# Week 1 Module 1 Knowledge Checks (Fall/Spring)

**Due** No due date **Points** 14 **Questions** 14 **Time Li**
**Allowed Attempts** Unlimited

Take the Quiz Again

**Last Attempt Details:**

| | |
|---|---|
| **Time:** | 110 minutes |
| **Current Score:** | 14 out of 14 |
| **Kept Score:** | 14 out of 14 |

Unlimited Attempts

Take the Quiz Again
(Will keep the highest of all your scores)

## Attempt History

| | Attempt | Time | Score |
|---|---|---|---|
| **LATEST** | Attempt 1 | 110 minutes | 14 out of 14 |

Submitted Jan 10 at 1:24am

### Question 1

1 / 1 pts

Week 1 Module 1 Lesson 3 Question 1

We are interested in modeling the arrival and service process at the local McBurger Queen burger joint. Customers come in every once in a while, stand in line, eventually get served, and off they go. Generally speaking, what kind of model are we talking about here? (More than one answer below may be right.)

Correct! a. Discrete

b. Continuous

Correct! c. Stochastic

d. Deterministic

(a) (because events such as arrivals and service completions only happen once in a while, as opposed to continuously); and (c) (because customer arrival times, service times, shift changes, etc., are all random).

### Question 2

1 / 1 pts

Week 1 Module 1 Lesson 3 Question 2

Which of the following can be regarded as advantages of simulation? (More than one answer below may be right.)

Correct!
a. Simulation enables you to study models too complicated for analytical or numerical treatment.

Correct!
b. Simulations can serve as very pretty demos that even University of Georgia graduates can understand.

Correct!
c. Simulation can be used to study detailed relations that might be lost in an analytical or numerical treatment.

d. Simulations are often tedious and time-consuming to produce.

## Question 3

1 / 1 pts

Week 1 Module 1 Lesson 4 Question 1

Who is William Gosset?

Correct!

- a. He invented the t distribution that is used ubiquitously in statistics.
- b. He invented the s distribution that is used ubiquitously in statistics.
- c. He invented tea.
- d. He invented the word "ubiquitous".
- e. He is the brother of Louis Gossett Jr., best known for his fine acting in many films, including An Officer and a Gentleman.

## Question 4

1 / 1 pts

Week 1 Module 1 Lesson 4 Question 2

YES or NO? Has anyone closely related to the field of computer simulation ever won a Nobel Prize?

Correct!

- Yes

Harry Markowitz won the 1990 Nobel Prize in Economics for his work in the field of portfolio optimization. He is highly regarded in the simulation community for his conception and development of the general-purpose simulation language SIMSCRIPT.

- No

## Question 5

1 / 1 pts

Week 1 Module 1 Lesson 5 Question 1

Which of the following are areas where simulation has found substantial application? (More than one answer below may be correct.)

Correct!
- a. Inventory and Supply Chain Analysis

Correct!
- b. Financial Analysis

Correct!
- c. Manufacturing

Correct!
- d. Health Systems

Correct!
- e. Transportation Systems

## Question 6

1 / 1 pts

Week 1 Module 1 Lesson 5 Question 2

Why might simulation be a good tool to analyze supply chains? (More than one answer below may be correct.)

- a. Supply chains are always deterministic systems.
- Correct! b. Supply chains often have complicated network structures, making exact analysis difficult.
- Correct! c. Supply chains are stochastic systems, with random travel times, lead times, and order patterns.
- d. Supply chain simulations can be programmed in a matter of minutes.

(Choice (a) is a joke. I wish (d) were correct, but unfortunately, that is rarely the case.)

## Question 7

1 / 1 pts

Week 1 Module 1 Lesson 6 Question 1

Suppose there are 40 random people in a room. What is the probability that at least two of them will have the same birthday?

- a. Close to 0
- b. A bit less than 1/2
- c. Almost exactly 1/2
- Correct! d. Somewhat greater than 1/2

In fact, you only need 23 people in the room to achieve a probability of 1/2.

## Question 8

1 / 1 pts

Week 1 Module 1 Lesson 6 Question 2

Inscribe a circle in a unit square and toss 1000 random darts at the square. Suppose that 800 of those darts land in the circle. Using the technology developed in this lesson, what is the resulting estimate for

- a. -3.2
- b. 2.8
- c. 3.0
- Correct! d. 3.2

Since the estimate $\hat{\pi}$ = 4 x (proportion in circle). Note that (a) is the University of Georgia answer, and is completely incorrect.

- e. 4.0

## Question 9

1 / 1 pts

Week 1 Module 1 Lesson 7 Question 1

TRUE or FALSE? All random number generators perform pretty much the same.

- True
- False

Correct!

In fact, one of the reasons that you're taking this course is to help you learn the differences between good and bad generators.

## Question 10

1 / 1 pts

Week 1 Module 1 Lesson 7 Question 2

Suppose customers to a barber shop show up at times 4 and 11. Moreover, suppose that it takes the barber 12 minutes to serve customer 1 and then 14 minutes to serve customer 2. When does customer 2 leave the barber?

- a. 18
- b. 25
- c. 30

Correct!

Since customer 2's service starts only when customer 1 leaves, which happens at time 4 + 12 = 16.

- d. 40

## Question 11

1 / 1 pts

Week 1 Module 1 Lesson 8 Question 1

Suppose we are using the (terrible) pseudo-random number generator $X_i = (5X_{i-1} + 3) \text{mod}(8)$, with starting value ("seed") $X_0 = 1$. Find the second PRN, $U_2 = X_2/m = X_2/8$.

- a. 0
- b. 1/8
- c. 3/8

Correct!

$X_1 = (5X_0 + 3) \text{ mod}(8) = 8 \text{ mod}(8) = 0$, and then $X_2 = (5X_1 + 3) \text{ mod}(8) = 3 \text{ mod}(8) = 3$. So $U_2 = X_2/8 = 3/8$

- d. 3

## Question 12

1 / 1 pts

Week 1 Module 1 Lesson 8 Question 2

Suppose that we generate a pseudo-random number U = 0.728. Use this to generate an Exponential($\lambda$=3) random variate.

- a. -0.106
- Correct! b. 0.106

It turns out that $X=-(1/\lambda)\ell n(1-U)=-(1/3)\ell n(0.272)=0.4340$ would also have been an acceptable answer. Can you see why?

- c. -0.95
- d. 0.952

## Question 13

1 / 1 pts

Optional: Week 1 Module 1 Lesson 9 Question 1

TRUE or FALSE? Simulation outputs such as consecutive customer waiting times are almost always independent and identically distributed normal random variables.

- True
- Correct! False

Output is pretty much *never* i.i.d. normal!

## Question 14

1 / 1 pts

Optional: Week 1 Module 1 Lesson 9 Question 2

Let's simulate a bank that closes at 4:30 p.m. What kind of simulation approach would you take?

- Steady-state simulation
- Correct! Terminating simulation
- Arnold Schwarzenegger simulation
- I'm from The University of Georgia. What is simulation? And what is bank?