Attempt History

LATEST Attempt 1 117 minutes 82 out of 100		Attempt	Time	Score
	LATEST	Attempt 1	117 minutes	82 out of 100

Score for this quiz: **82** out of 100 Submitted Feb 18 at 7:01am This attempt took 117 minutes.

	Question 1	3 / 3 pts
	There are 6 random people in a room. What is the probabilit none of them share the same birthday? (Assume 365 days are equally likely.)	-
	0.901	
	0.943	
Correct!	0.960	
	0.973	
	0.989	

	Question 2	3 / 3 pts
	Consider a family that has 4 children. Assume that $\Pr(\mathrm{kid}\ \mathrm{is}\ \mathrm{a}\ \mathrm{boy}) = \Pr(\mathrm{kid}\ \mathrm{is}\ \mathrm{a}\ \mathrm{girl}) = 1/2$, and that the of the 4 kids are independent. What is the probability that a are boys given that we know at least 3 of them are boys?	
	○ 1/16	
	○ 1/8	
Correct!		
	○ 1/4	
	○ 1/2	

Question 3 3 / 3 pts

TRUE or FALSE? Randomly select one card from a standard deck of 52 cards. Suppose we define the event A to be that the selected card is a Diamond, and the event B is that the selected card is a Spade. Then A and B are independent.

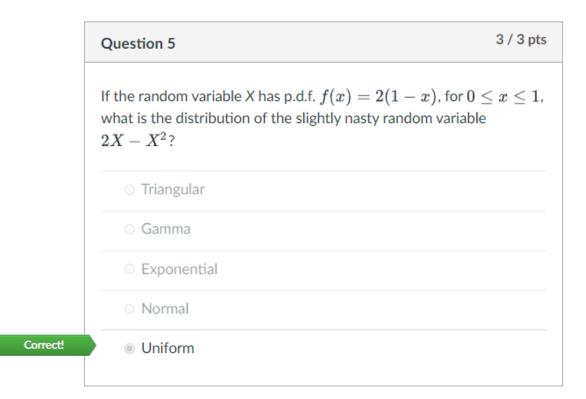
Note: A standard deck of playing cards contains a total of 52 cards of 4 types: 13 each of Spades, Clubs, Hearts, and Diamonds.

○ True

Correct!

False

Question 4 3 / 3	pts
TRUE or FALSE? The function $F(x)=1-(1/5)e^{-x/5}$ for $x\geq$ a valid c.d.f.	0 is
○ True	
False	
	TRUE or FALSE? The function $F(x)=1-(1/5)e^{-x/5}$ for $x\geq a$ a valid c.d.f.



Consider the discrete random variable \boldsymbol{X} such that

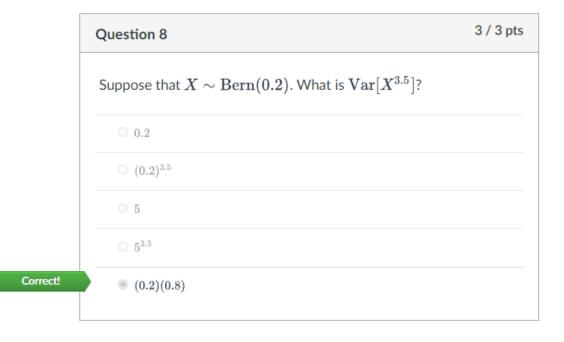
$$P(X = x) = \begin{cases} 0.5, & \text{if } x = -2\\ 0.2, & \text{if } x = 0.2\\ 0.3, & \text{if } x = 7\\ 0, & \text{otherwise} \end{cases}$$

Use the discrete version of the Inverse Transform method from class and the $\mathrm{Unif}(0,1)$ pseudo-random number U=0.99 to generate one observation X coming from this p.m.f.

