**Programming Challenges 3A November 6th, 2018 - Due on or before 10:10pm**

**Objective:** Classes and Objects

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| --- |
| **Important instructions:**   * *All programs must include comments at the top of your program: your name, course name-section number (e.g. CSIT 839 -26953), program name and the program description in brief.* * *Copy and paste your program code and outputs in Part B of each program.* * *Once it is done, save and submit this word file via Canvas.* |

To receive full credit, your program must:

- Include simple, clear comments explaining your program logic

- Indent your code and line up your braces

- Give descriptive variable names

- Use name constants wherever possible. Name constant must declare with CAPITAL.

- The data of your output should be the same as the given sample output.

1. **Gratuity.cpp (15 pts)**

Design a **Tips** class that calculates the gratuity on a restaurant bill. There is only one private class member variable **taxRate**. The constructor should accept a tax rate from user or uses a default value of 6.5% (0.065). The class should have one public function **computeTip**. This function accepts two arguments, the total bill amount and the tip rate. The function should use this information to compute the cost of the meal was before the tax was added. It should then apply the tip rate to the meal cost, computes and return the tip amount.

Write a program that create a single tip object, then loop multiple times to allow the user to enter the meal cost and the desired tip rate. You are given the class definition below:

class **Tips**

{

private:

double taxRate;

public:

// Constructor that accepts a tax rate

// or uses a default value of 6.5%

Tips (double rate = .065);

double computeTip(double, double);

};

**Sample output 1:**

This program will compute a restaurant tip based on a

total bill amount and % the patron wishes to tip the server.

Tax % for this location (example 6.5): 6.5

\*\*\*\*\*\*\*\*\*\*\*\*\* Tip Helper \*\*\*\*\*\*\*\*\*\*\*

Enter total bill amount: 52.5

Enter desired tip % 15

The tip should be $ 7.39

Compute another tip (y/n)? y

**Sample run 2:**

This program will compute a restaurant tip based on a

total bill amount and % the patron wishes to tip the server.

Tax % for this location (example 6.5): 9.25

\*\*\*\*\*\*\*\*\*\*\*\*\* Tip Helper \*\*\*\*\*\*\*\*\*\*\*

Enter total bill amount: 65.75

Enter desired tip % 18

The tip should be $ 10.83

Compute another tip (y/n)?

**Copy and paste your program (source) code and the outputs after this line**

**+++++++++++++++++++++++++++++++++++++++++++++++++**

/\*

Inola Cohen

Gratuity.cpp

Nov 6, 2018

CO SCI 839 - 26953

Purpose: to design a TIPS class that calculates

the gratuity on a restaurant bill.

\*/

#include "stdafx.h"

#include <iostream>

#include <iomanip>

#include <string>

using namespace std;

class Tips

{

private:

double taxRate;

double tipRate;

public:

Tips(double tax = 6.5, double tip = 15) { // Constructor: initial object created is default tax rate: 6.5%

taxRate = tax;

tipRate = tip;

}

/\* Setter Function(s) \*/

double setTaxRate(double);

double setTipRate(double);

/\* Other Function(s) \*/

double computeTip(double, double);

double computeTax(double, double);

};

/\* General Function(s) \*/

double computeTotalBill(double, double, double); // Generic function, it does not access anything

// within the class, so it can be outside

int main()

{

Tips tip;

double subtotalBill;

double taxPercent, tipPercent;

double taxDollar, tipDollar;

string answer;

do {

cout << "This program will compute a restaurant tip based on\na total bill amount and"

<< " % the patron wishes to tip the server." << endl;

/\* SubTotal \*/

cout << "\nEnter sub-total bill amount: ";

cin >> subtotalBill; // Get user's subtotal for bill

/\* Tax Computation \*/

cout << "Tax % for this location (example 6.5): ";

cin >> taxPercent; // Get user's desired tax rate

taxPercent = (tip.setTaxRate(taxPercent)) / 100; // Call compute function and convert to decimal for percent

taxDollar = tip.computeTax(taxPercent, subtotalBill);

cout << "\nThe tax should be $" << setprecision(2) << fixed << showpoint

<< taxDollar << endl;

cout << "\n\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* Tip Helper \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\n" << endl;

/\* Tip Computation \*/

cout << "Enter desired tip %: "; // Get user's desired tip rate

cin >> tipPercent;

tipPercent = (tip.setTipRate(tipPercent)) / 100;

tipDollar = tip.computeTip(tipPercent, subtotalBill); // Call computer function and convert to decimal for percent

cout << "\nThe tip should be $" << setprecision(2) << fixed << showpoint

<< tipDollar << endl;

/\* Total Bill = subtotal + tip + tax \*/

cout << "\n\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* Total Bill \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\n" << endl;

cout << "Your total bill, including tip and tax is $" << setprecision(2) << fixed << showpoint

<< computeTotalBill(tipDollar, taxDollar, subtotalBill) << endl;

cout << "\nCompute another tip? (Y/N) ";

cin >> answer;

cout << endl;

} while (answer == "y" || answer == "Y" || answer == "yes" || answer == "Yes" || answer == "YES");

return 0;

}

double Tips::setTaxRate(double rate)

{

if (rate > 0) // If user's value is valid, set their tax rate

{

taxRate = rate;

}

if (rate <= 0) // Otherwise, use default tax rate from constructor

{

cout << "\nInvalid tax rate. Using default tax rate: 6.5% " << endl;

taxRate = 6.5;

}

return taxRate;

}

double Tips::setTipRate(double rate)

{

if (rate > 0) // If user's value is valid, set their tax rate

{

tipRate = rate;

}

if (rate <= 0) // Otherwise, use default tax rate from constructor

{

cout << "\nInvalid tip rate. Using default tip rate: 15% " << endl;

tipRate = 15;

}

return tipRate;

}

double Tips::computeTip(double percent, double billSubtotal)

{

double total;

total = percent \* billSubtotal;

return total;

}

double Tips::computeTax(double percent, double billSubtotal)

{

double total;

total = percent \* billSubtotal;

return total;

}

double computeTotalBill(double tip, double tax, double billSubtotal)

{

double total;

total = tip + tax + billSubtotal;

return total;

}

