Week 6 Homework

Due Feb 23 at 11:59pm **Points** 20 **Questions** 20
Available after Feb 14 at 8am **Time Limit** None

Attempt History

	Attempt	Time	Score
LATEST	Attempt 1	6,743 minutes	19 out of 20

Score for this quiz: **19** out of 20
Submitted Feb 21 at 2:51pm
This attempt took 6,743 minutes.

Question 1

1 / 1 pts

(Lesson 5.2: Process-Interaction.) What sequence of Arena modules would you use to generate customer arrivals, use a server, and then have customers leave the system after they're done with the server?

- a. Seize-Delay-Release
- b. Create-Resource-Leave
- c. Create-Process-Dispose
- d. Create-Seize-Dispose

Correct!

(c).

Question 2

1 / 1 pts

(Lesson 5.2: Process-Interaction.) TRUE or FALSE? Arena uses the P-I "world view".

Correct!

- (•) True
- ( ) False

Question 3

1 / 1 pts

(Lesson 5.3: Let's Meet Arena.) It turns out that the version of Arena that you're seeing in my videos is not quite the most-recent version. With this in mind, I'd like you to go to:

https://www.arenasimulation.com/academic/students

and download the current version, which should be approximately 15.1. If you get that version, you'll see a few new modules here and there, e.g., the Clone module in the Basic Process template. To tell you the truth, none of this will affect you at all, but it'll simply be nice to have the newest version.

So… did you download the new version?

Correct!

- (•) a. Yes, I did, and it's lovely. [Hint: This is the correct answer!]
- ( ) b. Not yet, but I will pretty soon!

Question 4

1 / 1 pts

(Lesson 5.4: The Arena Basic Process Template.) TRUE or FALSE? The Basic Process template contains a number of spreadsheets, e.g., a Resource spreadsheet.

Correct!

- (selected) True
- False

Question 5

1 / 1 pts

(Lesson 5.4: The Arena Basic Process Template.) Go to the Basic Process template and drop-and-drag a Create module over to the main screen.

Now click into the module. What do you see?

- a. A field for “Time Between Arrivals” (i.e., the interarrival time distribution)
- b. A field for time units (for the interarrival times).
- c. A field for “Entities per Arrival” (i.e., how many customers show up at a time).
- d. A field for “First Creation” (i.e., when does the first arrival show up).

Correct!

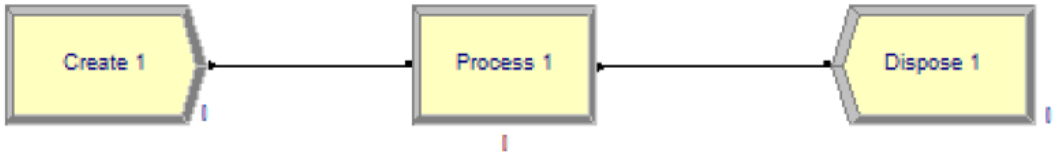
- (selected) e. All of the above

(e).

Question 6

1 / 1 pts

(Lesson 5.5: The Create-Process-Dispose Modules.) Go to the Basic Process template and drag-and-drop Create-Process-Dispose modules in that order. They should connect automatically, so that you'll see something like:



If the little lines don't connect up nicely, you can use the "connect" functionality by clicking on the "Connect" button from the top menu and manually drawing the connecting lines yourself.

Now run the simulation by hitting the "Go" button.

At this point, you should see little guys getting generated and flowing from left to right. But do you see any lines forming?

a. Yes, I see long lines with angry customers.

Correct!

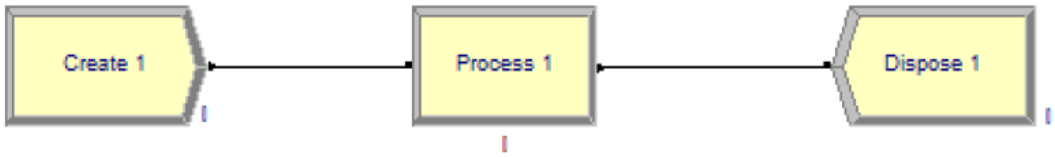
b. No, I don't see any lines [Hint: We haven't defined or used any servers yet, so there's no reason to see a line.]

