

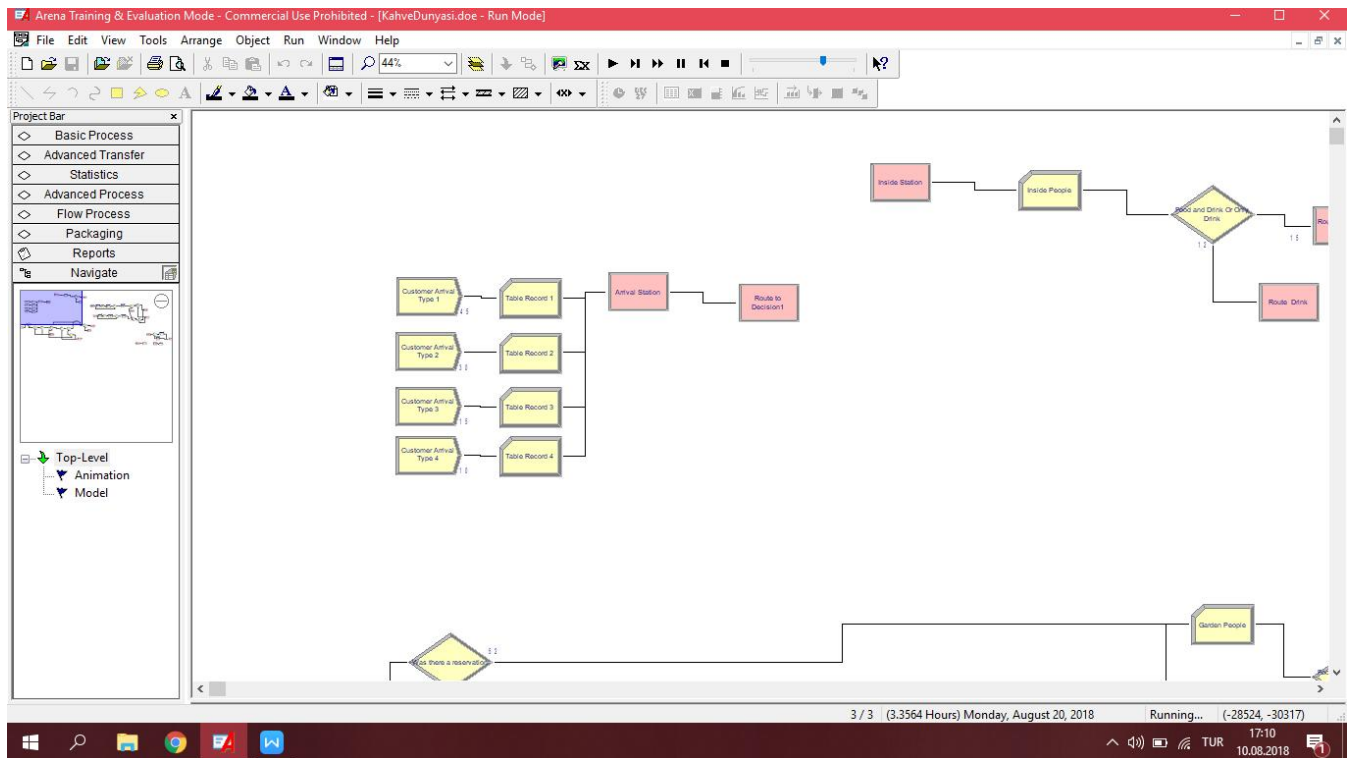


# **Design, Simulate and Analyze Kahve Dünyası Using Arena**

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**Gülşah Yılmaz  
Hale Şahin**

- 1- Summary: Efforts are being made to simulate and analyze the local cafeteria and create simulations using the Arena software. Arena logic is made to express complex conditions.



From here we arrived on arrival to different departures on different arrival lara. We decided by count method how many people the tables were. We have checked out the tables in this project have 6 outs in 4 in total which is 10 in total. We evaluated these total tables according to the likelihood of customers coming and going.

Here in our stations :

Arena Training & Evaluation Mode - Commercial Use Prohibited - [KahveDunyasi.doc]

File Edit View Tools Arrange Object Run Window Help

30%

Project Bar

- Basic Process
- Advanced Transfer
  - Move
  - Request
  - Transport
  - Station Data
  - Sequence
  - Conveyor
  - Segment
  - Transporter
  - Distance
  - Network
  - Network Link
  - Activity Area
  - Statistics
  - Advanced Process
  - Flow Process
  - Packaging
  - Reports
  - Navigate

Station Data - Advanced Transfer

	Symbol Number	Name	Associated Intersection	Parent Activity Area	Report Statistics
1		Food and Drink Station			<input checked="" type="checkbox"/>
2		Decision Station			<input checked="" type="checkbox"/>
3		Garden			<input checked="" type="checkbox"/>
4		Interior			<input checked="" type="checkbox"/>
5		Drink			<input checked="" type="checkbox"/>
6		Leave Customer Station			<input checked="" type="checkbox"/>
7		Exit Station			<input checked="" type="checkbox"/>
8		Cash			<input checked="" type="checkbox"/>
9		Arrival Station			<input checked="" type="checkbox"/>

Double-click here to add a new row.

