

Workshop - 5

Workshop Value: 10 marks (4.375% of your final grade)

Please review the following documents:

1. Workshop [Grading Policies](#)
2. Workshop [Submission Procedures](#)
3. Workshop [Group Breakdown](#)

Workshop Overview

The objective of this activity is to emphasize how much easier it is to provide solutions to larger problems by first isolating and focusing on smaller discrete parts of the problem individually and then piece those solutions together at the end to provide an overall solution to the larger problem. This approach will provide a modular solution where each smaller part works independently from other parts and performs only a very specific task. Each “part” or scenario detailed in the next section guides you on this journey by isolating one specific smaller part of the problem. Incrementally, with each scenario, a new smaller problem will be solved and by the end of 6th scenario, an overall solution will have been developed.

Workshop Details

A La Carte Entertainment is a place where people can see stage productions (theatrical) or musicals. Each type of production has a different ticket cost, and each production can be seen during the day (Matinée) or in the evening. The time of day the production is run influences the ticket cost. To gain access to the venue, a cover charge is applied. Discounts are offered based on the number of people in a group. As optional services, A La Carte Entertainment also offers a small-scale snack bar and valet parking. An **online mobile application** system is needed to track the costs generated by each patron and provide an overall itemized receipt of costs incurred for the time spent at A La Carte Entertainment. Use the pricelist described below later in this document to extract the possible options for each part of the system.

The online mobile application system should implement a pre-ordering feature where most of the costs can be predetermined prior to arriving to the complex. To secure the reservation, a deposit of \$50 will be required and a QR code is generated to uniquely identify the order.

As you go through the computational thinking approach to problem solving this workshop, keep in mind the following:

- **Data Structure definition** something that will track all required information (hint: Reverse engineer what you need to display in a detailed receipt)
- **Create a variable** that is the data type of the data structure defined above! This will be used to "send" and "update" as it is **passed** to other sub-processes (functions)
- **Call sub-processes** (functions) in a logical sequence as it should occur (these will be the 6 main parts to the workshop!)

A LA CARTE ENTERTAINMENT – PRICELIST

Musical Feature Ticket Pricing

Matinée (12pm-4pm) ----- \$70.00 / person
 Evening (6pm-9pm) ----- \$150.00 / person

Theatre Feature Ticket Pricing

Matinée (12pm-4pm) ----- \$55.00 / person
 Evening (6pm-9pm) ----- \$115.00 / person

Valet Parking (Tipping Optional)

Matinée – Standard \$10.00
 Matinée – VIP \$15.00
 Evening – Standard \$20.00
 Evening – VIP \$30.00

Discounts * (Applies only to the total ticket cost)

2 People (Disc) ----- 5%
 3 People (Disc) ----- 15%
 4 People (Disc) ----- 20%
 5+ People (Disc) ----- 30%

Admission Cover Charge

Per child (<18) ----- \$0.75
 Per Adult (18+) ----- \$4.00
 Per Senior (65+) ----- \$1.50

Snack Stand

Non-Alcoholic Beverage ----- \$2.25
 Alcoholic Beverage ----- \$7.50
 Misc. Candy Item ----- \$1.75

Work Breakdown

Part-1 (Cover Charges)

- A) Using what you know about the **cover charges**, define the necessary process (using **pseudo code**) to calculate the cover charges for an individual or group (more than one person).
- Hint: What inputs do you need? How will the calculated values be stored? How will other processes outside of this specific task access/use this calculated value(s)?
- B) Test your logic using the following scenarios (create your own to thoroughly test all possibilities):
1. Three seniors, one adult, and two children enter the venue paying the necessary cover charges.
 2. One adult enters the venue paying the necessary cover charge.