(b).

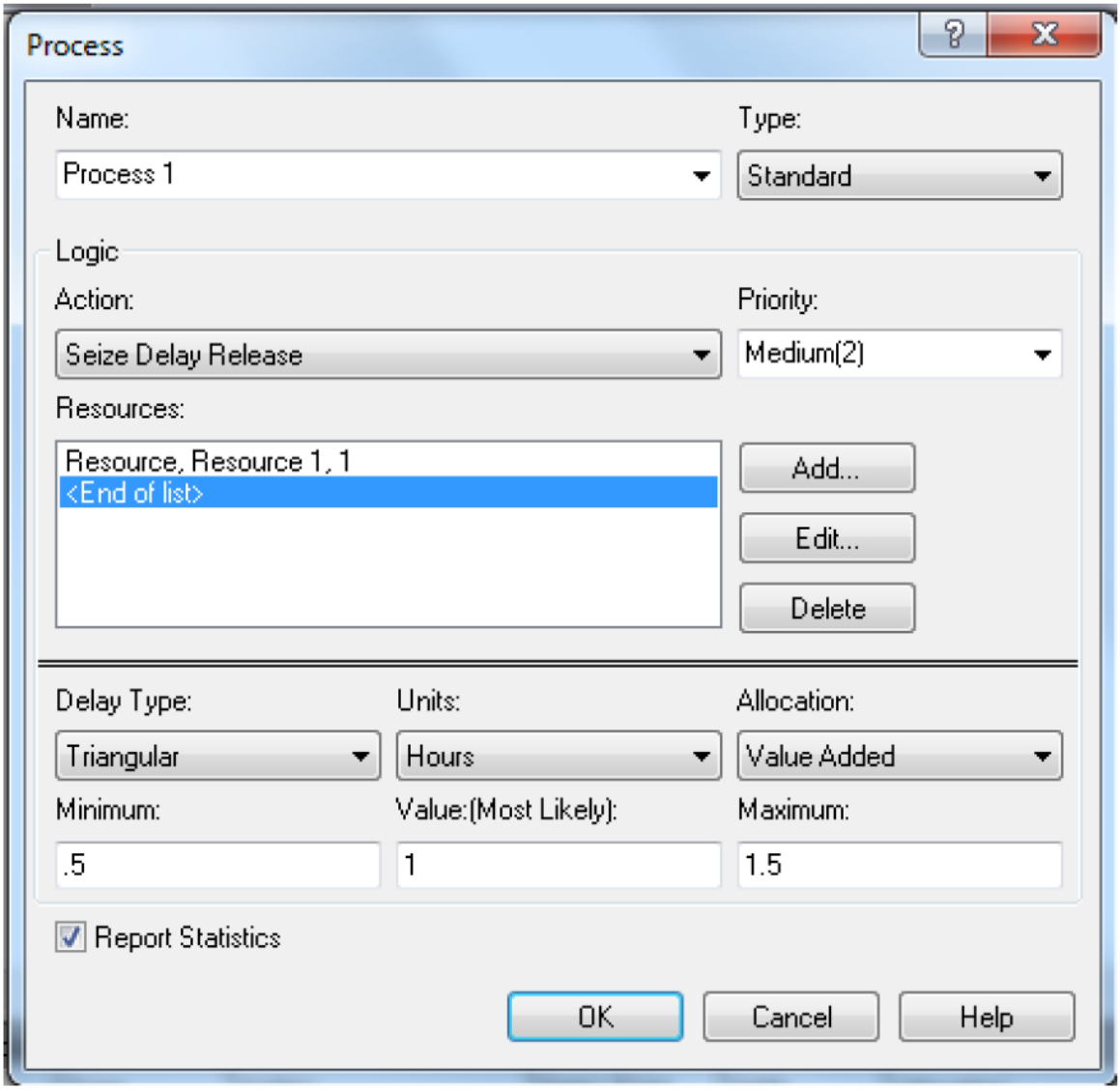
Question 7

1 / 1 pts

(Lesson 5.6: The Process Module.) As in the previous problem, drag-and-drop Create-Process-Dispose modules in that order, so that you obtain something like:



