## **New York University Tandon School of Engineering**

Biomedical Engineering
Applied Mathematics and Statistics for Biomedical Engineering

Fall 2021 Professor Mirella Altoe Tuesday 5:00-7:30PM Rogers Hall 325

## Computer Lab Assignment #9

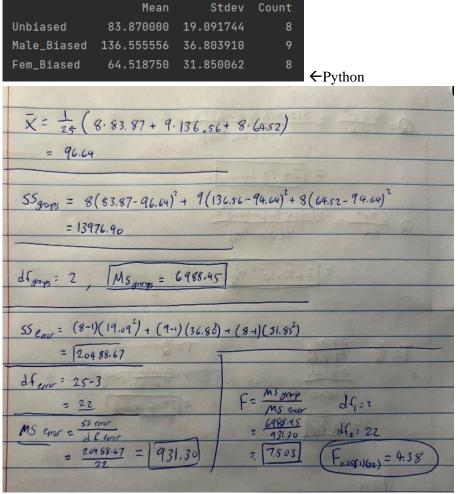
**QUESTION 1:** In some animal species, exposure to males reduces lifespan of females, because of the damage caused by harassment and male seminal fluids. In other species, exposure to other females is more harmful than exposure to males because of resource competition or aggressive interactions between females. Khan et al. (2018) tested these effects in the flour beetle *Tribolium castaneum*, whose females are known to produce toxins called quinones that may affect other individuals. They created groups of beetles that had equal numbers of males and females ("unbiased" sex ratio), more males than females ("male-biased"), or more females than males ("female-biased"). They measured the number of offspring per female in each group.

**Unbiased:** 82.16, 62.16, 79.83, 82.33, 75.83, 127.33, 87.16, 74.16

**Male-biased:** 118, 87, 123, 150, 94, 133, 206, 162, 156

**Female-biased:** 80.16, 6, 53.17, 121.34, 69, 57.82, 62.16, 66.5

**A.** (2.0 pts.) Use ANOVA to test whether the sex ratio treatment affects the mean number of offspring per female.



Since our calculated test statistic of 7.503 is greater than the critical value of 4.38, we can reject  $H_0$ . Sex ratio treatment affects the mean number of offspring per female.

**B.** (2.0 pts.) Determine which of the three treatment means are different from the others.

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	groups	differen	SE	12	cm				
	Unbird-mile	-52.69	14.83	-3.55	3.653				
	Unbigal-fem	19.36	15.26	1.27	3.553				
	male-fem	72.04	14.83	4.86	3.553				
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