

Student Name _____ Section _____

Instructor _____ Due Date _____

Project	1	2	3	4	5	6	TOTAL
<i>Maximum Points</i>	2 points	2 points	2 points	2 points	1 point	1 point	10 points
<i>Your Score</i>							

PROJECT ONE**Objective** To write, compile and execute a simple program that uses a function.**PROJECT DESCRIPTION**

Charles receives a salary of \$ 2,500 per month. He also receives a 5 % commission for sales over \$ 15,000 . Last month's sales were \$ 75,000 . Write, compile and execute a program that uses a function to calculate Charles' gross pay.

Information About This Project

This project involves utilizing a decision / selection structures such as a block if - else statement. It also demonstrates the use of a function to perform calculations.

Steps To Complete This Project**STEP 1 Open MS Visual C ++ and Write the Program Code**

Open Visual C ++ on you computer. Write the program code that will allow the user to enter the necessary input items and then use these items to compute the required output value(s). Use the following instructions.

Save your code in a file named: **Commission.cpp**

STEP 2 Open the Initial Program Code

First, type the code shown below, which consists of a preprocessing directive and a main() method.

Figure 1 Program Code for the C ++ Commission Function Application

```
#include <iostream>
using namespace std; //preprocessing directive(s)

//place function prototype here

int main()
{ //Commission Application: Sammy Student Programmer

    //declare local variables
    char name[30];
    int num = 0, double commission = 0;
    double salary = 0, double sales = 0;
    cout << "welcome to the commission application\n";

    //place call to the function here

    return 0;
}

//place function definition here
```

Student Name _____

Section _____

PROJECT ONE**STEP 3 Perform a Trial Run of the Program**

After you type the initial program code, perform a trial run by executing the program to verify that the program is syntactically correct. When using MS Visual Studio, use the keyboard shortcut `Ctrl` + `F5` to execute the program. Observe the output of the program.

STEP 4 Add the Function Prototype

In the code shown in **Figure 1**, locate the line of code which states:

```
//place function prototype here
```

Directly below this line of code and before the `main()` method declaration, write the following function prototype:

```
double Compute(int, double, double);
```

STEP 5 Perform a Trial Run of the Program

After you type the initial program code, perform a trial run by executing the program to verify that the program is syntactically correct. When using MS Visual Studio, use the keyboard shortcut `Ctrl` + `F5` to execute the program. Observe the output of the program.

STEP 6 Add the Function Definition

In the code shown in **Figure 1**, locate the line of code which states:

```
//place function definition here
```

Directly below this line of code and after the `main()` method declaration, write the following function definition:

Figure 2 Program Code for the C++ Commission Function Definition

```
double Compute(int number, double salary, double gross_sales)
{
    cout << "commission report for employee " << number << endl;
    if(gross_sales > 15000)
        return gross_sales * 0.05;
    else
        return 0;
}
```

STEP 7 Add a Call to the Function

The next step is to request the salary data from the user, to call the function and to display the commission report.

Locate the following two lines of code.

```
//place call to the function here
```

```
return 0;
```

Directly between these two lines of code, add the statements appearing in **Figure 3**, which follows.

Student Name _____

Section _____

PROJECT ONE

Figure 3 Program Code for the C + + Commission Function Call

```

cout << "enter the employee name \n";
cin.getline(name, 30);
cout << "enter the employee id number \n";
cin >> num;
cout << "enter the employee salary \n";
cin >> salary;
cout << "enter the employee sales \n";
cin >> sales;
commission = Compute(num, salary, sales);
cout << "commission report for \n";
cout << name << "\n";
cout << "id number \t" << num << endl;
cout << "monthly salary \t" << "$" << salary << endl;
cout << "monthly sales \t" << "$" << sales << endl;
cout << "commission \t" << "$" << commission << endl;

```

STEP 8 Run the Program

After you type the initial program code, perform a run of your program. Use the following data for input.

Employee	Charles
Employee ID	858
Salary	\$ 2,500
Gross Sales	\$ 75,000

STEP 9 Modify the Program

After you perform a trial run of your program, modify it such that each of the following is included in your program.

- Within the `main()` function, declare a character variable named `month` (field size 20).
- Within the `main()` function, add statements that will prompt the user for the month of sales activity (January, February, etc.) and receive the user's response in the variable `month`.
- Within the `main()` function, add a statement that will display the activity month within the commission report.
- Within the `Compute()` function, modify the `if` block such that a default commission amount of \$ 200 will be earned regardless of the employee's gross sales.

STEP 10 Run the Modified Program

After you supplement the code, run your application and tests its operation.