$$X = 0.2$$

$$\bigcirc X = 3$$

	Question 7	3 / 3 pts
	Suppose that U and V are i.i.d. $\mathrm{Unif}(0,1)$ random variables would you simulate the sum of two 6-sided dice tosses?	s. How
	\circ (a) $12U$	
	\odot (b) $\lceil 12U ceil$	
	\circ (c) $\lceil 12V ceil$	
Correct!	$_{\odot}$ (d) $\lceil 6U ceil + \lceil 6V ceil$	
	(e) Both (b) and (c)	
	(f) None of the above	



TRUE or FALSE? Let X denote the number of tails from two fair coin tosses. Then the probability mass function for $Y=X^2-1$ is

$$P(Y = y) = \begin{cases} 1/4, & \text{if } y = -1\\ 1/2, & \text{if } y = 0\\ 1/4, & \text{if } y = 3 \end{cases}$$

Correct!

True

False

Question 10

3 / 3 pts

YES or NO? Suppose X and Y are random variables that have joint p.d.f.

$$f(x,y) = cx^2 \ln(1+y)$$
 for $0 \le x \le 1$ and $0 \le y \le 1$,

where c is the constant that makes this integrate to 1. Are X and Y independent?

Correct!

YES

NO

	Question 11	0 / 3 pts
	Suppose X and Y are two random variables for which the join probability density function is given by	nt
	$f(x,y) \ = \ 6e^{-x-2y} ext{for } 0 < x < y < \infty$	
	What is the probability that $2Y>X$?	
	O 0	
	○ 0.324	
You Answered	◎ 0.623	
	0.915	
Correct Answer	○ 1	

Question 12

3 / 3 pts

Suppose that X is a random variable with a mean of 6 and variance of 8; Y is a random variable with a mean of -10 and variance of 18; and $\mathrm{Cov}(X,Y)=-8$. Find $\mathrm{Corr}(X,Y)$.

- -1/3
- -1/2

Correct!

- -2/3
- -3/4
- -4/5

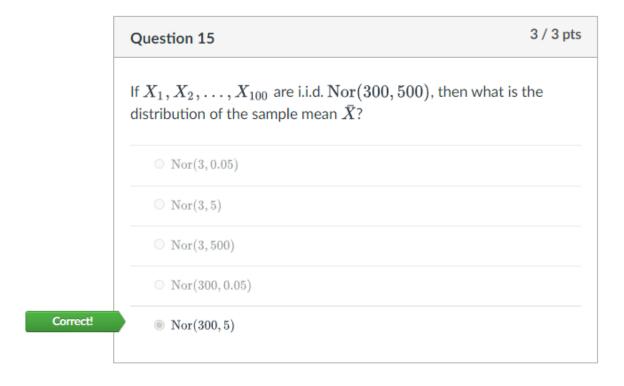
Question 13

3 / 3 pts

Given an exponential random variable $X\sim {\rm Exp}(\lambda=1/180)$, what is the conditional probability ${\rm P}({\rm X}>100|{\rm X}>40)$?

- $@ e^{-1/3}$
- $-e^{-2/9}$
- $e^{-1/9}$
- $e^{-1/18}$
- $\bigcirc \ 1-e^{-2/9}$

Question 14	3 / 3 pts
On a particular river, floods occur once every year on average number of floods follows a Poisson distribution, calculate the probability of exactly 3 floods during a particular two-year	ie
0.003	
O.015	
O.061	
◎ 0.180	
0.368	
	On a particular river, floods occur once every year on average number of floods follows a Poisson distribution, calculate the probability of exactly 3 floods during a particular two-year probability and 5 floods during a particular two-year probability of exactly 4 floods during a particular two-year probability of exactly 4 floods during a particular two-year probability and 5 floods during a particular two-year probability and 5 floods during a particular two-year probability and 5 floods during a particular two-y



Suppose X_1,\dots,X_{100} are i.i.d. from an ${
m Exp}(1)$ distribution. If we use the Central Limit Theorem approximation, what is

P
$$\bigg(\sum_{i=1}^{100} X_i < 97\bigg)$$
?

