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***MODULE: CMPG 121***

***PROJECT NAME: CREATIVE  
PROJECT – LOGICAL DESIGN PHASE***

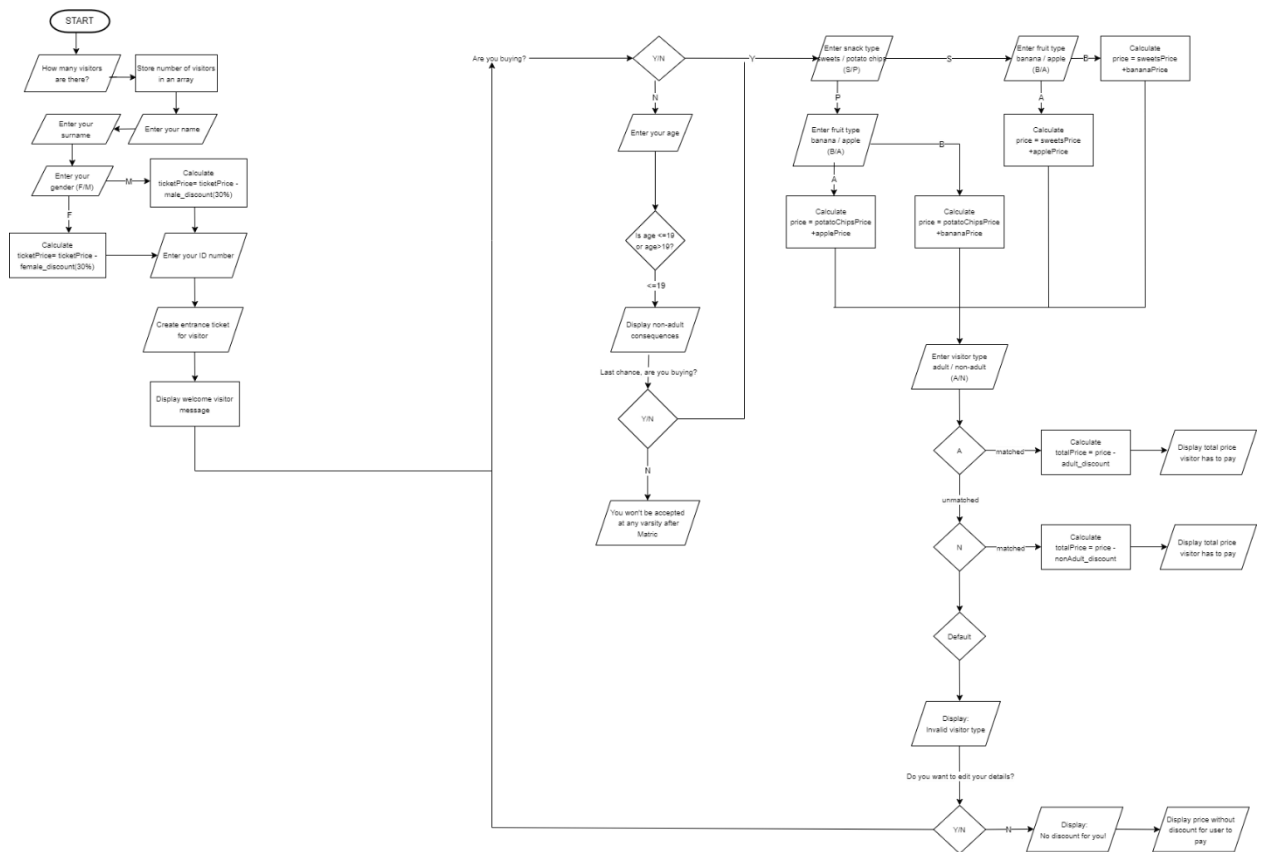
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## FLOWCHART

### ➤ Visual representation of the program's flow



## **PSEUDOCODE**

### ➤ A structured and high-level definition of my program

My program is going to create an entrance ticket for people who are visiting the AG (Art Gallery) museum, ask them to buy a minimum of 1 snack and 1 fruit as per museum rules, giving the user two chances to do so.

