

Study Session Week of 11/13

Objectives:

- I will apply previous knowledge to solve problems involving simulations.

Agenda:

- MC practice problems
- FR practice problems

Your statistics class has 30 students. You want to call an SRS of 5 students from your class to ask where they used a computer for an online exercise. You label the students 01, 02, , 30. You enter the table of random digits at this line:

~~14~~~~59~~ ~~26~~~~05~~ ~~31~~~~42~~ ~~80~~~~37~~ ~~65~~~~10~~ ~~62~~~~25~~ ~~22~~~~49~~ ~~61~~~~18~~~~1~~

Your SRS contains students labeled:

- a. 14, 45, 92, 60, 56
- b. 14, 31, 03, 10, 22
- c. 14, 03, 10, 22, 22
- d. 14, 03, 10, 22, 06
- e. 14, 03, 10, 22, 11

In a large table of random digits,

- a. Each pair of digits 11, 01, 02, ..., 99 appears exactly once in any row of the table.
- b.** Any pair of entries is equally likely to be any of the 100 possible pairs 00, 01, 02, ..., 99.
- c. A specific pair such as 00 cannot be repeated until all other pairs have appeared.
- d. The pair 00 can appear, but 000 is not random and can never appear in the table.
- e. The pair 99 is less likely to appear than the pair 64.

Planners of a bridal shower have each of the 25 guests draw a ticket from a hat, with the tickets numbered 1 to 25. At the end of the party, three different names will be drawn and those three guests will receive prizes. Which of the following assignments of random digits would be appropriate for modeling a simulation of this?

- I. Assign "0, 25, 50, 75" to the first ticket, "1, 26, 51, 76" to the second ticket, . . . "24, 49, 74, 99" to the 25th ticket.
- II. Assign "0-3" to the first ticket, "4-7" to the second ticket, . . . "96-99" to the 25th ticket.
- III. Assign "01" to the first ticket, "02" to the second ticket, . . . "25" to the 25th ticket, and ignore "00" and "26-99".

- A. I only
- B. II only
- C. III only
- D. II or III only
- E. I, II, III

A basketball player has a 70% free throw percentage. Which plan could be used to simulate the number of free throws she will make in her next five free throw attempts?

- I. Let 0, 1 represent making the first shot, 2, 3 represent making the second shot, ..., 8, 9 represent making the fifth shot. Generate five random numbers 0-9, ignoring repeats.
- II. Let 0, 1, 2 represent missing a shot and 3, 4, ..., 9 represent making a shot. Generate five random numbers 0-9 and count how many numbers are in 3-9.
- III. Let 0, 1, 2 represent missing a shot and 3, 4, ..., 9 represent making a shot. Generate five random numbers 0-9 and count how many numbers are in 3-9, ignoring repeats.

- A. I only
- B. II only
- C. III only
- D. II and III
- E. I, II, and III

Criticize the following simulation: A student simulates the outcome of a basketball player's 3-point shot by letting 0 = missed shot and 1 = made shot.

- A) The simulation cannot model the real situation. Shooting accuracy varies from day to day, so the real situation is inherently unpredictable.
- B) The simulation probably will not model the real situation. The simulation assumes that the player makes 50% of his 3-point shots, which is probably unrealistic.
- C) The simulation should model the real situation.
- D) The simulation will not model the real situation. The simulation fails to account for the type of defense employed by the opposing team.
- E) The simulation probably will not model the real situation. The shooter's accuracy on a given day might be affected by an injury or illness.

Criticize the following simulation: A student uses a random number from 5 to 13 to simulate the shoe sizes of a population of females.

- A) The simulation will not model the real situation. To accurately model the population, the simulation should also account for the foot width.
- B) The simulation will not model the real situation. Some females have foot sizes that fall outside of the range.
- C) The simulation will not model the real situation. It will predict too many small sizes and too many large sizes. Extremes in foot size are not all that common.
- D) The simulation should model the real situation.
- E) The simulation will not model the real situation. The shoes size of a particular female is unpredictable and cannot be modeled.

A multiple choice quiz has 4 questions. Each question has 5 choices (a to e). If you guess indiscriminately, what is the chance that you will get more answers correct than incorrect? Use the random number table below. Run 5 trials.

10097	32533	76520	13586	34673	54876	80959	09117	39292	74945
37542	04805	64894	74296	24805	24037	20636	10402	00822	91665
08422	68953	19645	09303	23209	02560	15953	34764	35080	33606
99019	02529	09376	70715	38311	31165	88676	74397	04436	27659
12807	99970	80157	36147	64032	36653	98951	16877	12171	76833
66065	74717	34072	76850	36697	36170	65813	39885	11199	29170
31060	10805	45571	82406	35303	42614	86799	07439	23403	09732
85269	77602	02051	65692	68665	74818	73053	85247	18623	88579
63573	32135	05325	47048	90553	57548	28468	28709	83491	25624
73796	45753	03529	64778	35808	34282	60935	20344	35273	88435

Good CDs Brian is a systems manager for a large company. In his work, he has found that about 5% of all CDs he orders are bad. He needs to give one of the executives at his company five good CDs. Conduct a simulation to estimate how many CDs Brian will have to check to get five good CDs for the executive.

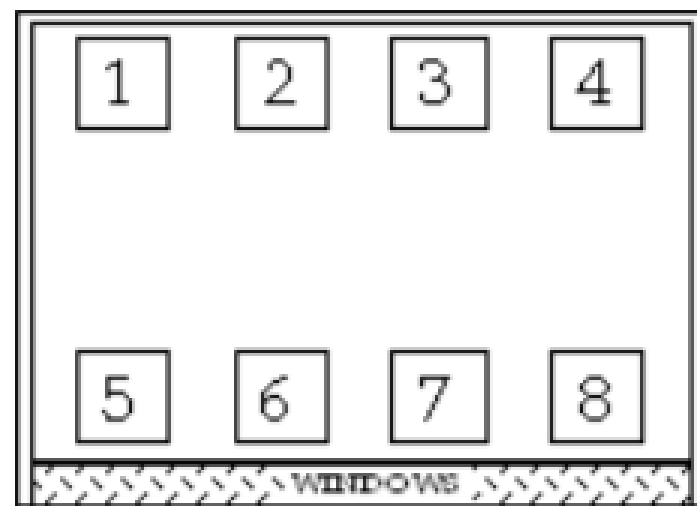
a. Describe how you will use a random number table to conduct this simulation.

b. Show three trials by clearly labeling the random number table given below. Specify the outcome for each trial.

Trial	Simulation	Outcome
#1	03242 50692 18977 28370	
#2	78695 21402 85525 81183	
#3	60809 06765 39996 81915	

c. State your conclusion.

Preservative Leather furniture used in public places can fade, crack, and deteriorate rapidly. An airport manager wants to see if a leather preservative spray can make the furniture look good longer. He buys eight new leather chairs and places them in the waiting area, four near the south-facing windows and the other four set back from the windows as shown. He assigned the chairs randomly to these spots. You must select 2 chairs from each side.



Use the random numbers given to decide which chairs to spray. Explain your method clearly.

3 2 2 1 9 0 0 5 9 7 8 6 3 7 4