For Help, press F1

(-23052, -28503)

TUR 17:27 10.08.2018

We checked our legends, did not we have full of our legs? If the tables are full or there is no room in the queue, the person exits. He never enters the café.

Was there a reservation  
If there are a reservation go to the food drink or just food.

Is the before 7 or after 22.00 -> if false -> lost customer

**Decide** ? X

Name:  Type:

If:

Value:

OK Cancel Help

Is customer came after 21.00 and are there queue less than 6 -> true -> if false -> lost customer ;

**Decide** ? X

Name:  Type:

If:

Value:

OK Cancel Help

Garden or inside ;

Decide

Name: Garden or Inside

Type: 2-way by Chance

Percent True (0-100): 65 %

OK Cancel Help

Is garden full ;

Decide

Name: Is Garden Full

Type: 2-way by Chance

Percent True (0-100): 60 %

OK Cancel Help

Inside or leave ;

**Decide** ? X

Name: Type:

Inside Or Leave 2-way by Chance

Percent True (0-100):

85 %

OK Cancel Help

Food and drink or just drink ;

**Decide** ? X

Name: Type:

Food and Drink Or Just Drink 2-way by Chance

Percent True (0-100):

50 %

OK Cancel Help



## Food and Drink Service Time;

**Process**

Name: **Food and Drink Service Time** Type: **Standard**

Logic

Action: **Seize Delay Release** Priority: **Medium(2)**

Resources:

**Set, Food and Drink Servers, 1, Random,**  
<End of list>

Add...  
Edit...  
Delete

---

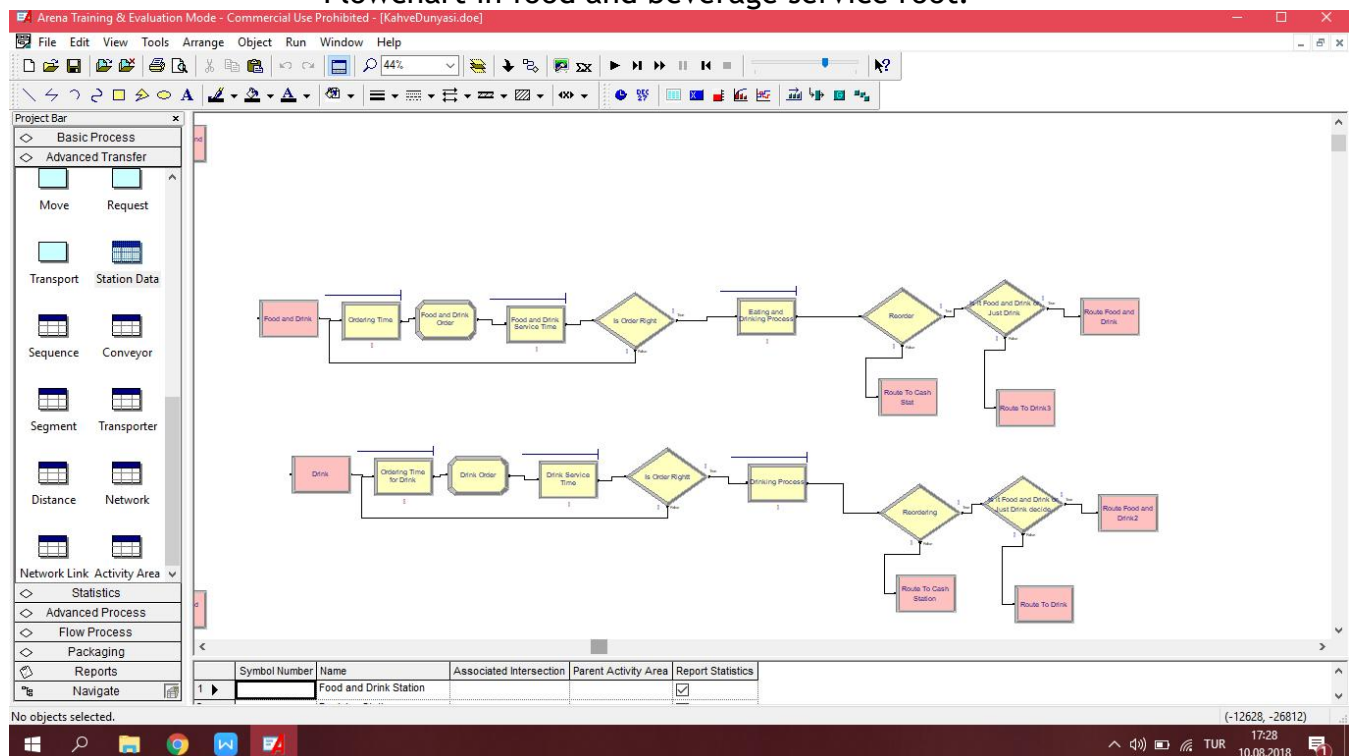
Delay Type: **Expression** Units: **Minutes** Allocation: **Value Added**

Expression: **WEIB( 11.7, 1.93 )**

☒ Report Statistics

OK Cancel Help

## Flowchart in food and beverage service root.



## Ordering Time

Process

?