If the user rejects both chances given to him or her, they will face some consequences depending on their age (visitor can be a non-adult <age less than or equal to 19 years> or an adult <age greater than 19 years>), whether they have kids and the number of kids they have (if visitor is an adult)

```
#include default header <iostream>
```

```
#include the header used to round the prices to two decimal places and position  
details on the visitor's ticket ( <iomanip> )  
using namespace std;
```

```
//Definition of the visitors struct to represent each of the visitors and create  
entrance tickets for them
```

```
struct Visitor
```

```
Start Struct
```

```
    READ name
```

```
    READ surname
```

```
    READ gender
```

```
    READ ID_number
```

```
    READ ticketID
```

```
    SET ticketPrice = 50.00
```

```
SET male_discount = 0.10
SET female_discount = 0.30
SET totalPrice = 0
```

**End Struct**

**//Function to get visitor details from him/her**

void inputVisitorInfo(Visitor visitors[], SET input)

**Start Method inputVisitorInfo()**

**//Ask visitor to input his/her details for entrance ticket**

for (int i=0; i<input; i++)

**Start For Loop**

DISPLAY NEWLINE + "Visitor details: " + NEWLINE

DISPLAY "Enter your name: "

READ.ignore();

getline(READ, visitors[i].name) **//Read and get names even when there are spaces between them**

DISPLAY "Enter your surname: "

getline(READ, visitors[i].surname) **//Read and get names even when there are spaces between them**

DISPLAY "Enter your Gender (F for Female OR M for Male): "

READ >> visitors[i].gender;

DISPLAY "Enter your ID number: ";

READ >> visitors[i].ID\_number;

**End For Loop**

**End Method inputVisitorInfo()**

**//Function to calculate each of the visitors' total prices to pay for the tickets and display the tickets with their full details on them**

void displayVisitorDetails(Visitor visitors[], SET input)

**Start Method displayVisitorDetails()**

**//Add discounts on the ticket price based on the visitor's gender**

for (int i=0; i<input; i++)

**Start For Loop**

if (visitors[i].gender is F) THEN

SET visitors[i].totalPrice = visitors[i].ticketPrice - (visitors[i].ticketPrice \* visitors[i].female\_discount)

else if (visitors[i].gender is M) THEN

SET visitors[i].totalPrice = visitors[i].ticketPrice - (visitors[i].ticketPrice \* visitors[i].male\_discount)

**//Create a random 8-digit ticket ID for the visitor**

```

SET ticketID = " "

for (int i=0; i<8; i++)
    if (i is less than 4) THEN
        SET ticketID+= (rand() % 26) + 65
    else
        SET ticketID+= to_string(rand() % 10)

//Display visitor ticket with all the details on it
for (int i = 0; i < input; i++)
Start For Loop
    DISPLAY "AG MUSEUM ENTRANCE TICKET\n"
    DISPLAY "=====NEWLINE"
    DISPLAY "|Full names: " + right + setw(20) + visitors[i].name + " " +
        visitors[i].surname + "\n"
    DISPLAY "|Gender: " + right + setw(32) + visitors[i].gender + "NEWLINE"
    DISPLAY "|ID number: " + right + setw(29) + visitors[i].ID_number +
        "NEWLINE"
    DISPLAY "|Original ticket price: " + right + setw(12) + setprecision(2) + fixed
        + "R " + visitors[i].ticketPrice + "NEWLINE"
    DISPLAY "===== + NEWLINE"
    DISPLAY + left + setw(15) + "|" + right + setw(5) + "TicketID: " + right +
        setw(10) + "|Discounted price: | + NEWLINE"
    DISPLAY + left + setw(3) + "|" + ticketID + right + setw(12) + setprecision(2)
        + fixed + "|R " + visitors[i].totalPrice + "NEWLINE"

    DISPLAY "===== + NEWLINE"
End For Loop

End method displayVisitorDetails()

//Define class for adult visitor
class Adult
Start Of Class Adult
    public: //Add public access modifiers
    //If user is an adult and has kids, they are not going to jail, there are kids to
    take care of
    void UpToTwoKids()
    Start of Method UpToTwoKids()
        DISPLAY "As you have agreed to the rules and regulations of AG Museum
            at the gate, you are going to face the following consequences: "
        DISPLAY "NEWLINE" + "List of consequences: "
        DISPLAY "NEWLINE" + "1. You are given a chance to buy again "