STEP 11 Submit the Program

Submit screen snapshots of your program as well as the completed source code.

Student Name _____ Section _____

PROJECT TWO

Objective To write, compile and execute a program that computes estimated Federal Income Tax liability.

PROJECT DESCRIPTION

This project has you running a program that computes Federal Income Tax liability.

Information About This Project

The Federal Income Tax that a taxpayer is liable to pay is a function of the individual's taxable income. The table below contains the formulas for computing a single individual's estimated Federal Tax liability tax.

Table 1 2006 Federal Tax Rate Schedule X - Use if your filing status is Single

Taxable Income Bracket	Rate	Tax Paid
\$ 7,550 or less	10 %	10 % of the amount over \$ 0.00
greater than \$ 7,550 but not more than \$ 30,650	15 %	\$ 755 + 15 % of the excess over \$ 7,550
greater than \$ 30,650 but not more than \$ 74,200	25 %	\$ 4,220.00 + 25 % of the excess over \$ 30,650
greater than \$ 74,200 but not more than \$ 154,800	28 %	\$ 15,107.50 + 28 % of the excess over \$ 74,200
greater than \$ 154,800 but not more than \$ 336,550	33 %	\$ 37,675.50 + 33 % of the excess over \$ 154,800
more than \$ 336,550	35 %	\$ 97,653.00 + 35 % of the excess over \$ 336,550

An example of using this table includes the following: If a single taxpayer has a taxable income of \$ 68,720 , an amount between \$ 30,650 and \$ 74,200 , then the taxpayer is in 25 % tax bracket and the tax to be paid would be:

$$\begin{aligned}
 & \$ 4,220.00 + 25 \% \text{ of the excess over } \$ 30,650.00 && \text{or} \\
 & \$ 4,220.00 + 25 \% (\$ 68,720.00 - \$ 30,650.00) && \text{or} \\
 \text{or} & \$ 13,737.50
 \end{aligned}$$

Steps To Complete This Project

STEP 1 **Figure 1** contains the source code to compute a Federal Income Tax liability, except part of the code is missing, as indicated by the underlines. Open a C++ editor, such as MS Visual C++, and type the program code shown in **Figure 1**, including the underlines and then determine what the missing code is by filling in the blanks using the information in **Table 1** and by examining the structure of a typical if - else statement, whose general form follows:

structure of an if - else statement

```

if (expression_1)
    statement1;
else if (expression_2)
    statement_2;
else if (expression_3)
    statement_3;
.
.
else if (expression_n)
    statement_n;
else
    last_statement;

```

Student Name _____ Section _____

PROJECT TWO

Figure 1 Partially Completed Program Code for the Income Tax Program

```

#include <iostream>
using namespace std;

void main()
{
    double income = 0, tax = 0;
    //taxable income and tax to be paid
    cout << "Enter your taxable income(Single Filing Status): ";
    cin >> income;
    cout << "Your marginal tax rate equals: ";
    if ( _____ )
    {
        tax = 97653.00 + 0.35 * (income - 336550);
        cout << "35.0%\n";
    }
    else if (income > 154800)
    {
        tax = 37675.50 + 0.33 * (income - _____);
        cout << "33%\n";
    }
    else if (income > 74200)
    {
        tax = 15107.50 + .28 * (income - _____);
        cout << "28%\n";
    }
    else if (income > 30650)
    {
        tax = _____
        cout << "25%\n";
    }
    else if (income > 7550)
    {
        tax = 755 + _____ * (income - 7550);
        cout << _____ ;
    }
    _____

    {
        _____
        _____
    }
    cout << "Your tax is approximately " << _____<< endl;
}

```

Student Name _____

Section _____

PROJECT TWO

- STEP 2** After you type the program code shown in **Figure 1**, and determine the code the missing code by filling in the blanks, save your program as:
- FedTax.cpp**
- Remember to include your name, course information, date and project number in the heading portion of your code.
- STEP 3** Next perform, a trial run for your program using the example provided in the **Information About This Project** section of this lab project. For this example, you will input \$ 68,720 as the taxable income and the successful program will produce an output of \$ 13,737.50, as the tax liability.
- STEP 4** Next, use your Income Tax program and determine the federal income tax for each of the following scenarios. For each exercise, take a screen snapshot of your output window and paste the snapshot into an MS Word document.
- (a) If taxable income is \$ 25,000.00
the marginal tax rate is _____
the tax is _____
- (b) If taxable income is \$ 10,000.00
the marginal tax rate is _____
the tax is _____
- (c) If taxable income is \$ 53,501.00
the marginal tax rate is _____
the tax is _____
- (d) If taxable income is \$ 117,305.00
the marginal tax rate is _____
the tax is _____
- (e) If taxable income is \$ 400,000.00
the marginal tax rate is _____
the tax is _____
- (f) If taxable income is \$ 283,150.00
the marginal tax rate is _____
the tax is _____
- (g) If taxable income is \$ 128,150.00
the marginal tax rate is _____
the tax is _____
- STEP 4** Finally, print your correct source code and submit it for credit. Also, submit the answers to the above exercises, which includes your MS Word document showing the output for each of the above exercises.