×

Name:

Type:

Ordering Time

Standard

Logic

Action:

Priority:

Seize Delay Release

Medium(2)

Resources:

Set, Food and Drink Servers, 1, Random,  
<End of list>

Add...

Edit...

Delete

Delay Type:

Units:

Allocation:

Expression

Minutes

Value Added

Expression:

NORM( 5.4 , 1.73 )

☒ Report Statistics

OK

Cancel

Help

## DrinkServicesTime

Process

?

×

Name:

Drink Service Time

Type:

Standard

Logic

Action:

Seize Delay Release

Priority:

Medium(2)

Resources:

Set, Drink Servers, 1, Random,  
<End of list>

Add...

Edit...

Delete

Delay Type:

Expression

Units:

Minutes

Allocation:

Value Added

Expression:

UNIF(2.5 , 8.5)

☒ Report Statistics

OK

Cancel

Help

Both Food and Drink Order  
Is orderRight

Decide

Name:

Type:

Is Order Right

2-way by Chance

Percent True (0-100):

97

%

OK

Cancel

Help

Reorder

Decide

Name:

Type:

Reorder

2-way by Chance

Percent True (0-100):

80

%

OK

Cancel

Help

### Is it Food and Drink or Just Food

**Process** ? X

Name:  Type:

Logic

Action:  Priority:

Resources:

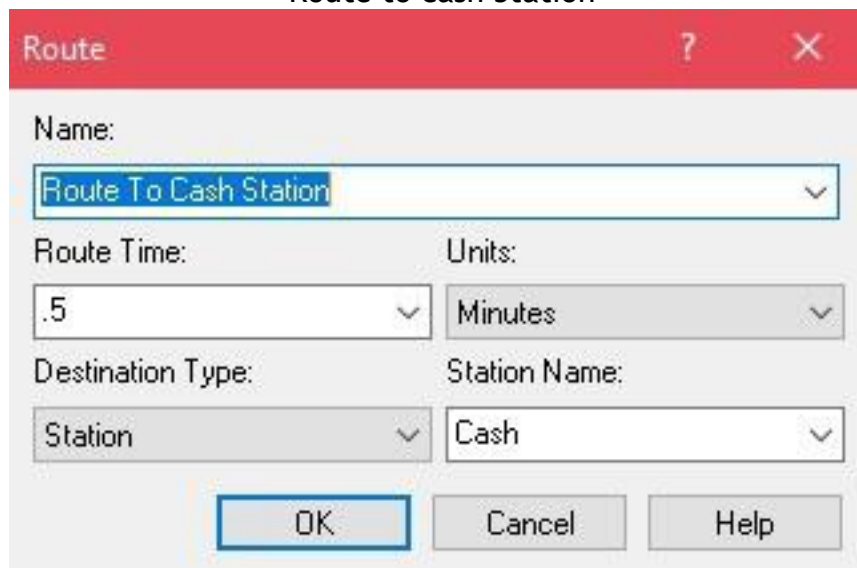
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Delay Type:  Units:  Allocation:

Minimum:  Value: (Most Likely):  Maximum:

☒ Report Statistics

### Route to cash Station



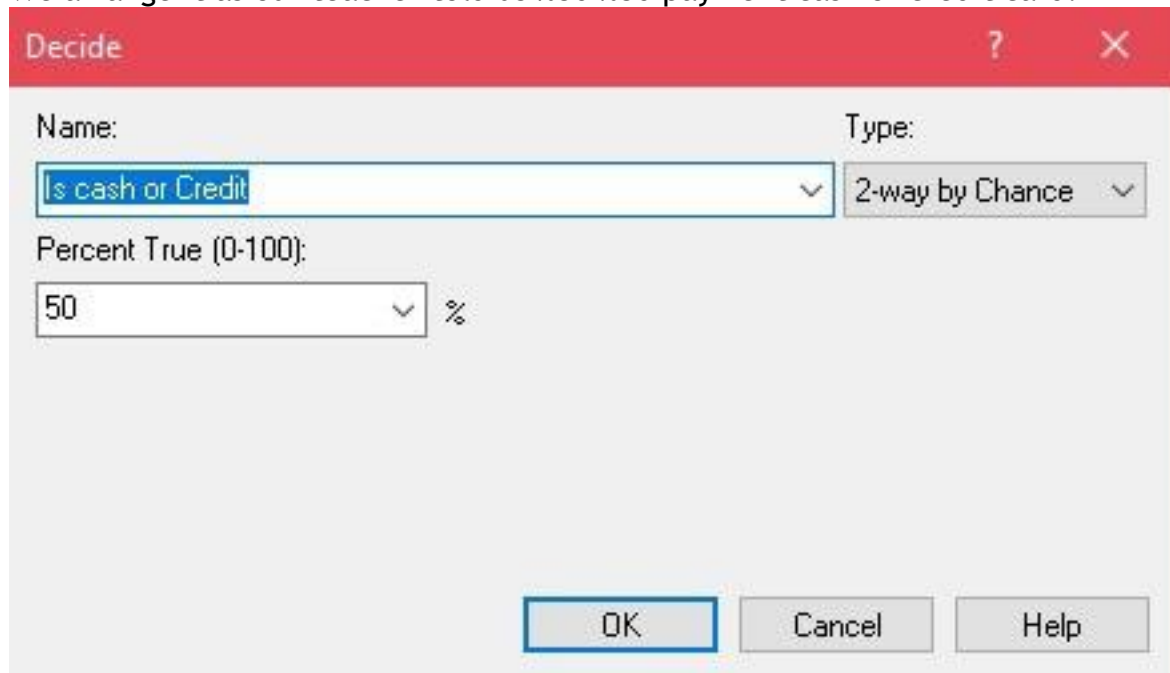
A dialog box titled "Route" with a red header bar containing a question mark and a close button. The dialog contains four dropdown menus: "Name" (set to "Route To Cash Station"), "Route Time" (set to ".5"), "Units" (set to "Minutes"), "Destination Type" (set to "Station"), and "Station Name" (set to "Cash"). At the bottom are three buttons: "OK", "Cancel", and "Help".