0.242

- 0.382
- 0.421
- 0.460
- 0.618

3 / 3 pts

Suppose you approximating the solution of a simple differential equation involving the function f(x), and you appeal to the relation

 $f(x+h) \ \doteq \ f(x) + hf'(x),$ where h is some "small" number.

What is this method called?

- Inverse Transform
- LOTUS
- Newton's Method
- Bisection Method

Correct!

Euler's Method

Question 18 3 / 3 pts

Consider a circle inscribed in a unit square (so that the circle has area $\pi/4$). We toss 1000 darts randomly into the square, and it turns out that 784 of those darts land in the circle. Using the method described in class, estimate π .

- 3.136
- 3.156
- 3.208
- 3.422
- 3.568

Suppose we use Monte Carlo integration to approximate $I=\int_2^5 \ell n(2x-4)\,dx$. If U_1,U_2,\ldots,U_n are i.i.d. $\mathrm{Unif}(0,1)$ random numbers, which of the following is a good approximation \bar{I}_n for I?

$$\bigcirc$$
 $\frac{1}{n} \sum_{i=1}^{n} \ell n(6U_i)$

$$\odot$$
 $\frac{3}{n}\sum_{i=1}^{n} \ell n(6U_i)$

$$\bigcirc \ \ \frac{1}{n} \sum_{i=1}^{n} \ell n (6U_i - 4)$$

$$\bigcirc \ \tfrac{3}{n} \sum_{i=1}^n \ell n (6U_i - 4)$$

Question 20 3 / 3 pts

Consider the following event list for a FIFO single-server queue, where i is the customer's sequence number, A_i is the ith customer's arrival time, T_i is the customer's service start time, and S_i is the customer's service time.

i	A_i	T_i	S_i
1	2	2	6
2	7	8	4
3	10	12	7
4	15	19	3
5	21	22	2

Event list for FIFO

What is the average time in system (service + waiting time) for all 5 customers?

- 0 1.6
- -2.4
- 3.4
- 4.6

Correct!

6.0

Question 21	0 / 3 pts
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Consider the same FIFO single-server queue event list as in the previous question (table repeated below). What is the maximum number of customers in the system (queue + in-service) at any point in time?

i	A_i	T_i	S_i
1	2	2	6
2	7	8	4
3	10	12	7
4	15	19	3
5	21	22	2

Event list for FIFO

You Answered	1
Correct Answer	O 2
	O 3
	O 4
	O 5

Consider once again the FIFO single-server queue event list (table below). If the queue had instead been a LIFO queue, then which of the following statements would be TRUE?

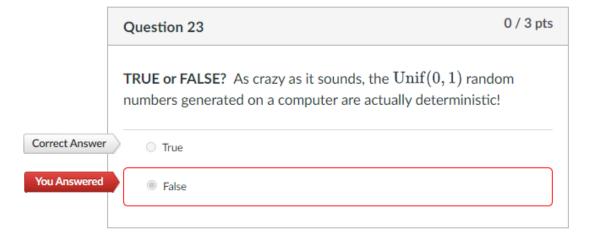
i	A_i	T_i	S_i
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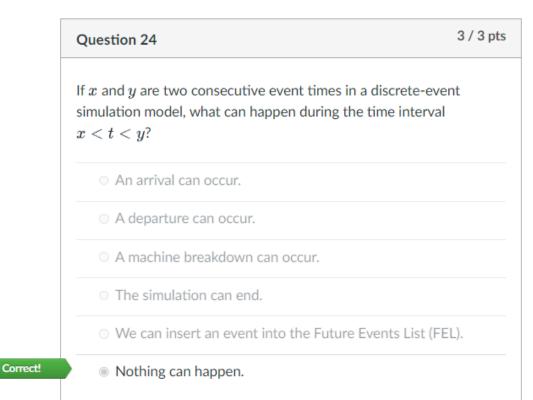
Event list for FIFO

- \circ The arrival times A_1, A_2, \ldots, A_5 would be different.
- Customer 4 would have been the last to be serviced.
- The average of the service times S_1, S_2, \ldots, S_5 would be changed.
- Customer 5 would have been the first to leave the system.

