CSE 2050 - Programming in a Second Language (C++)
Homework Assignment 2

September 1, 2014

1 Due Dates

- **September 3, by 11.59pm**

2 Questions

1. **Miles per Gallon**. Write a program that calculates a car's gas mileage. The program should ask the user to enter the number of gallons of gas the car can hold, and the number of miles it can be driven on a full tank. It should then display the number of miles that may be driven per gallon of gas.

2. **Stadium Seating**. There are three seating categories at a stadium. For a softball game, Class A seats cost $15, Class B seats cost $12, and Class C seats cost $9. Write a program that asks how many tickets for each class of seats were sold, then displays the amount of income generated from ticket sales. Format your dollar amount in fixed-point notation, with two decimal places of precision, and be sure the decimal point is always displayed.

3. **Angle Calculator**. Write a program that asks the user for an angle, entered in radians. The program should then display the sine, cosine, and tangent of the angle. (Use the sin, cos, and tan library functions to determine these values.) The output should be displayed in fixed-point notation, rounded to four decimal places of precision.

4. **Box Office**. A movie theater only keeps a percentage of the revenue earned from ticket sales. The remainder goes to the movie distributor. Write a program that calculates a theater's gross and net box office profit for a night. The program should ask for the name of the movie, and how many adult and child tickets were sold. (The price of an adult ticket is $6.00 and a child's ticket is $3.00.) It should display a report similar to:

```
Movie Name:                  "Wheels of Fury"
Adult Tickets Sold:              382
Child Tickets Sold:              127
Gross Box Office Profit:     $ 2673.00
Net Box Office Profit:       $  534.60
Amount Paid to Distributor:  $ 2138.40
```

   NOTE: Assume the theater keeps 20 percent of the gross box office profit.

5. **Monthly Sales Tax**. A retail company must file a monthly sales tax report listing the sales for the month and the amount of sales tax collected. Write a program that asks for the month, the year, and the total amount collected at the cash register (that is, sales plus sales tax). Assume the state sales tax is 4 percent and the county sales tax is 2 percent.

   If the total amount collected is known and the total sales tax is 6 percent, the amount of product sales may be calculated as:

$$S = \frac{T}{1.06}, \tag{1}$$

   where S is the product sales and T is the total income (product sales plus sales tax).

   The program should display a report similar to:

```
Month: October
--------------------
Total Collected:     $ 26572.89
Sales:               $ 25068.76
County Sales Tax:    $   501.38
State Sales Tax:     $  1002.75
Total Sales Tax:     $  1504.13
```

6. **Monthly Payments**. The monthly payment on a loan may be calculated by the following formula:

$$Payment = \frac{Rate * (1 + Rate)^N}{((1 + Rate)^N - 1)} * L, \tag{2}$$

where Rate is the monthly interest rate, which is the annual interest rate divided by 12. (12% annual interest would be 1 percent monthly interest.) N is the number of payments and L is the amount of the loan. Write a program that asks for these values and displays a report similar to:

```
Loan Amount:              $ 10000.00
Monthly Interest Rate:             1%
Number of Payments:                36
Monthly Payment:          $   332.14
Amount Paid Back:         $ 11957.15
Interest Paid:            $  1957.15
```

7. **How Many Pizzas?**. Write a program that reports the number of pizzas you need to buy for a party if each person attending is expected to eat an average of four slices. Each slice should have an area of 14.125 sq. inches. The program should ask the user for the number of people who will be at the party and for the diameter of the pizzas to be ordered. It should then calculate and display the number of pizzas to purchase.