Part-2 (Ticket Charges)

- A) Using what you know about the **musical/theatre ticket costs** based on **matinee and evening times**, define the necessary process to calculate the ticket costs for an individual or group (more than one person).
- Hint: What inputs do you need? How will the calculated values be stored? How will other processes outside of this specific task access/use this calculated value(s)?
- B) Test your logic using the following scenarios (create your own to thoroughly test all possibilities):

1. One senior, two adults, and one child go to the A La Carte venue at 8:00 PM to see the musical “Trump Squeaks”. Using your flowchart determine how much the ticket charges cost.
2. One senior, two adults, and one child go to the A La Carte venue at 3:00 PM to see the musical “Doug Ford Barks”. Using your flowchart determine how much the ticket charges cost.
3. One senior, two adults, and one child go to the A La Carte venue at 8:00 PM to see the theatre production of “Saw 1 – Where it Began”. Using your flowchart determine how much the ticket charges cost.
4. One senior, two adults, and one child go to the A La Carte venue at 2:00 PM to see the theatre production of “Jaws 1 – Swim with Me”. Using your flowchart determine how much the ticket charges cost.

Part-3 (Discounts)

- A) Using what you know about the available **discounts**, define the necessary process to calculate the discount (if applicable) for an individual or group (more than one person).
- Hint: What inputs do you need? How will the calculated values be stored? How will other processes outside of this specific task access/use this calculated value(s)?
- B) Test your logic using the following scenarios (create your own to thoroughly test all possibilities):
1. One senior goes to the A La Carte venue at 8:00 PM to see the musical “The Walking Dead”. Using your flowchart determine the discount.
 2. One senior, and two adults go to the A La Carte venue at 3:00 PM to see the theatre production of “Daenarys Rides Dragons”. Using your flowchart determine the discount.
 3. Two adults, and five children go to the A La Carte venue at 8:00 PM to see the musical of “APS145 Puts Logic to Music!” Using your flowchart determine the discount.

Part-4 (Snack Charges)

- A) Using what you know about the snack costs, define the necessary process to calculate the costs for snack purchases at the snack stand.
- Hint: What inputs do you need? How will the calculated values be stored? How will other processes outside of this specific task access/use this calculated value(s)?
- B) Test your logic using the following scenarios (create your own to thoroughly test all possibilities):
1. Purchase of no snacks.
 2. Purchase of 4 soft-drinks (Coke, Pepsi, Ginger Ale and Fruitopia). Using your flowchart determine the cost.
 3. Purchase of 2 soft-drinks, 2 beers, and 2 wines. Using your flowchart determine the cost.
 4. Purchase of 1 wine and 4 chocolate bars

Part-5 (Valet Parking Charges)

- A) Using what you know about valet services, define the process for calculating the valet charges.
- Hint: What inputs do you need? How will the calculated values be stored? How will other processes outside of this specific task access/use this calculated value(s)?
- B) Test your logic using the following scenarios (create your own to thoroughly test all possibilities):
1. Standard tier valet service during the matinee timeframe (A: with a \$4.75 tip, B: Without a tip).
 2. Standard tier valet service during the evening timeframe (A: with a \$4.00 tip, B: Without a tip).
 3. VIP tier valet service during the matinee timeframe (A: with a \$2.50 tip, B: Without a tip).
 4. VIP tier valet service during the evening timeframe (A: with a \$3.00 tip, B: Without a tip).

Part-6 (Display Mobile Receipt: Itemized Listing of All Charges)

- A) Using what you know about all the possible chargeable services, define the process for displaying the final receipt of costs (taxes are optional if you want to include this).
- Hint: What inputs do you need? How will the calculated values be stored? How will other processes outside of this specific task access/use this calculated value(s)?
 - Note: This is the final smaller problem. Putting everything together at this point will give you the full solution!
- B) Test your logic using the following scenarios (create your own to thoroughly test all possibilities):