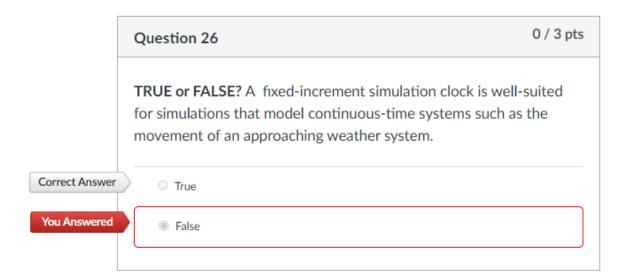
Correct!

None of the above.





	Question 25	3 / 3 pts
	In the course of a simulation study, we should stop to ask, "I simulation model correctly mimic the real-world system und study?" What step of the simulation study process is this?	
	Problem Formulation	
	Data Collection	
	 Verification 	
Correct!	Validation	
	Output Analysis	



Which of the following statements about the future events list (FEL) is TRUE?

The order of events in the FEL can never change.

Events can be deleted from the FEL, but not inserted.

Most of the programming effort when using a commercial simulation package is spent directly managing the FEL.

Correct Answer

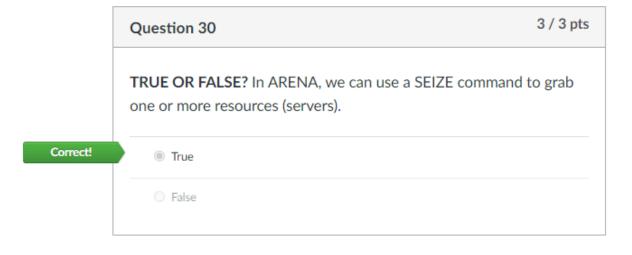
Arena -- and in fact every commercial discrete-event simulation package -- maintains a FEL.

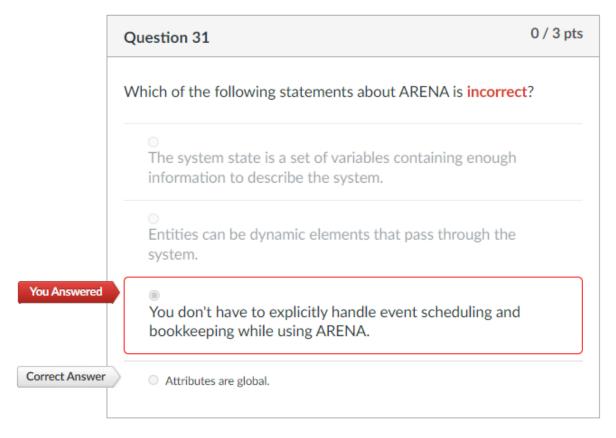
You Answered

All of the above.

	Question 28	3 / 3 pts
	Which high-level simulation modeling approach does ARENA employ?	
	Event-Scheduling	
Correct!	Process-Interaction	
	Customer-Process	
	 Entity-Solving 	
	Attribute-Recording	

	Question 29	3 / 3 pts
	TRUE or FALSE? In the process-interaction worldview, at any time the system may have many entities interacting with each other as they compete for resources.	
Correct!	⊚ True	
	○ False	





Question 32	3 / 3 pts
What ARENA module is used to generate new customers?	
 Generate 	
Enter	
Create	
○ Start	
○ Seize	
	What ARENA module is used to generate new customers? Generate Enter Create Start

Question 33	3 / 3 pts
What command sequences are possible in an ARENA PRO module?	OCESS
o DELAY	
 SEIZE-DELAY 	
DELAY-RELEASE	
SEIZE-DELAY-RELEASE	
All of the above	

	Question 34	1 / 1 pts
	Who is the best teacher ever?	
Correct!	Dave Goldsman	
	O Justin Bieber	