```

```
    DISPLAY "NEWLINE" + "2. You are going to do a community service for 2
months."
```

```
    End of Method UpToTwoKids()
```

```
void MoreThanTwoKids() //Not going to pay double the price as user is taking
                        care of many kids
```

```
    Start of Method MoreThanTwoKids()
```

```
        DISPLAY "NEWLINE" + "As you have agreed to the rules and regulations of
        AG Museum at the gate, you are going to face the following
        consequences: "
```

```
        DISPLAY "NEWLINE" + "List of consequences: "
```

```
        DISPLAY "NEWLINE" + "1. You are given a chance to buy again "
```

```
        DISPLAY "NEWLINE" + "2. You are going to do a community service for 2
        months. "
```

```
    End of Method MoreThanTwoKids()
```

```
    End of Class Adult
```

```
//Function to get information about what the user wants to buy, type of user
and display calculations output
```

**Reference:** I used an example in the book: *Beginning C++ by author Ivor Horton* as well as *CMPG 121 Practical 5* to guide me with the code under this function

```
char visitorBuying(char snackType, char fruitType, char visitorType)
```

```
    Start of Method visitorBuying()
```

```
        SET Sweets_price = 7.00
```

```
        SET PotatoChips_price = 9.00
```

```
        SET Banana_price = 4.00
```

```
        SET Apple_price = 5.00
```

```
        SET adult_discount = 0.15
```

```
        SET nonAdult_discount = 0.5
```

```
        SET price
```

```
        SET totalPrice
```

```
        SET replyIf_buying
```

```
        SET reply
```

```
        SET secondChance_reply
```

```
        SET editChoice
```

```
        DISPLAY "Is the visitor buying? (Y/N): "
```

```
        READ replyIf_buying
```

```
        if (replyIf_buying is Y OR replyIf_buying is y)
```

```
            do
```

```
                Start do-while Loop
```

DISPLAY "Enter a snack that you want to buy (S for Sweets, P for Potato  
Chips: "

READ snackType

SET snackType = accept uppercase character only for (snackType)

DISPLAY "Enter a fruit that you want to buy (B for Banana, A for Apple: "

READ fruitType

SET fruitType = accept uppercase character only for (fruitType)

DISPLAY "Enter the type of visitor (A for Adult, N for Non-adult) : "

READ visitorType

visitorType = accept uppercase character only for (visitorType)

**//Calculate the price of items bought without discount**

if (snackType is S)

AND

if (fruitType is B)

{

SET price = Sweets\_price + Banana\_price

}

else if (fruitType is A)

{

SET price = Sweets\_price + Apple\_price

}

}

else if (snackType is P)

AND

if (fruitType is B)

{

SET price = PotatoChips\_price + Banana\_price

}

else if (fruitType is A)

SET price = PotatoChips\_price + Apple\_price

}

else

DISPLAY "Error - Invalid snack or fruit! Go back to the gate and be the  
last in the queue" **//If user enters invalid snack or fruit type,**

**he/she has to go be the last in the queue to start entering**

**buying details from scratch**

stop/break program

**//Applying discounts**

Use switch statement for (visitorType)

**Start Switch statement**

case if visitor is 'A':



```

        SET totalPrice = price - (price * adult_discount)
        DISPLAY "The price you have to pay for purchased items is " +
            totalPrice (fixed and rounded to 2 decimal places) +
            ENDLINE
        stop/break switch statement
    case if visitor is 'N':
        SET totalPrice = price - (price * nonAdult_discount)
        DISPLAY "The price you have to pay for purchased items is " +
            TotalPrice (fixed and rounded to 2 decimal places) +
            ENDLINE
        Stop/break switch statement
    Default (if visitorType does not match) :
        DISPLAY "Error - Invalid visitor type! "
End Switch statement
    DISPLAY "Do you want to edit your details / start afresh? (YES OR NO): "
    READ editChoice
    DISPLAY ENDLINE
Close do Loop

//Program starts from the beginning, after user ticket has been created
while (editChoice == "Yes" || editChoice == "yes" || editChoice == "YES")
    DISPLAY "No discount for you! The price you must pay for purchased items
        is " + price (fixed and rounded to 2 decimal places) + ENDLINE

//Main function
int main()
Start method main()
    SET Adult adult //Declare class variable
    SET age
    SET input
    SET kidsReply
    SET numberOfKids
    SET firstChance_reply
    SET secondChance_reply
    SET snackType
    SET fruitType
    SET visitorType

//CODE TO CREATE AN ENTRANCE TICKET FOR VISITORS
    DISPLAY "How many are you?: " //Ask visitor about how many other people
        is he/she with

    READ input