Student Name _____ Section _____

PROJECT THREE**Objective** To write, compile and execute a simple selection control program.**PROJECT DESCRIPTION**

Write a program that asks the user to select one of the numbers 1, 2 or 3 and then calls a function that asks the associated question and then requests the answer.

Use the questions shown below.

- (1) Microsoft Windows allows you to use filenames containing up to at most 155 characters.
- (2) When copying a diskette, the source diskette refers to the original disk you want to copy.
- (3) A megaflop is the abbreviation for computer clock or processing speed, in millions of cycles per second.

Note: the answers to these questions are: False, True and False, respectively.

Information About This Project

This particular project involves utilizing computer programming decision / selection structures such as a block `if - else` statement.

Steps To Complete This Project**STEP 1 Open MS Visual C ++ and Write the Program Code**

Open Visual C ++ on your computer. Write the program code that will allow the user to enter the necessary input items and then use these items to compute the required output value(s).

STEP 2 Compile and Run your Program

Build, compile and run your program. Test the operation of your program using appropriate numbers for your input variables.

STEP 3 Print your Program Code and your Run Time Output

When completed, print your program source code as well as the program output(s). Attach the hardcopies to your lab cover sheet for credit.

Student Name _____ Section _____

PROJECT FOUR**Objective** To write a program that computes and prints electric bills.**PROJECT DESCRIPTION**

Write, compile and execute a computer program that computes and prints electric bills.

Your program should allow the user to enter, through the keyboard, the following information for each customer: (1) the customer name, (2) the customer number, (3) the customer address, (4) the Kilowatt - Hours (KWH) used and (5) the amount past due.

Electric rates are based on KWH according to the schedule shown in **Figure 1**.

The total amount due is the sum of the following:

- (a) the current charge based upon the KWH used
- (b) the amount past due
- (c) a penalty of 2.5 % of the amount past due

Your program output is to include the customer name, the customer number, the customer address, the amount past due, the penalty and the total amount due.

Figure 1 Electric Rates

Kilowatt - Hours (KWH) Used	Charge
125 KWH or less	10 ¢ per KWH
More than 125 KWH but not more than 320 KWH	\$ 12.50 plus 9 ¢ per KWH over 125 KWH
More than 320 KWH but not more than 500 KWH	\$ 30.60 plus 8 ¢ per KWH over 320 KWH
More than 500 KWH	\$ 42.60 plus 6 ¢ per KWH over 500 KWH

Information About This Project

This particular project involves utilizing computer programming decision / selection structures such as a block `if - else` statement.

Steps To Complete This Project**STEP 1 Open MS Visual C ++ and Write the Program Code**

Open Visual C ++ on you computer. Write the program code, which will allow the user to input the items listed, namely the customer name, customer number, etc., and then compute the total amount due.

Include your name, course title and date in the header comment (remarks) section of your program code.

Save your file as: **Electric.cpp**

Student Name _____ Section _____

PROJECT FOUR

STEP 2 Compile and Run your Program

Build, compile and run your program.

Once your program compiles correctly, test your code by running the sample information shown in **Figure 2**.

Print a run time image of your program showing the required input items as well as the output item, namely the total amount due.

Figure 2

<i>Customer Name</i>	Eddie Electric
<i>Customer Number</i>	E1432
<i>Customer Address</i>	7300 W. Higgins Avenue Chicago, Illinois 60656
<i>Kilowatt - Hours Used</i>	371 KWH
<i>Amount Past Due</i>	\$ 71.43

STEP 3 Print your Program Code and your Run Time Output

When completed, print your program source code and attach the hardcopy to your lab cover sheet for credit.

Student Name _____ Section _____

PROJECT FIVE**Objective** To write a program that computes a monthly home mortgage.**PROJECT DESCRIPTION**

Ronald Reynolds is buying a house costing \$ 325,000 . He must pay 15 % down and the remainder is to be repaid in equal monthly payments over 20 years at 9.60 % , compounded monthly. Write, compile and execute a computer program to determine the amount of Ronald's monthly payment.