Name:	Route To Cash Station		
Route Time:	.5	Units:	Minutes
Destination Type:	Station	Station Name:	Cash

OK Cancel Help

### Payment Cash or Credit Card

We arrange it as our teacher told us %50 %50 payment cash or credit card.



A dialog box titled "Decide" with a red header bar containing a question mark and a close button. The dialog contains three fields: "Name" (set to "Is cash or Credit"), "Type" (set to "2-way by Chance"), and "Percent True (0-100):" (set to "50"). The "Percent True" field is followed by a percentage symbol. At the bottom are three buttons: "OK", "Cancel", and "Help".

Name:	Is cash or Credit	Type:	2-way by Chance
Percent True (0-100):	50 %		

OK Cancel Help

## DrinkingProces

Process

?

×

Name:

Type:

Drinking Process

Standard

Logic

Action:

Priority:

Seize Delay Release

Medium(2)

Resources:

Set, Drink Servers, 1, Random,  
<End of list>

Add...

Edit...

Delete

Delay Type:

Units:

Allocation:

Triangular

Minutes

Value Added

Minimum:

Value:(Most Likely):

Maximum:

14.5

22

37.5

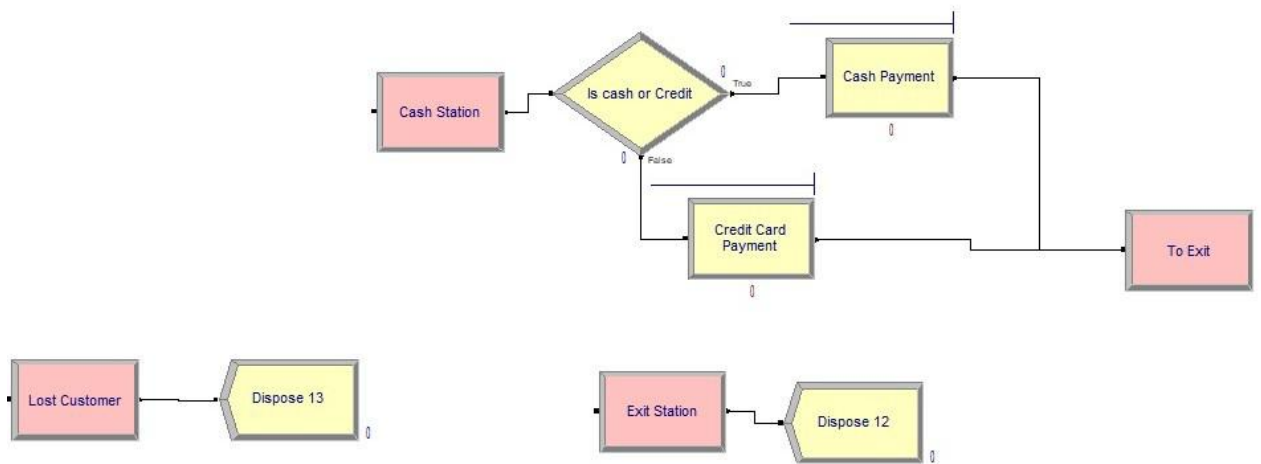
☒ Report Statistics

OK

Cancel

Help

### Cash Station :



### Is cash or credit

Decide

Name:

Is cash or Credit

Type:

2-way by Chance

Percent True (0-100):

50

%

OK

Cancel

Help



Cash Payment :

Process ? ×

Name:  Type:

Logic

Action:  Priority:

Resources:

Set, Cashier, 1, Random,	<input type="button" value="Add..."/>
<End of list>	

---

Delay Type:  Units:  Allocation:

Expression:

☒ Report Statistics

### Credit Card Payment:

**Process** [?] [X]

Name:  Type:

Logic

Action:  Priority:

Resources:

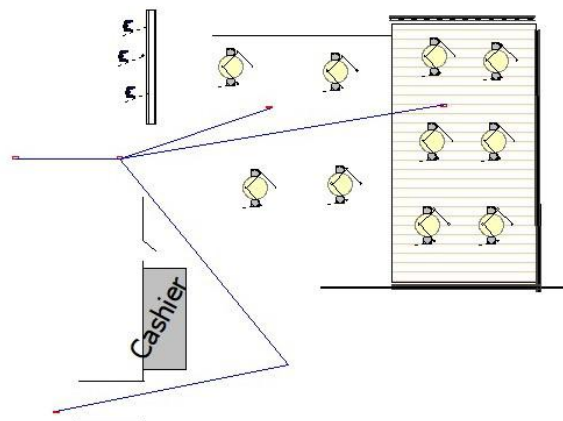
---

Delay Type:  Units:  Allocation:

