Printed T-shirts **(statement)**

Production orders arrive to a factory according to a Poisson distribution process with mean 1 t-shirt per hour. Two successful designs are printed in the factory: blue horizontal stripes and leopard spots, being the blue one the most popular accounting for 70 % of the orders. T-shirts are packed in 3 and 5-unit packages, 75 % and 25 % respectively. The production time of ONE shirt (of any design) is uniformly distributed within a range of 15-25 minutes. Two workers are responsible of this production. When an order arrives to the factory, type (blue stripes or leopard spots) and pack size (3 or 5) are determined. After being printed, t-shirts are sent for being packaged and boxed. Another worker does this later process. It takes between 8 and 10 minutes to make the box and print the postal address in it. Afterwards, the box waits for a final inspection by the same worker. The inspection time follows a triangular distribution with a minimum of 5 minutes, a most likely value of 10 minutes, and a maximum value of 15 minutes for the 3-unit package and 6, 12 and 16 minutes for the 5-unit package. Finally, the box is sent to the customer.

Determine:

1. Entities arriving to the system
2. Attributes associated to these entities
3. Resources used
4. Pseudocode with explanatory comments
5. Average total processing time (sine the order reception until final delivery) for each type of package

SOLUTION:
Elements of the simulation model:

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1 punto

ENTITIES (Tshirt/Order)
      myTypeShirt (1, 2) % type of shirt blue (1), leopard (2)
      myPackSize(3,5) % pack size

0.5 puntos
      myArrivalTime3 % Arrival Time of a package of size 3
      myArrivalTime5 % Arrival Time of a package of size 5

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1 punto

RESOURCE
ShirtMaker
      Fixed capacity = 2
Packager
      Fixed capacity= 1

PseudoCode of the simulation model

2 puntos
CREATE(Tshirt, Expo(1) ,1,infinite,Expo(1)) % creation of the shirts to be printed
ASSIGN(
      myTypeShirt = DISC(0.7,1,1,2) %save the shirt type into an attribute
      myPackSize =DISC(0.75,3, 1,4) %save the pack size into an attribute
)

0.5 puntos
DECIDE(2-way by Condition
      If myPackSize==3 then #1
      Else #2)
#1
ASSIGN (myArrivalTime3=TNOW % save the arrival time into an attribute)
#2
ASSIGN (myArrivalTime5=TNOW % save the arrival time into an attribute)

1 punto

PROCESS (SDR,ShirtMaker,1,U(15,25)) % use the ShirtMaker to make the shirts one a time.

En este punto, mucha gente creó los batches de 3 o 5:
Opcion 1: BATCH(myPackSize,byEntity, Last) %Grouping 3/5 tshirts. The last entity to be grouped keeps the value of the different attributes.
Opcion 2: BATCH(myPackSize,byAttribute(myTypeShirt),Last) %Grouping 3/5 tshirts by the attribute type of shirt. The last entity to be grouped keeps the value of the different attributes.

1 punto

PROCESS (SDR,Packager,1,U(8,10)) % use the Packager to make the box.

DECIDE(2-way by Condition
      If myPackSize==3 then #3
      Else #4)
#3
PROCESS (SDR,Packager,1,TRIAG(6,12,16)) % use the Packager to inspect. (**1 punto**)

RECORD(Time Interval,,myArrivalTime3,Record Total Time 3) (**0.5 punto**)
DISPOSE

#4
PROCESS (SDR,Packager,1,TRIAG(5,10,15)) % use the Packager to inspect. (**1 punto**)
RECORD(Time Interval,,myArrivalTime5,Record Total Time 5) (**0.5 punto**)
DISPOSE