```

```
// Declare an array of Visitor struct to store visitor's information
Visitor arrVisitors[input]

//Call the inputVisitorInfo function to get visitor's information from the
him/her
Call method inputVisitorInfo(arrVisitors, input)

//Call the displayVisitorDetails to display the entrance ticket with visitor's
full information on it
Call method displayVisitorDetails(arrVisitors, input)

//CODE TO WELCOME VISITORS, GET WHAT THEY WANT TO BUY AND
CALCULATE THEIR TOTAL PURCHASE PRICES OR DISPLAY
CONSEQUENCES FOR THEM IF THEY DO NOT WANT TO BUY AFTER BEING
GIVEN TWO CHANCES
DISPLAY "NEWLINE" + "Hello, visitor. Welcome to the beautiful, fun, and
      special AG Museum!"
DISPLAY "NEWLINE" + "***As of AG Museum rule number 1, visitor must buy a
      minimum of 1 snack and 1 fruit***" //Reminding a visitor about the
rules that he/she has read at
the gate

DISPLAY "NEWLINE" + "Are you buying? (Y/N): " //Asking if visitor wants to
buy

READ firstChance_reply
if (firstChance_reply is Y OR firstChance_reply is y) //If visitor wants to buy
(during his/her first
chance)
{
    Call method visitorBuying(snackType, fruitType, visitorType) //Call function
to get details about what visitor wants to buy, calculating the total price to be
paid and display all the details
}
else
{
    DISPLAY "NEWLINE" + "Enter your age: "
    READ age
    if (age is greater than 19) //Visitors over 19 considered as adults
    {
        DISPLAY "Do you have kids? (Y/N): "
        READ kidsReply
        if (kidsReply is Y || kidsReply is y) //If a visitor is an adult and has kids
```

```

{
    DISPLAY "How many kids do you have? "
    READ numberOfKids;
    if (numberOfKids is less than or equal to 2) //If visitor has up to 2 kids
    {
        Call class method adult.UpToTwoKids() //Class function for visitors
                                                who refused to buy and
                                                have up to 2 kids
    }
    else if (numberOfKids is greater than 2)
    {
        Call class method adult.MoreThanTwoKids() //Class function for
visitors who refused to buy and have more than 2 kids
    }
    else
    {
        DISPLAY "Error - Integer numeric value required!"
    }
    DISPLAY "Last chance... Are you buying? (Y/N): " //Giving the visitor a
second and last chance to buy
    READ secondChance_reply
    if (secondChance_reply is 'Y' || secondChance_reply is 'y')
    {
        Call method visitorBuying(snackType, fruitType, visitorType)
    }
    else //If visitor rejects a second chance that was given to him/her,
faces consequence of going to jail
    {
        DISPLAY "Rule broken... Second chance rejected! You are going to
jail for 5 months."
    }
}
else //If the visitor is an adult and does not have kids
{
    DISPLAY "There are consequences for adults with no kids visitors. "
    DISPLAY "List of consequences: "
    DISPLAY "1. You are given a second chance to buy again "
    DISPLAY "2. You are not going to get a discount, instead, "
    DISPLAY "3. You are going to pay double the price of what you are
going to buy "
}
DISPLAY "Last chance... Are you buying? (Y/N): "
READ secondChance_reply