Expression:

☒ Report Statistics

### Our GUI



## Customer Arrival Type :

**Create**

Name:  Entity Type:

Time Between Arrivals  
 Type:  Value:  Units:

Entities per Arrival:  Max Arrivals:  First Creation:

## Decide Function :

Arena Training & Evaluation Mode - Commercial Use Prohibited - [KahveDunyasi.doc]

File Edit View Tools Arrange Object Run Window Help

44%

Project Bar

Basic Process

Create Dispose

Process Decide

Batch Clone

Separate Assign

Adjustable Batch Record

Go to Label Label

Advanced Transfer

Statistics

Advanced Process

Flow Process

Packaging

Reports

Navigate

Decide - Basic Process

	Name	Type	Percent True	If	Value
1	Reorder	2-way by Chance	80	Entity Type	1
2	Is Garden Full	2-way by Chance	60	Expression	NQ(Garden Queue.Queue) < 6
3	Inside Or Leave	2-way by Chance	85	Entity Type	1
4	Food and Drink Or Just Drink	2-way by Chance	50	Expression	1
5	Queue less than 6	2-way by Condition	50	Expression	(NQ(Restaurant Queue.Queue) < 6)    (NC(TableCounter) < 10)
6	Garden or Inside	2-way by Chance	65	Expression	1
7	Is it after 21	2-way by Condition	50	Expression	(NQ(Restaurant Queue.Queue) == 0) && (TNOW < 21.00)
8	Is it before 7 am or after 23	2-way by Condition	50	Expression	(TNOW < 23.00)    (TNOW > 7.00)
9	Is cash or Credit	2-way by Chance	50	Entity Type	1
10	Is Order Right	2-way by Chance	97	Entity Type	1
11	Is it Food and Drink or Just Drink	2-way by Chance	50	Entity Type	1
12	Reordering	2-way by Chance	80	Entity Type	1
13	Is Order Rightt	2-way by Chance	97	Entity Type	1
14	Is it Food and Drink or Just Drink decide	2-way by Chance	50	Entity Type	1
15	Was there a reservation	2-way by Chance	50	Entity Type	1
16	Food and Drink Or Only Drink	2-way by Chance	50	Expression	1

For Help, press F1

(-10893, -27068)

TUR 17:28 10.08.2018

## ProcessFunction

Process - Basic Process												
	Name	Type	Action	Priority	Resources	Delay Type	Units	Allocation	Minimum	Value	Maximum	Expression
1	Food and Drink Service Time	Standard	Seize Delay Release	Medium(2)	1 rows	Expression	Minutes	Value Added	-2.285	22.88	54.925	WEIB( 11.7 , 1.93 )
2	Cash Payment	Standard	Seize Delay Release	Medium(2)	1 rows	Expression	Seconds	Value Added	12.445	34.223	65.223	UNIF(1.5 , 3.65)
3	Credit Card Payment	Standard	Seize Delay Release	Medium(2)	1 rows	Expression	Seconds	Value Added	12.445	34.223	65.223	BETA( 0.962 , 1.18)
4	Ordering Time	Standard	Seize Delay Release	Medium(2)	1 rows	Expression	Minutes	Value Added	5	1	1.5	NORM( 5.4 , 1.73 )
5	Drink Service Time	Standard	Seize Delay Release	Medium(2)	1 rows	Expression	Minutes	Value Added	-2.285	22.88	54.925	UNIF(2.5 , 8.5)
6	Ordering Time for Drink	Standard	Seize Delay Release	Medium(2)	1 rows	Expression	Minutes	Value Added	5	1	1.5	NORM( 5.4 , 1.73 )
7	Eating and Drinking Process	Standard	Seize Delay Release	Medium(2)	1 rows	Triangular	Minutes	Value Added	17.5	33.3	42.5	1
8	Drinking Process	Standard	Seize Delay Release	Medium(2)	1 rows	Triangular	Minutes	Value Added	14.5	22	37.5	1

## Entitiy :

Entity - Basic Process									
	Entity Type	Initial Picture	Holding Cost / Hour	Initial VA Cost	Initial NVA Cost	Initial Waiting Cost	Initial Tran Cost	Initial Other Cost	Report Statistics
1	Customer	Picture.Person	0.0	0.0	0.0	0.0	0.0	0.0	<input checked="" type="checkbox"/>
2	Waiter	Picture.Man	0.0	0.0	0.0	0.0	0.0	0.0	<input checked="" type="checkbox"/>

