Project 1 Design Document

**Program Requirements:**

This program is meant to create an invoice for a cinema. The program will calculate gross earnings, the net profit, and the amount owed to the distributor. We know that the distributor gets 80% of the gross earnings meaning that the net profit will be 20% of the gross. We also know that the current ticket prices for adults and child tickets are $7.50 and $4.75 respectively. These values can be hard-coded since ticket prices rarely change.

**Program Inputs:**

* Name of the movie
  + string movie
  + Will only accept a string of characters.
  + Should not exceed ‘23’ characters
* Amount of adult tickets sold
  + int adultTickets
  + Will only accept positive whole numbers.
* Amount of child tickets sold
  + int childTickets
  + Will only accept positive whole numbers.

**Program Outputs:**

* Adult ticket price
  + double adultPrice
  + Hard-coded to be ‘7.50’
* Child ticket price
  + double childPrice
  + hard-coded to be ‘4.75’
* Gross revenue
  + double gross
  + Must be formatted to 2 decimal places
  + Cannot exceed ‘99999.99’
  + Calculated: gross=(adultTickets\*adultPrice)+(childTickets\*childPrice)
* Distributor amount
  + Double distributor
  + Must be formatted to 2 decimal places.
  + Calculated: distributor=gross\*0.8
* Net profit
  + Double net
  + Must be formatted to 2 decimal places.
  + Calculated: net=gross\*0.2

**Test Plan:**

The tests will verify that all dollar amounts are displayed with two decimal places. There should be no instance where a dollar amount displays more or less than 2 decimal places. We will verify that whole dollar amounts still display ‘.00’ at the end. We will also verify that amounts ending in a multiply of .10 will be displayed with two decimal places. Lastly, we will verify that the program can handle extreme values such as 0 or 999 tickets sold.

* Case 1: gross and net two decimal places, distributor has no decimal places.
  + Example Input: 26 adult tickets and 135 child tickets
  + Expected Output:
    - gross = $836.25
    - distributor = $669.00
    - net = $167.25
* Case 2: gross, distributor and net have one decimal place.
  + Example Input: 132 adult tickets and 22 child tickets
  + Expected Output:
    - gross = $1094.50
    - distributor = $875.60
    - net = $218.90
* Case 3: gross, distributor, and net have no decimal places.
  + Example Input: 132 adult tickets and 120 child tickets
  + Expected Output:
    - gross = $1560.00
    - distributor = $1248.00
    - net = $312.00
* Case 4: No adults attend movie
  + Example Input: 0 adult tickets and 41 child tickets
  + Expected Output:
    - gross = $194.75
    - distributor = $155.80
    - net = $38.95
* Case 5: No children attend movie
  + Example Input: 41 adult tickets and 0 child tickets
  + Expected Output:
    - gross = $307.50
    - distributor = $246.00
    - net = $61.50
* Case 6: Many adults attend with no children
  + Example Input: 650 adult tickets and 0 child tickets
  + Expected Output:
    - gross = $4875.00
    - distributor = $3900
    - net = $975.00
* Case 7: Many children attend with no adults
  + Example Input: 0 adult tickets and 650 child tickets
  + Expected Output:
    - gross = $3087.50
    - distributor = $2470.00
    - net = $617.50

**Solution Overview**

We will need to use the libraries ‘iostream’, ‘iomanip’, and ‘string’ for formatting and access to the string class type along with the main function. First, variables need to be created. A string will be used to hold the title of the movie. Two Integer variables will be used to hold the values for the number of adult and child tickets sold. Three floating-point (double) variables will be used to hold the values for gross, distributor, and net. Lastly, two additional floating-point variables will be used to hold the price for the adult ($7.50) and child ($4.75) ticket prices.

The user will receive a prompt asking for the title of the movie. Be sure to use ’getline’ so the entire name of the movie may be stored. This will be stored in the variable ‘movie’. The user will then receive an additional prompt asking them to input the number of adult tickets sold. This value will be stored in the integer variable ‘adultTickets’. A final prompt will then ask the user to input the number of child tickets sold. This value will be stored in the integer variable ‘childTickets’.

The variable ‘gross’ will represent the total amount of money made from ticket sales. This variable will be defined by adding the products of ‘adultTickets’ x ‘adultPrice’ and ‘childTickets’ x ‘childPrice’. The variable ‘distributor’ will represent the amount of money that goes to the distributor (80%). The variable will be defined by multiplying ‘gross’ by ‘0.8’. The variable ‘net’ will represent the theater’s share of the revenue. The variable will be defined by multiplying ‘gross’ by ‘0.2’. Output the information to the console.

Use ‘setprecision(2)’ and ‘fixed’ to round to and display two decimal places. Use ‘setw(8)’ to align the numerical values . Be sure to include ‘right’ so the fill characters will always come at the beginning. Lastly, ensure that ‘Movie Name:’, ‘Gross Box Office Revenue:’, and ‘Net Profit’ all are preceded by dollar signs ($) and that the dollar signs line up.

The program should return a value of 0 to close the main function.

**Algorithm Flowchart**

**A close up of a piece of paper

Description automatically generated**