```

```

        if (secondChance_reply == 'Y' || secondChance_reply == 'y')
        {
            visitorBuying(snackType, fruitType, visitorType)
        }
        else
        {
            DISPLAY "Rule broken... You are going to jail for 5 months."
        }
    }
    else //If visitor is a non-adult(aged 19 or less)
    {
        cout << "There are consequences for non-adult visitors. "
        cout << "List of consequences: ";
        cout << "1. You are given a second chance to buy again "
        cout << "2. You are going to do a community service for 2 weeks "
    }
    DISPLAY "Last chance... Are you buying? (Y/N): "
    READ secondChance_reply
    if (secondChance_reply == 'Y' || secondChance_reply == 'y')
    {
        Call method visitorBuying(snackType, fruitType, visitorType)
    }
    else
    {
        DISPLAY "Rule broken... You are not going to be accepted at any
        University when you are done with your Grade 12."
        return 0;
    }
End Program

```

## **MY THOUGHT PROCESS**

- I thought of a program that is going to work for a museum when there are visitors.
- This program is going to start by welcoming a visitor at the gate and read rules and regulations for them before they can purchase entrance tickets and ask them if they agree to the rules. If a visitor agrees with these rules, he/she is going to be assisted into buying the entrance ticket otherwise, he/she is not going to be allowed inside the museum.
- After a visitor enters the museum, he/she is going to be transferred to the queue where one of the rules and regulations (having to buy a minimum of 1 snack and 1 fruit – **with a 15% discount for adults and 50% discount for non-adults**) is going to apply. At first, the visitor is going to be reminded about the museum's rules and be asked if he/she would like to buy.
  - If the visitor agrees to buy, they are going to be asked for a few input for the details. The program will now store all the information entered by the visitor, do all the necessary or important calculations and display user details and the calculated results.
  - If the visitor does not agree to buy, they are going to be asked to input their age to check if the visitor is an adult or a non-adult as there are consequences based on the categories.

If the visitor's age is greater than 19 years, they are going to be asked if they have children and how many.

**If the visitor has two or less children**, they are going to be given a second chance to buy.

- If the visitor accepts the second chance that he/she was given, they are going to buy a minimum of 1 snack and 1 fruit and do a community service for 2 months as a punishment.
- If the visitor rejects the second chance given to him/her, he/she is going to jail for 5 months, for breaking the museum's rule.

**If the visitor has more than two children**, they are going to be given a second chance to buy.

- If the visitor accepts the second chance that he/she was given, they are going to buy a minimum of 1 snack and 1 fruit and do a community service for 2 months as a punishment.
- If the visitor rejects the second chance given to him/her, he/she is going to jail for 5 months, for breaking the museum's rule.

**If the visitor is an adult without children**, they are going to be given a second chance to buy.

- If he/she accepts the second chance that he/she was given, they are going to buy a minimum of 1 snack and 1 fruit with no discount and instead a double price of what he/she has bought and do a community service for 2 months.
- If the visitor rejects the second chance given to him/her, he/she is going to jail for 5 months, for breaking the museum's rule.

**If the visitor's age is less than or equal to 19 years (non-adult)**, they are going to be given a second chance to buy.

- If he/she accepts the second chance that he/she was given, they are going to buy a minimum of 1 snack and 1 fruit and do a community service for 2 weeks.
- If the visitor rejects the second chance given to him/her, he/she is going to be informed that he/she will not be accepted at any of all the universities after finishing his/her Grade 12.

## **THE CHALLENGES I ANTICIPATE**

I expect my program to become a little confusing and planning on sharing all of its tasks amongst Classes, Structs, Arrays, Functions and Pointers, as well as including switch statements, if-else statements and loops to make it understandable and readable.

## **REFERENCES**

- *Beginning C++ by author Ivor Horton* (I have only looked at some examples on Structs and Arrays)

- *CMPG 121 Practical 5*

YouTube channels for c++ tutorials where I was learning more about classes and objects.

- [https://youtu.be/vlcOhM\\_Vkc4?si=VocBzzZfev8LJ316](https://youtu.be/vlcOhM_Vkc4?si=VocBzzZfev8LJ316)
- [https://youtu.be/\\_bYFu9mBnr4?si=MPG7EsrkPB1jg7lt](https://youtu.be/_bYFu9mBnr4?si=MPG7EsrkPB1jg7lt)