



Optimizing Customer Experience and Operational Efficiency at Z Beans Coffee Shop: A Quantitative Analysis Using JaamSim Simulation Modeling

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Welcome To Our Z Beans

The report highlights the origin story of Z Beans Coffee Shop, founded in 2016 by Shane Buerster, who traveled to Ecuador to find an alternative to gold mining and started the business to promote fair and direct trade of Ecuadorian coffee. Knowing the origin story of Z Beans Coffee Shop can help to build customer loyalty, differentiate the business from competitors, and provide context for its success.



PROBLEM DESCRIPTION

Z Beans Coffee Shop has experienced challenges managing customer flow and providing efficient service. The shop's limited staffing, with only one server, cashier, and prep person, has resulted in long wait times and customer frustration, negatively impacting the business's reputation and customer loyalty. Additionally, customer dwell time results in missed revenue opportunities and decreased customer satisfaction.

DATA COLLECTION & PREPARATION



SITE VISITS

DATA ANALYSIS

DATA
PREPARATION

STATISTICAL
ANALYSIS

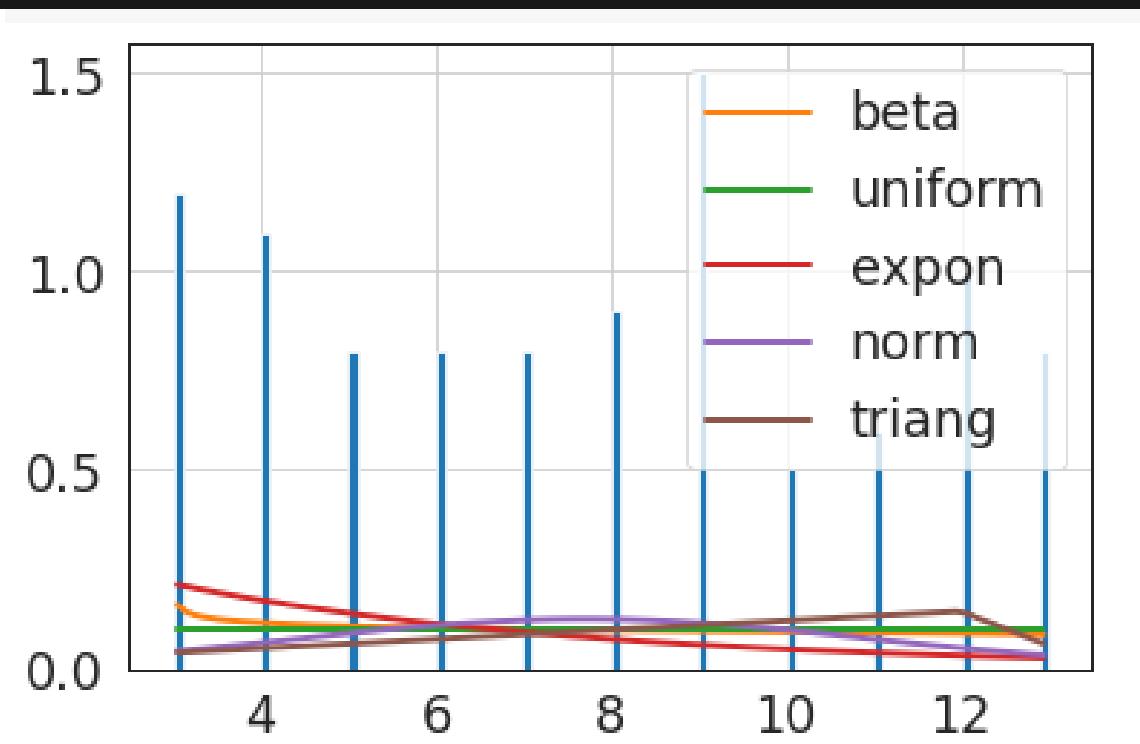
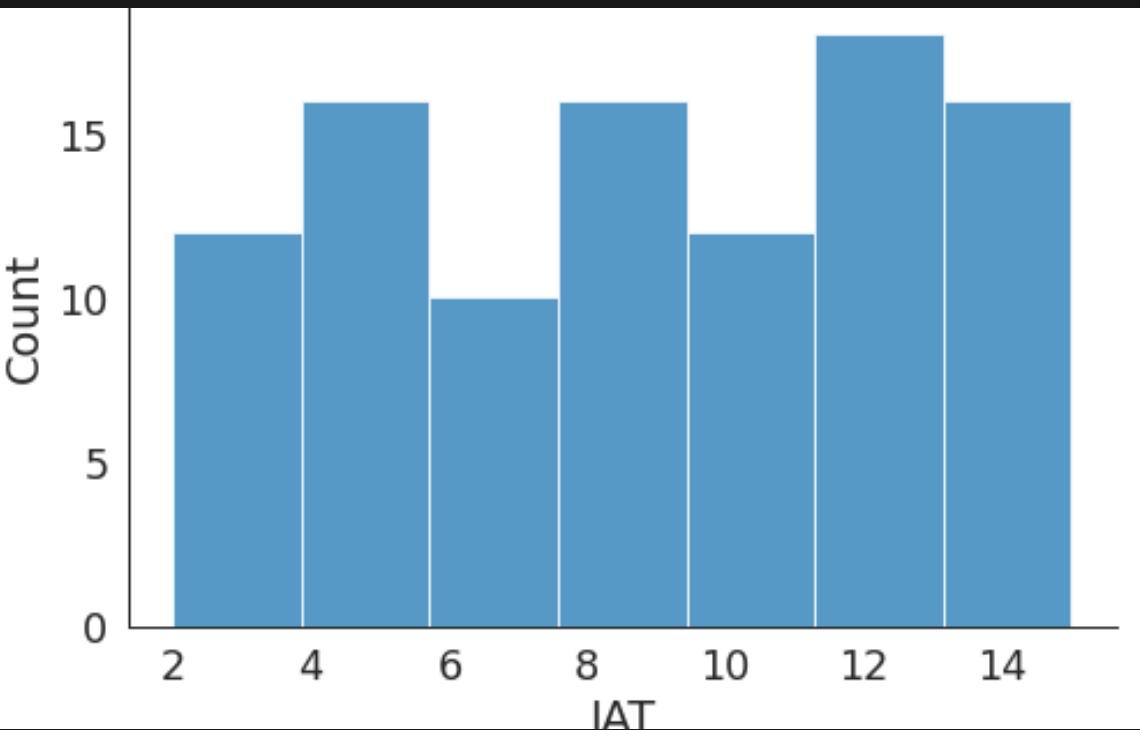