Click in the Process module; choose the “Seize Delay Release” option from the Action drop-down; and Add 1 resource from the Resources menu (it’ll automatically name it “Resource 1”). Your screen should look something like:



Click OK, and now run the program. What do you see?

Correct!

- a. I see little guys running around from left to right, with an occasional line forming over the Process module.
- b. I see guys running around, but no lines.
- c. I don't see any movement [This is not the right answer.]
- d, I see dead people. https://www.youtube.com/watch?v=QUYKSWQmkrg

(a).

Question 8

1 / 1 pts

(Lesson 5.6: The Process Module.) Referring to the above problem, what will happen if you choose the “Seize Delay” option from the Action drop-down instead of choosing the “Seize Delay Release” option?

- a. Pretty much the same nice behavior as in the previous problem.

Correct!

- b. You won’t see any customers leaving (at least, after the first customer), and the line will start to get pretty big (and eventually, Arena may give you an error because the number of customers in the system will exceed the student version’s limits).

(b).

Question 9

1 / 1 pts

(Lesson 5.7: Basic Process Spreadsheets.) Which spreadsheets are available in the Basic Process template?

- a. Attribute spreadsheet (which concerns user-defined properties that customers can have, e.g., height, weight, etc.).
- b. Entity spreadsheet (which lists types of customers).

c. Queue spreadsheet (which lists the various queues in the system).

d. Resource spreadsheet (which gives properties of the various servers).

e. Variable spreadsheet (which concerns various user-defined system variables such as work-in-process).

Correct!

f. All of the above.

(f).

Question 10

1 / 1 pts

(Lesson 5.8: The Decide Module.) Joe is a customer who needs to go to Point A with probability 0.5, Point B with probability 0.2, and Point C with probability 0.3. Which Decide module option would he use to do so?

a. 2-Way by Chance

Correct!

b. N-Way by Chance

c. 2-Way by Condition

d. N-Way by Condition

Since there are three probabilistic options, the correct answer is (b).

Question 11

1 / 1 pts

(Lesson 5.8: The Decide Module.) Consider the demo model from class,

Module05-08 - Decide2WayConditionEntityType.doe

What is the Decide module doing?

a. 50% of all customers go to the Process module named “men shopping” and 50% go to “women shopping”.

b. The Decide block changes the entity’s picture from a man to a woman with probability 50%.

Correct!

c. If the Entity Type is “men”, the customer goes to the Process module named “men shopping”.

d. If the Entity Type is “men”, the customer goes to the Process module named “women shopping”.

(c).

Question 12

1 / 1 pts

(Lesson 5.9: The Assign Module.) TRUE or FALSE? We can use the Assign Module to change an entity’s picture.

Correct!

- (●) True
- ( ) False

Question 13

1 / 1 pts

(Lesson 5.9: The Assign Module.) Consider the demo model from class, in which customers in line are ordered by their eventual tip – the bigger the tip, the better their priority!

Module05-09 - AssignPlusFunnyQueuePriority.doe

Which of the following best describes what's going on?

- ( ) a. The eventual tip is determined in the Assign module, and the queue is ordered by highest tip amount using the Queue spreadsheet.
- ( ) b. The eventual tip is determined in the Assign module, and the queue is ordered by highest tip amount using the "Priority" field of the Process module.
- ( ) c. The Barber's service time depends on the amount of the tip.
- ( ) d. The customer's waiting time depends on the amount of the tip.

