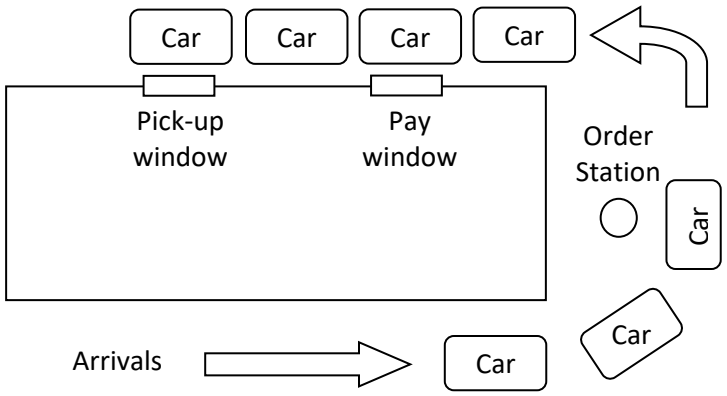
CS 4830/6830
Project 2

For your second programming assignment, you will study how to model and simulate input distributions. Since you already have experience simulating a simple queuing system, we will use the McDonald's Restaurant across the street from Wright State as our source of data. The restaurant has a single order station, a payment window, and a pick-up window.

This restaurant has the following layout:



Your tasks are to:

Construct a model of the current operation of the restaurant. You need to model the arrival pattern to the order station, the time it takes to place an order, the time it takes to pay, and finally the time to pick-up food and exit.

To accomplish this task, you will need to collect data by observing the real system. The best strategy is to collect data for a short time interval (~20 minutes) at some time between 11:30-12:30 and/or 5:30 PM - 6:30 PM Monday-Friday. You should measure the time between successive arrivals of customers to the order station. The second thing you need to measure is the time it takes to pay for the food. Finally, determine the time it takes to pick-up the food.

Once you have collected the data, select distributions to characterize the arrival, order, payment, and pick-up pattern of this system. Make sure to justify your choice of distribution by conducting goodness of fit tests of the distributions to the real data.

Finally, test your model to determine if it is a behaviorally valid representation of the McDonald's restaurant during a busy period of operation by comparing the output of your simulation to the real data.

It is difficult for one person to accurately measure data so for this project you may work as teams of two. Each team is responsible for collecting at least one sample of data for each of the components of the system (arrival, order, payment, and pickup). A copy of the data must be delivered (placed in the dropbox) to the instructor on the data listed in the dropbox. All data sets will be made available on Pilot.

Data sets should include the following:

Team member names
Date data was collected
Time data was collected (start - end)
Station (arrival, order, payment, pickup)

For arrival data:

11:48:20
11:48:30
11:48:55
11:49:00
etc.

For the order, payment, pickup stations:

Arrival	Depart
11:49:20	11:50:35
11:49:50	12:00:45
12:02:00	12:03:35
12:04:52	12:06:27

etc.

Each team should provide 4 data files (~20 minutes). These files should be labeled as follows:

Arrival_LastNames.csv
Order_LastNames.csv
Payment_LastNames.csv
Pickup_LastNames.csv

On the assignment due date, each team should submit a report discussing the results of their simulation. The report should focus on the analysis of the measured data, choice of distributions/parameters, and validation tests. Also, discuss your confidence in your recommendations using proper statistical techniques.