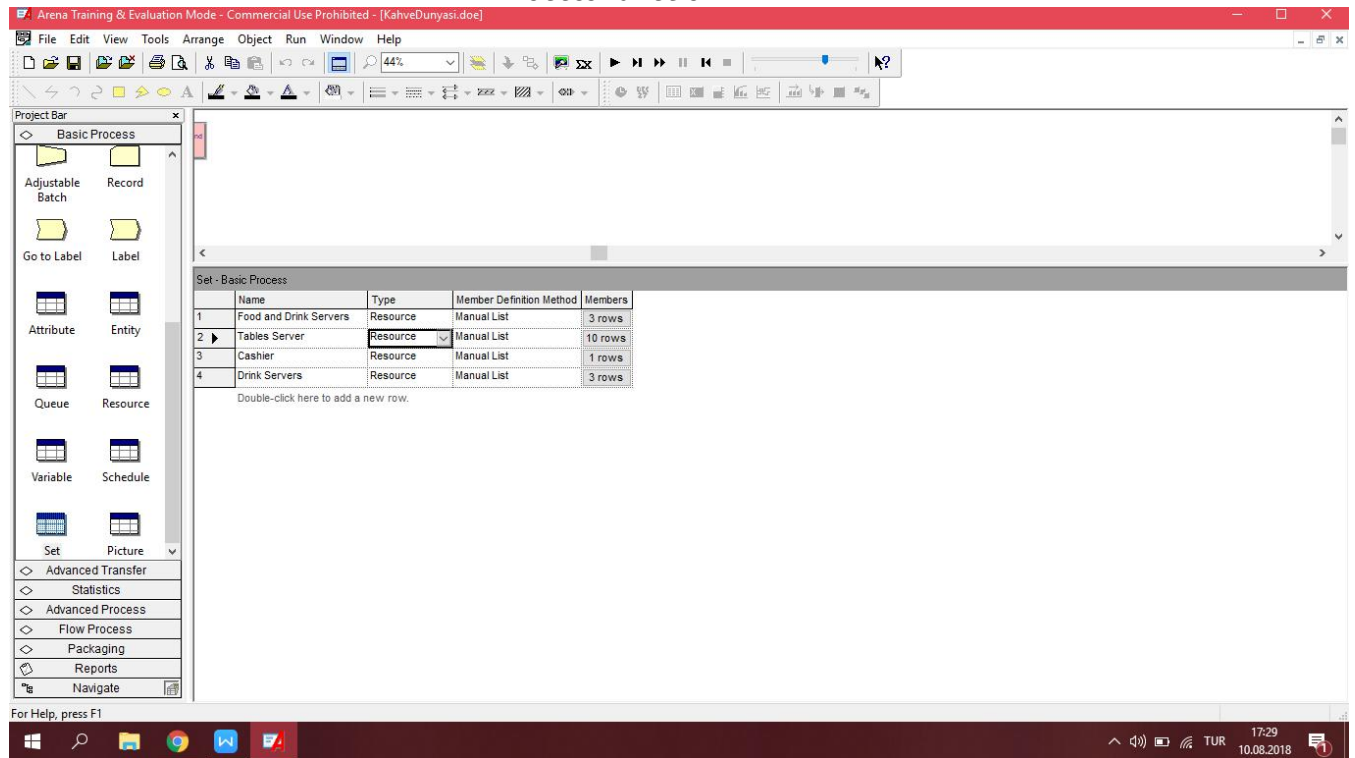
Entity - Basic Process									
	Entity Type	Initial Picture	Holding Cost / Hour	Initial VA Cost	Initial NVA Cost	Initial Waiting Cost	Initial Tran Cost	Initial Other Cost	Report Statistics
1	Customer	Picture.Person	0.0	0.0	0.0	0.0	0.0	0.0	<input checked="" type="checkbox"/>
2	Waiter	Picture.Man	0.0	0.0	0.0	0.0	0.0	0.0	<input checked="" type="checkbox"/>

