

# Homework 3

100 Points

## Expressions and Interactivity

Assignments:

1. Find and fix errors: [Hw3\\_A.cpp](#)
2. Read, calculate, and print a report: [Hw3\\_B.cpp](#).
3. Use library functions: [Hw3\\_C.cpp](#) // see next pages

Run each program as required and save the output at the end of the source file as a comment.  
Compress the source files and upload the compressed file: [22A\\_LastName\\_FirstName\\_H3.zip](#)

### Grading

- [Hw3\\_A.cpp](#). – 20 Points
- [Hw3\\_B.cpp](#). – 50 Points
- [Hw3\\_C.cpp](#). – 30 Points

### PART B

A movie theater keeps 20 percent of the gross box office profit. The remainder goes to the movie distributor. Write a program that calculates a theater's gross and net box office profit for a night and one movie. The price of an adult ticket is \$10.00 and a child's ticket is \$6.00. The program asks for the name of the movie, and how many adult and child tickets were sold:

```
What is the name of the movie?  Star Wars: The Force Awakens
How many adult tickets were sold?  382
How many child tickets were sold?  127
```

*Note: The user's input is shown above in orange.*

Display a report as shown below:

```
Movie Name:                "Star Wars: The Force Awakens"
Adult Tickets (382):       $ 3820.00
Child Tickets (127):       $  762.00
Gross Box Office Profit:   $ 4582.00
Net Box Office Profit:     $  916.40
Amount Paid to Distributor: $ 3665.60
```

Define and use named constants in your program. Output should be aligned as shown above (notice that the decimal points are all aligned).

Run the program twice: first time enter the data above, the second time enter the following data:  
"The Good Dinosaur", 100 adult tickets sold, and 200 child tickets sold.

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## PART C

Write a program that will do the following steps (pseudo-code):

1. Display a welcome message and a title, such as “Working with random numbers and simple mathematical functions”. Then display the name of the library functions you are going to use in this program and the header files needed for each function.
2. Generate 3 random numbers between -5 and 13 inclusive:  
    `r1, r2, r3`
3. Generate one random number between 2 and 6 inclusive, name it `x`
4. Calculate `result` as `r3` to the power of `x`
5. Calculate the average of the 3 random numbers
6. Calculate the square root of the average
7. Calculate the geometric mean of the random numbers (the product of these numbers to the power of  $1/3$ )
8. Display a line of “=”, such as “=====\n”
9. Display the following (with description):
  - `r1, r2, r3`
  - `r3, x, and result`
  - average of the 3 numbers with 2 digits after the decimal point
  - square root of the average with 4 digits after the decimal point
  - geometric mean of the random numbers with 1 digit after the decimal point

Note: Please define and use as many variables you consider useful.

Run the program twice.