DATA COLLECTION & PREPARATION

Sensitivity analysis was conducted by collecting data on input variables such as throughput, interarrival time, waiting queues, and dwell time and analyzing their impact on the coffee shop's operations.

STATISTICAL ANALYSIS

- We performed statistical analysis using Python programming in order to determine which probability distribution that needs to be applied to the data.
- “Fitter distribution” was used to identify the probability distribution to be used to execute the stimulation.



Statistical Analysis - Assumptions

- Customer arrival follows an exponential distribution.
- Service time for orders follows a normal distribution.
- Order pick-up follows a uniform distribution.
- Customer dwell time follows a normal distribution.



Assumptions

We also made some assumptions in the process flow to simplify the problem.

- Customers are served on a first-come, first-served basis and join the queue immediately upon arrival.
- The coffee shop has limited tables, and customers who cannot find seating will use takeaway.
- Upon arrival, if the queue line is greater than six, then customers exit.

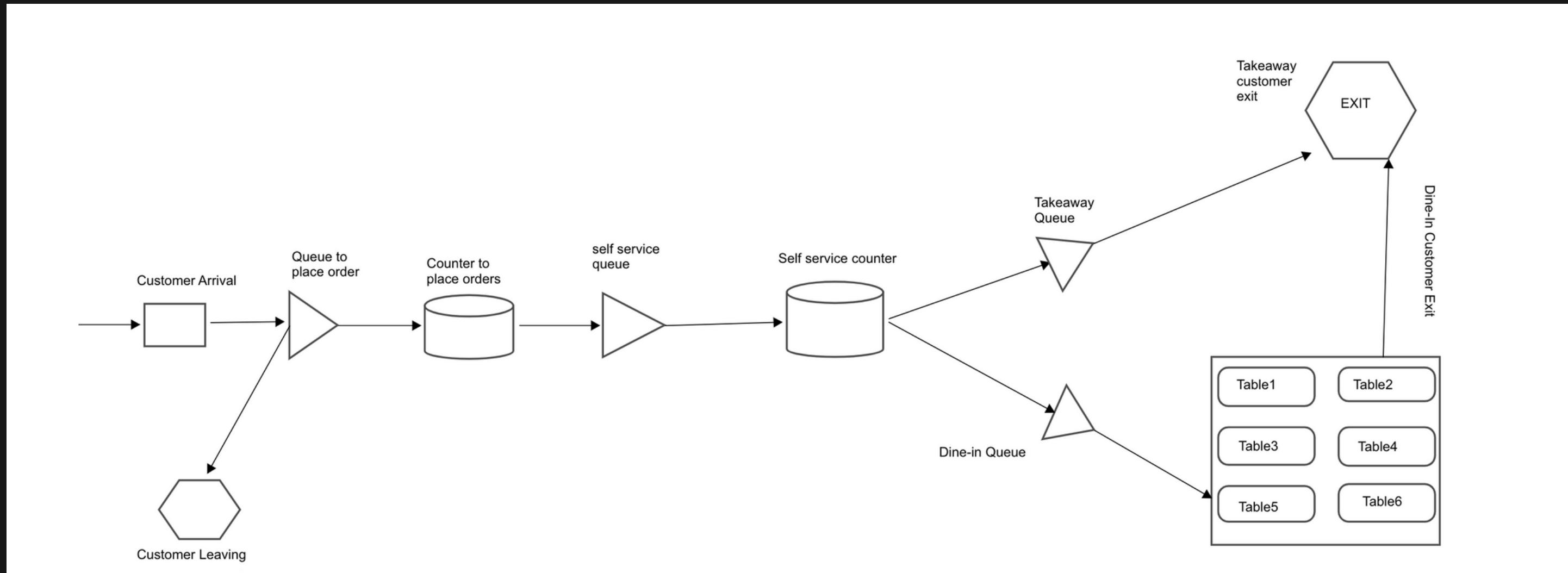


LIMITATIONS

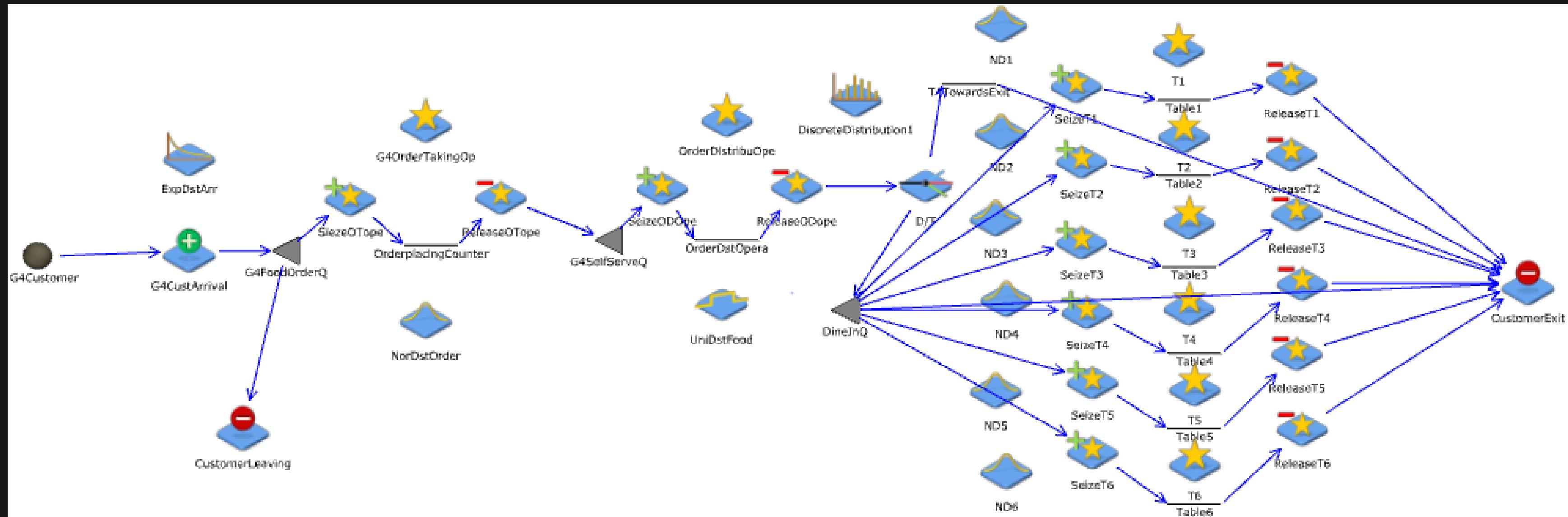
- Our sample size is based only on a few business days.
- The sample observed is on a weekday which might differ from the weekend rush.
- The model is unable to determine the service time for orders delivered by online platforms.
- The model is subject to a few limitations