Test	Cover Charges	Ticket Charges	Snack Charges	Valet Charges	Discounts Applied
1	YES/SHOW	YES/SHOW	-	-	-
2	YES/SHOW	YES/SHOW	YES/SHOW	-	YES/SHOW
3	YES/SHOW	YES/SHOW	-	YES/SHOW	-
4	YES/SHOW	YES/SHOW	YES/SHOW	YES/SHOW	YES/SHOW

Part-7 (Final Solution Test)

- A) Define a process that uses (references) the pre-defined sub-processes from all the parts above, to assemble the final solution. This acts as a "main" which should be a simple sequence of sub-process calls.
- Note**: The pseudo code and flowchart will be simplified as it can refer to sub-processes as a single process (ex: flowchart rectangular symbol) since those sub-processes (tasks) are already independently defined (review the "Main Process" below).
- B) Use the following test case scenario and apply it against your flowchart process to calculate the total cost:

1. One senior, two adults, and one child go to see the theatre production of “Chewbacca Chew’s the Furniture” at 9:00 PM. They opt for the VIP valet treatment (tipping \$7.50) and at intermission, indulge themselves with three wines, four bags of chips, and three Sprite soft drinks. What was the total cost?
2. Two adults go to see the musical of “Yoda Sings” at 2:00 PM. They don’t use the valet, but at intermission, indulge themselves with two wines and two bags of popcorn. What was the total cost?

Consider This Main Process

1. Customer PRE-ORDERS
 - Order is created (email information is required)
 - Number of people attending (by age group)
 - Cover charges applied
 - Production (Theatrical or Musical)
 - Time of production (matinee or evening)
 - Optional valet services (standard or VIP)
 - Determine discounts (if applicable)
 - \$50 deposit is charged to secure the ticket reservation
 - QR code is created that will be scanned to authenticate entrance upon arrival
2. While On-Site (example: during intermission)
 - Optionally, snacks can be purchased and tracked by the mobile application (review the snacks costing chart for details)
 - The snack stand vendor will need to scan the patron's mobile order QR code (created earlier) to link the purchases to the customer's order (acts like a "tab" that will be paid later)
3. The production is over and it's time to leave...
 - If valet parking services were used, the option to provide a tip should be presented at this point
 - The mobile application should display a full itemized receipt consisting of only the products/services associated to the customer's order.
 - Full payment must be made (don't forget \$50 deposit has already been charged) before being permitted to leave the building
 - After the payment is processed successfully, the A La Carte Entertainment Complex representative will scan the customer's mobile QR code to confirm payment and permit the customer to leave.

[Logic 1] Logic for Parts 5 & 6 (Valet Parking and Displaying of Detailed Receipt)

[Logic 2] Logic for Parts 1 & 2 (Cover Charges and Ticket Charges)

[Logic 3] Logic for Parts 3 & 4 (Applying Discounts and Snack Charges)

Group Solution

Refine all the sub-processes (defined parts from earlier) and create a main process (Part 7) that uses modularity by calling the sub-processes as required to implement all the functionality of the system.

Your Task

Individual Logic Assignment

1. Determine your individual assigned logic part based on your member# (see **Group Breakdown** link at the beginning of this document)
2. Where applicable, apply the core components of the **computational thinking** approach to problem solving to help you synthesize a solution
3. Submit your individual assigned part to your professor (see **Submission Procedures** link at the beginning of this document)

Group Solution

1. In the week the workshop is scheduled, you will be working in your assigned sub-group. See **Group Breakdown** link at the beginning of this document for details on how the sub-groups are determined.
2. Please review what is expected as described in the **Grading Policies** link at the beginning of this document.
3. Submit your group solution to your professor (if you are handing in physical paper answers, follow the directions as set by your professor, otherwise, refer to the **Submission Procedures** link at the beginning of this document)

Presentation

Decide among yourselves which member among you in the sub-group will be doing a presentation. Priority should be given to those who have not yet done one. Refer to the **Grading Policies**, and **Submission Procedures** links for details on deadlines, expectations and how to submit your work.