Correct!

- (●) e. Both (a) and (d).

(e).

Question 14

1 / 1 pts

(Lesson 5.10: Attribute, Variable, and Entity Spreadsheets.) TRUE or FALSE? The system's work-in-process will typically be a variable – not an attribute.

Correct!

- (●) True

  TRUE. Attributes are properties for individual customers; variables are properties of the entire system.

- ( ) False

TRUE. Attributes are properties for individual customers; variables are properties of the entire system.

Question 15

1 / 1 pts

(Lesson 5.11: Arena Internal Variables.) Which expression will give you the number of customers in the queue called DaveRules.Queue in front of the server called Dave?

- ( ) a. NQ(Dave)
- ( ) b. NQ(DaveRules)
- ( ) c. NQ(Dave.Queue)

Correct!

- (●) d. NQ(DaveRules.Queue)

(d).

Question 16

0 / 1 pts

(Lesson 5.11: Arena Internal Variables.) Consider the demo model from class, in which customers go to the shortest of two queues:

Module05-11 - UseShortestQ.doe

Which of the following best describes what's going on inside of the Decide block?

a. The customer either goes to Process 1 with 50% probability or Process 2 w.p. 50%.

b. The logical expression "NQ(process 1.queue) < NQ(process 2.queue)" checks to see if Process 1's queue is smaller than Process 2's.

ou Answered

c. The logical expression "NQ(process 1.queue) < NQ(process 2.queue)" returns a value of either 0 (False) or 1 (True); if True, then the customer goes to Resource 1 in Process 1.

d. The logical expression "NQ(process 1.queue) < NQ(process 2.queue)" returns a value of either 0 (False) or 1 (True); if True, then the customer goes to Resource 2 in Process 2.

orrect Answer

e. Both (b) and (c).

(e).

Question 17

1 / 1 pts

(Lesson 5.12: Displaying Stuff.) What best describes what the following button is used for?

a. It displays a time series plot, e.g., how many people are in line as a function of time?

Correct!

b. It gives you a histogram.

c. It fits a probability distribution to data, e.g., are the observed interarrival times exponential?

d. It keeps track of the current number of people in a queue.

(b).

Question 18

1 / 1 pts

TRUE or FALSE? I (i.e., you the student) am really looking forward to the next set of Arena lessons!