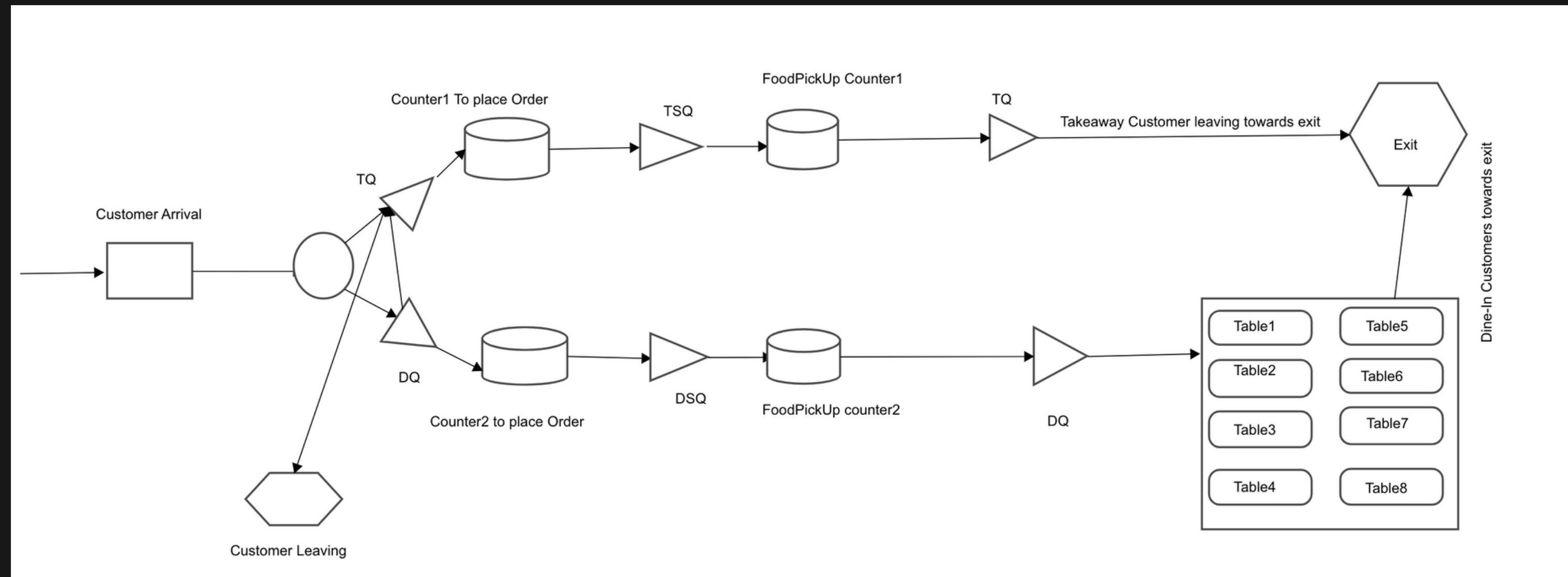
PROCESS FLOW - CURRENT



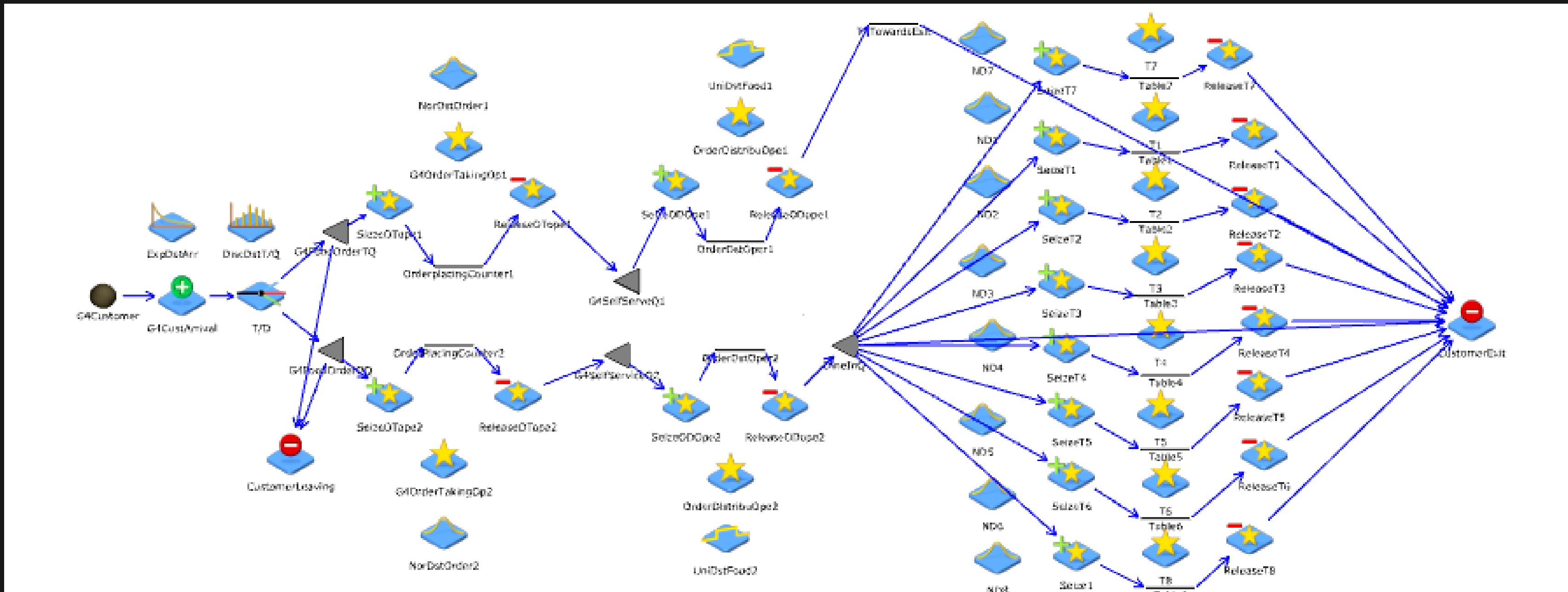
JAAMSIM PROCESS MODEL - CURRENT



PROCESS FLOW - IMPROVISED



JAAMSIM PROCESS MODEL - IMPROVISED



SIMULATION RUN & RESULTS

Scenario	Replication	[CustomerLeaving].Number	[G4OrderTakingOp].Units	[OrderDistribuOpe].Units	[TATowardsExit].Number	[DineInQ].NumberProcess	[CustomerExit].NumberProcessed	
1	1	64		1	0.93280392	20	47	65
1	2	79		1	0.90479189	28	37	62
1	3	70		1	0.90108929	19	45	62
1	4	53	0.99586692		0.82230156	23	45	62
1	5	82		1	0.83584329	19	44	60
1	6	57	0.99389364		0.90930231	18	46	60
1	7	69	0.99643483		0.93452358	24	43	64
1	8	70	0.98738833		0.8334025	19	40	59
1	9	74		1	0.91598043	21	39	57
1	10	74		1	0.91678142	28	37	64
1		69	6.5106492	0.99735837	0.00298143	0.89068202	0.03075336	21.9 2.66472604 42.3 2.67749636 62 1.79223754

Number of Workers	Pay/hr	Total hours/day	Avg Purchase/customer	Total cost	Revenue	Profit
2	12	9	8	216	492	276

Replication	[CustomerLeaving].Number	[G4OrderTakingOp1].Unit	[G4OrderTakingOp2].Unit	[OrderDistribuOpe1].Units	[OrderDistribuOpe2].Units	[TATowardsExit].Number	[DineInQ].NumberProcess	[CustomerExit].NumberProcesses	
1	0	0.35433497		0	0.32161827	0	42	96	138
2	0	0.45938816		0	0.36049912	0	49	100	149
3	0	0.4543408		0	0.42180056	0	57	84	141
4	0	0.35262444		0	0.25079336	0	39	88	127
5	0	0.5231841		0	0.40966942	0	59	91	150
6	0	0.31230012		0	0.26307903	0	35	95	130
7	0	0.46217893		0	0.37534842	0	52	94	146
8	0	0.48401457		0	0.41452547	0	56	81	137
9	0	0.48600858		0	0.4391846	0	55	87	142
10	0	0.47794057		0	0.4075622	0	54	91	145
	0	0.43663152	0.05038469	0	0.36640804	0.04793084	0	49.8 5.94465765 90.7 4.15795281 141	5.47104811

