**DCS 307: Simulation**

**Random Number Generator Streams**

**In-Class Work: 01 Feb 2023**

Name: YOUR NAME HERE

1. What are the first ten service times from the first run?
2. What are the first ten service times from the second run?
3. For what customer, and what are the different values, where the first service time diverges between the two runs?
4. In the first run, how many arrivals occur **after** the fourth arrival, but before that fourth customer completes service?
5. In the second run, how many arrivals occur **after** the fourth arrival, but before that fourth customer completes service?
6. What are the arrival times (rate = 1) generated using **rexp** (no streams)?
7. What are the service times (rate = 10/9) generated using **rexp** (no streams)?
8. Now what are the arrival times (rate = 1) generated using **rexp** (no streams)?
9. Now what are the service times (rate = 10/9) generated using **rexp** (no streams)?
10. What are the arrival times (rate = 1) generated using **vexp** (with streams)?
11. What are the service times (rate = 10/9) generated using **vexp** (with streams)?
12. Now what are the arrival times (rate = 1) generated using **vexp** (with streams)?
13. Now what are the service times (rate = 10/9) generated using **vexp** (with streams)?
14. What is the result of the following?

**sum(output1$interarrivalTimes - output2$interarrivalTimes)**

1. What is the result of the following?

**sum(output1$serviceTimes - output2$serviceTimes)**

(complete reflection on next page)

**Reflection / Investigation:**

1. What is the default RNG used by Python? What is its period? List your source(s).
2. What is the default RNG used by R? What is its period? List your source(s).
3. What additional RNGs are available in Python, and how do you set up code to use them? List your source(s).
4. What additional RNGs are available in R, and how do you set up code to use them? List your source(s).
5. Given the article posted to Lyceum last class, which of the RNGs you mention in 1-4 above are presented in the article, and how does the article describe and/or rank their relative "goodness"? Include pointers to specific passages in the article.