before	After
1	1.29	1.63
2	1.31	1.58
3	1.33	1.68
4	1.20	1.54
5	1.37	1.49
6	1.26	1.62
7	1.30	1.65
8	1.29	1.57
9	1.24	1.52

Please test the difference between before and after the training at the 5% significance level. And display the average and SD using barchart.

2. Using the following data, and assuming that both populations are normal with equal variance, test the null hypothesis that male and female turtles have the same mean serum cholesterol concentrations.

Serum cholesterol (mg/100 ml) of turtles	
Male	248,329,223,313,271,324,255,255,423,332,311,264
Female	341,311,362,371,419,366,246,273,312,331

3. The following data were reported in the study "A Low Carbohydrate as Compared with a Low Fat Diet in Severe Obesity". 132 severely obese subjects randomized to one of two diet groups. Subjects followed for a six month period. Assuming that both populations are normal with equal variance, test the null hypothesis that the

mean weight changes in two diet groups are same.

	Diet Group	
	Low-Carb	Low-Fat
Number of subjects (n)	64	68
Mean weight change (kg) Post-diet less pre-diet	-5.7	-1.8
Standard deviation of weight changes (kg)	8.6	3.9

4. A group of investigators are studying a treatment that can reduce LDL Cholesterol level. The following data shows the reduction of LDL at the end of the observation period from the treatment and control sample of participants, which were randomly selected from a specific patient population.

Data (Reduction in LDL):

Treatment: 80, 73, 34, 88, 95, 61, 110, 85

Control: 30, 59, 72, 63, 47, 70, 58, 61

Suppose the data is approximately normal distributed. Perform a t-test to test whether the average reduction in LDL in the treatment is greater than that in the control, at 5% level of significance.