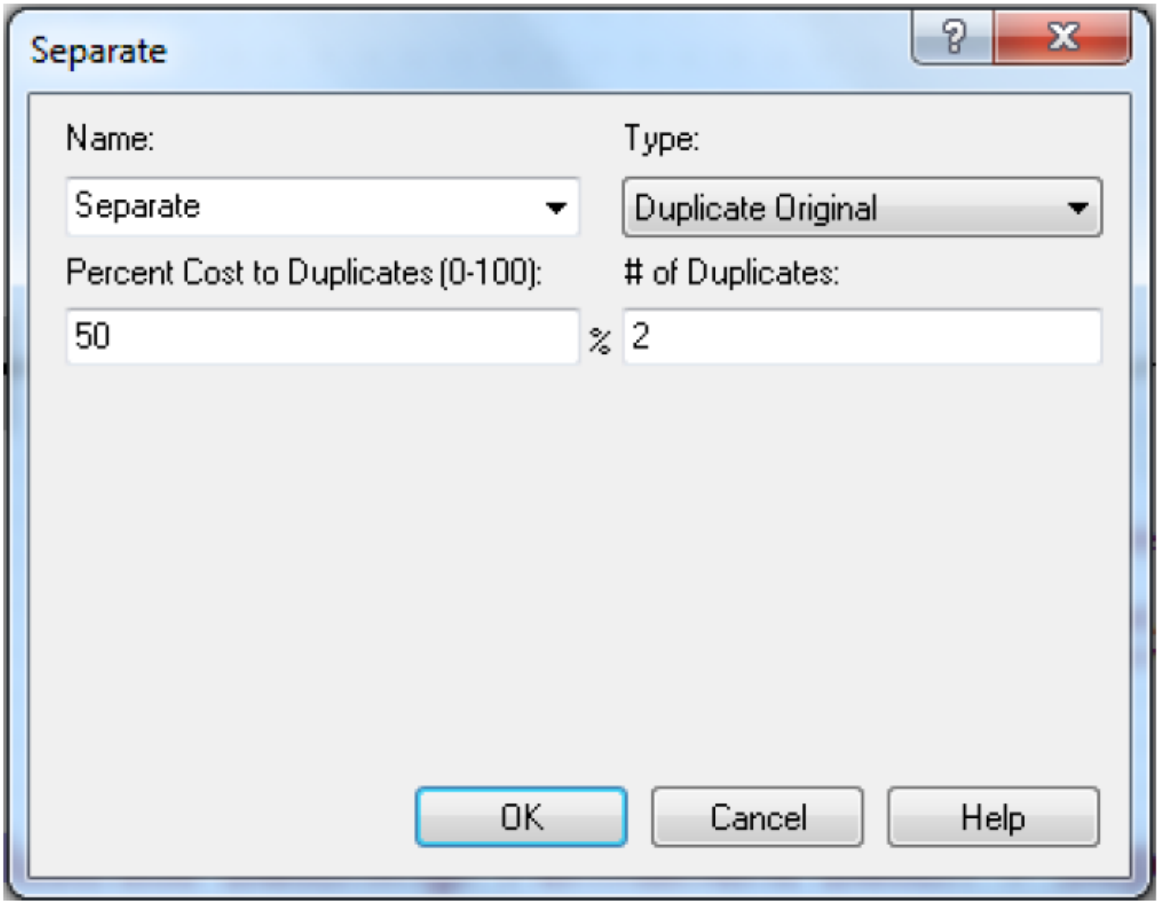
Correct!

- (●) True
- ( ) False

Question 19

1 / 1 pts

(Lesson 5.13: Batch, Separate, Record.) What is the following Separate module dialog box doing?



a. A customer enters the block and then emerges along with an exact clone of himself.

Correct!

b. A customer enters the block and then emerges along with two exact clones of himself.

c. Two customers enter the block and are then merged into one exiting customer.

d. Three customers enter the block and are then merged into one exiting customer.

(b).

Question 20

1 / 1 pts

(Lesson 5.14: Run Setup and Control.) Model a single-server queueing system (e.g., a barber shop) with first-in-first-out queueing priority. Let the interarrivals be i.i.d. exponential with a mean of 10 minutes, EXPO(10), and let the services be i.i.d. TRIA(5,8,11) with the units in minutes.

This is just a simple Create-Process-Dispose model, with the Process block only requiring that you Seize-Delay-Release the barber.

Run the system for 100 replications, each of length 1000 minutes. To handle the length/number of runs, go to Run > Setup > Replication Parameters and set “Number of Replications” = 100, “Replication Length” = 1000, and “Time Units” (immediately to the right of “Replication Length”) = “Minutes”. Moreover, make sure that the two “Initialize Between Replications” boxes are both checked.

100 reps can be slow. So, you will probably want to hit the “Fast-Forward” (double arrow) button to run all of those replications quickly. Or you can use the Run menu to run the thing in batch mode. In any case, the thing should just take a few seconds to execute.

When all of the reps are finally over, you’ll get the Crystal Reports output. Click on “Category Overview” and scroll through the 3 or so pages of output.

What is the % of time that the server is busy?

- a. ~8%
- b. ~20%
- c. ~50%

Correct!

- d. ~80%

(d). This follows since the traffic intensity = arrival rate/service rate = (1/10)/(1/8) = 0.8.

- e. ~100%

(d). This follows since the traffic intensity = arrival rate/service rate = (1/10)/(1/8) = 0.8.

Quiz Score: **19** out of 20