## Our queue FIFO model

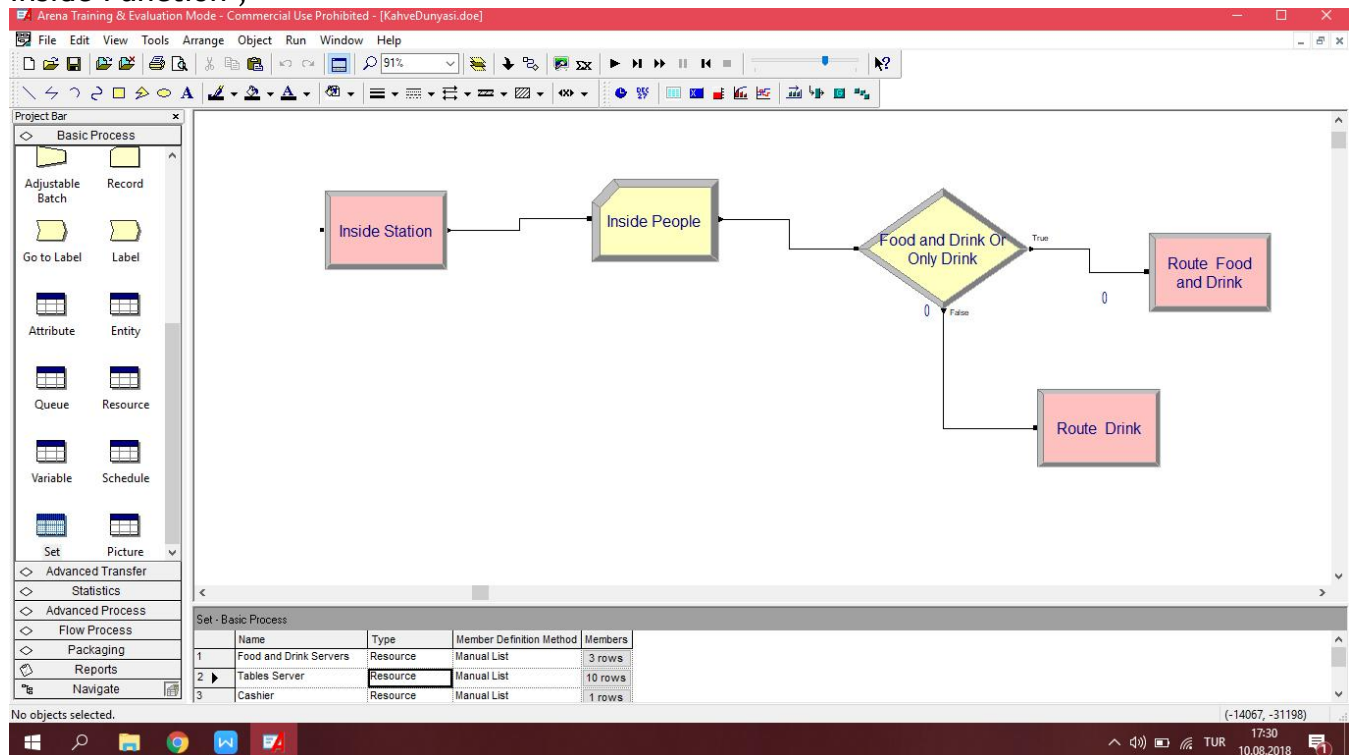
Queue - Basic Process				
	Name	Type	Shared	Report Statistics
1	Restaurant Queue.Queue	First In First Out	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2	Ordering Time.Queue	First In First Out	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3	Ordering Time for Drink.Queue	First In First Out	<input type="checkbox"/>	<input checked="" type="checkbox"/>
4	Just Drink Service Time.Queue	First In First Out	<input type="checkbox"/>	<input checked="" type="checkbox"/>
5	Garden Queue.Queue	First In First Out	<input type="checkbox"/>	<input checked="" type="checkbox"/>
6	Food and Drink Service Time.Queue	First In First Out	<input type="checkbox"/>	<input checked="" type="checkbox"/>
7	Food and Drink Process.Queue	First In First Out	<input type="checkbox"/>	<input checked="" type="checkbox"/>
8	Eating and Drinking Process.Queue	First In First Out	<input type="checkbox"/>	<input checked="" type="checkbox"/>
9	Drink Service Time.Queue	First In First Out	<input type="checkbox"/>	<input checked="" type="checkbox"/>
10	Drink Process.Queue	First In First Out	<input type="checkbox"/>	<input checked="" type="checkbox"/>
11	Credit Card Payment.Queue	First In First Out	<input type="checkbox"/>	<input checked="" type="checkbox"/>
12	Credit Card Check.Queue	First In First Out	<input type="checkbox"/>	<input checked="" type="checkbox"/>
13	Cash Payment.Queue	First In First Out	<input type="checkbox"/>	<input checked="" type="checkbox"/>
14	Cash Check Time.Queue	First In First Out	<input type="checkbox"/>	<input checked="" type="checkbox"/>