Number of Workers	Pay/hr	Total hours/day	Avg Purchase/customer	Total cost	Revenue	Profit
4	12	9	8	432	1124	692

FINDINGS & CONCLUSION



Staffing levels

Menu items

Customer satisfaction

Improve Customer Service

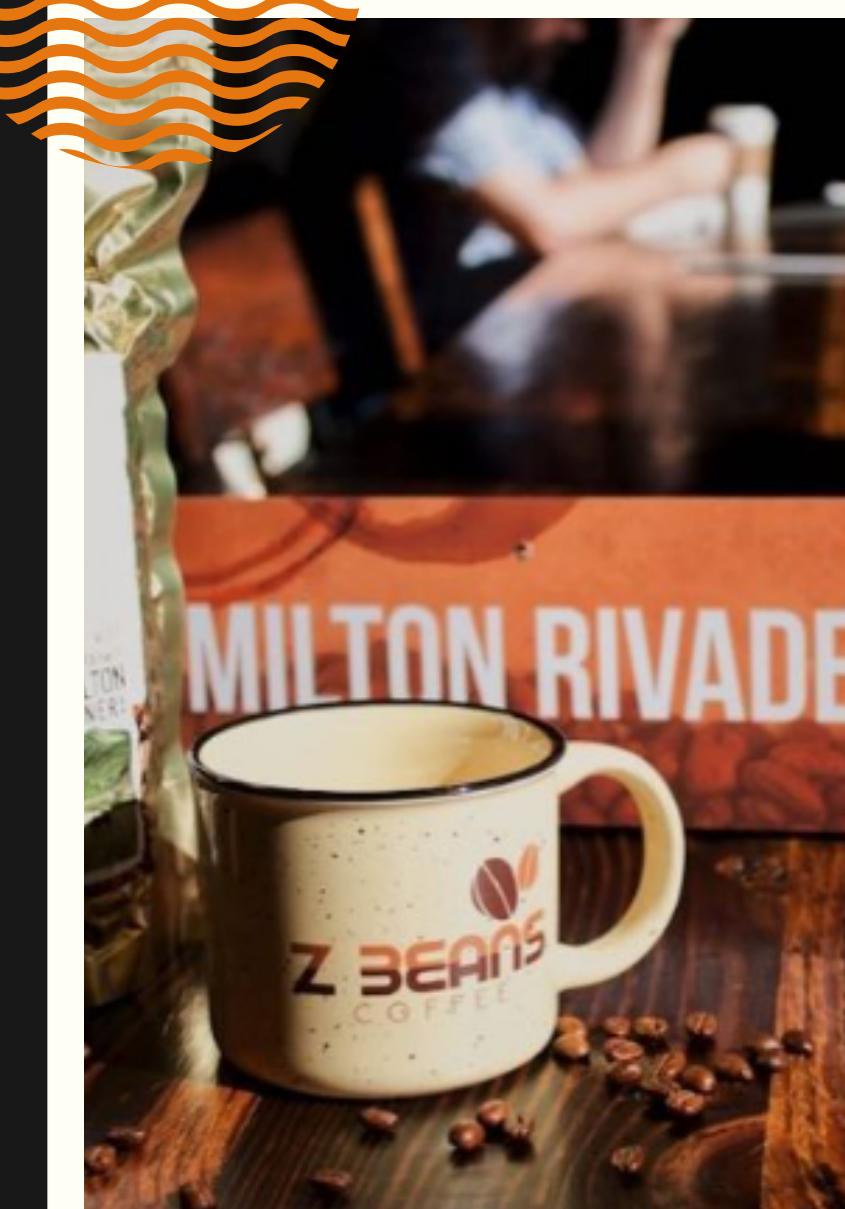
Recommendations

Dedicated parking for takeout orders.

- Posting Menu Outside Coffee Shop
- Increasing personnel
- Upon arrival, if the queue line is greater than six, then customers exit thus increasing the server count helps from losing potential customers.
- Discourage patrons from occupying tables without making a purchase.
- Publicize the conference room availability.



IMPROVEMENTS SUGGESTED



Q&A





Thank You

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COFFEE

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