## Set :

## ProcessFunction



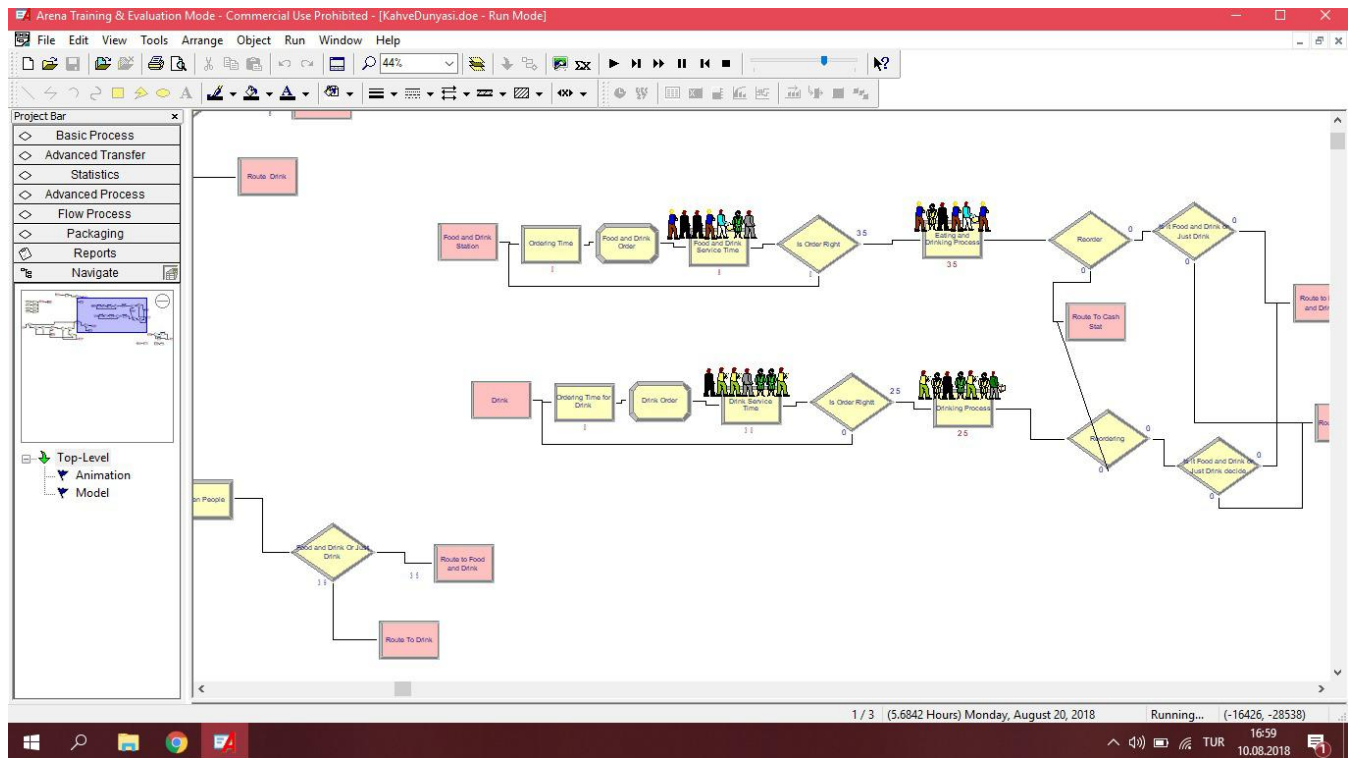
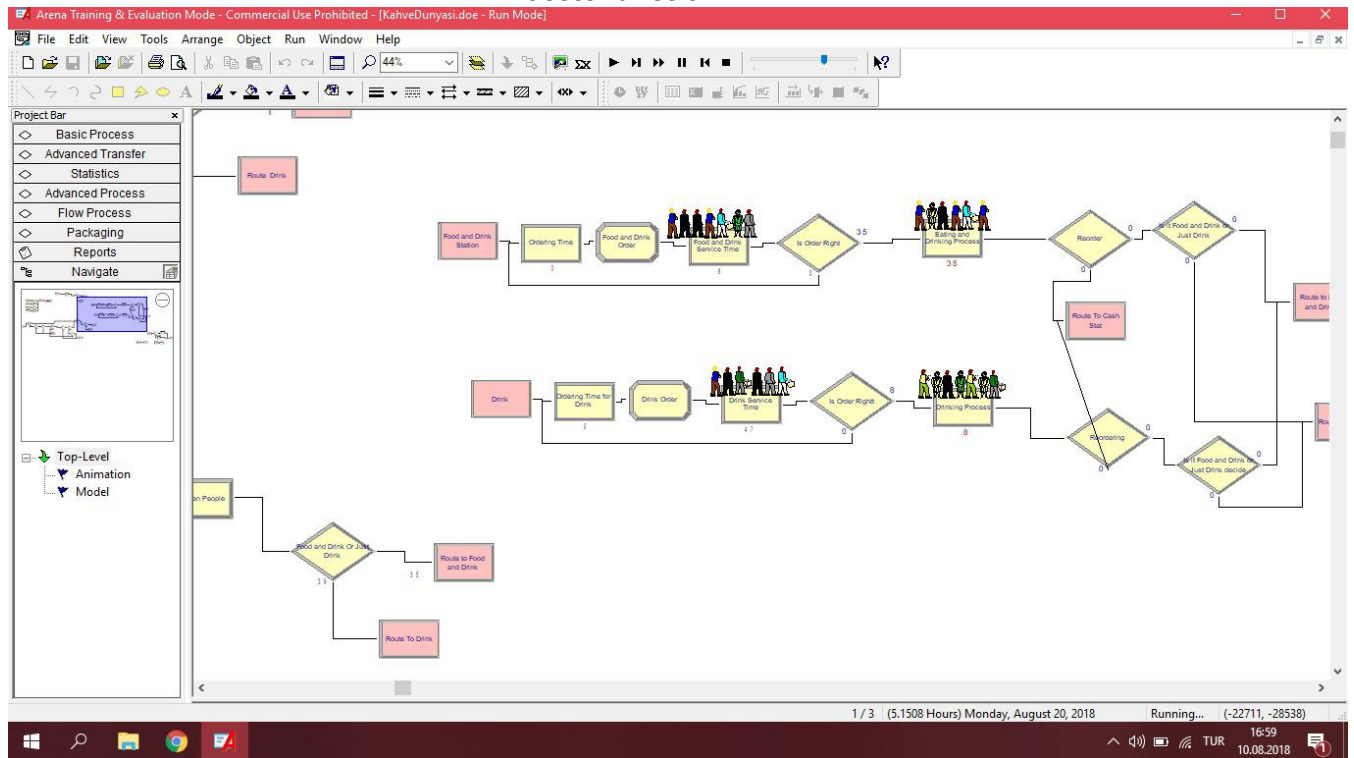
## Inside Function ;



These are photos from our running simulation;



# ProcessFunction



# ProcessFunction