Also, determine the total amount of interest that Ronald will pay throughout the term of the mortgage.

Information About This Project

The formula to compute the monthly home mortgage payment is:

$$PMT = PV \left[\frac{i}{1 - (1 + i)^{-n}} \right]$$

where

PMT is the monthly mortgage payment amount

i is the rate per period

n is the total number of payments or periods

PV is the present value or the loan amount

Steps To Complete This Project**STEP 1 Open MS Visual C ++ and Write the Program Code**

Open Visual C ++ on you computer. Write the program code that will allow the user to enter the necessary input items and then use these items to compute the required output value(s).

Note: use the chart below as a convenient guideline as what are the required input and output values required for your program.

Client Name	
Purchase Price	\$
Down Payment	\$
Loan Amount	\$
Term of Mortgage	_____ year(s)
Number of Payments	
Payment Type	Monthly
Interest Rate	_____ %, compounded monthly
Monthly Payment	\$
Total Payments	\$
Total Interest to be Paid	\$

Student Name _____

Section _____

PROJECT FIVE**STEP 2 Compile and Run your Program**

Build, compile and run your program. Test the operation of your program using appropriate numbers for your input variables.

STEP 3 Print your Program Code and your Run Time Output

When completed, print your program source code as well as the program output(s). Attach the hardcopies to your lab cover sheet for credit.

Student Name _____ Section _____

PROJECT SIX**Objective** To write a program that computes a straight - line depreciation.**PROJECT DESCRIPTION**

Natoma Telecommunications has purchased a business - use computer system costing \$ 6,500 . The pertinent information concerning this asset is listed in **Figure 1** below.

Natoma's accounting manager wants you to write a computer program, which will calculate the annual straight - line depreciation of this asset and generate a depreciation schedule showing the year - to - year depreciation over the expected life of the asset.

Figure 1 Business Asset Information

<i>asset type</i>	Computer System
<i>asset cost</i>	\$ 6,500.00
<i>asset life</i>	5 years
<i>salvage value</i>	\$ 500.00

Information About This Project

In accounting, the formula for straight - line depreciation is:

$$V(t) = C - CRt$$

where $V(t)$ is the value of the asset at time t , C is the asset cost and R is the rate defined:

$$R = \frac{\text{asset cost} - \text{salvage value}}{\text{asset cost} \times \text{asset life}}$$

Once the asset cost, life and salvage value are known, a complete depreciation schedule can be prepared, the template of which is illustrated below. The depreciation schedule shows the year, annual depreciation, accumulated amount and book or current value. Since we are dealing with straight - line depreciation, the annual depreciation is the same for years 1 through 5 . The current accumulated depreciation is obtained by adding the current year annual depreciation to the prior accumulated depreciation. The current book value is obtained by subtracting the prior book value by the annual depreciation.

Figure 2 Asset Depreciation Schedule

Year	Annual Depreciation	Accumulated Amount	Book Value
0	—	—	\$ 6,500.00
1	\$ 1,200.00	\$ 1,200.00	\$ 5,300.00
2	\$ 1,200.00	\$ 2,400.00	\$ 4,100.00
3	\$ 1,200.00	\$ 3,600.00	\$ 2,900.00
4	\$ 1,200.00	\$ 4,800.00	\$ 1,700.00
5	\$ 1,200.00	\$ 6,000.00	\$ 500.00

Student Name _____

Section _____

PROJECT SIX

Steps To Complete This Project**STEP 1 Open MS Visual C++ and Write the Program Code**

Open Visual C++ on your computer. First type the code given in **Figure 3**. The code consists of the preprocessing directive and the class definition. Save the file as: **Linear.cpp**

Figure 3 Completed Program Code for the Depreciation Program

```
#include <iostream>
using namespace std; //preprocessing directive(s)

class Depreciate //class definition
{
private: //data members
    char asset[20];
    double cost, rate, salvage, time, value;
    int life;
public:
    Depreciate() { //class constructor
        cost = 0;
        rate = 0;
        value = 0;
        salvage = 0;
        time = 0;
        life = 0;
    }
    void getInfo() { //member functions
        cout << "enter the asset type\n";
        cin.getline(asset,20);
        cout << "enter the asset cost\n";
        cin >> cost;
        cout << "enter the salvage value\n";
        cin >> salvage;
        cout << "enter the asset life\n";
        cin >> life;
        cout << "enter the time (in years)\n";
        cin >> time;
    }
    void Compute() {
        rate = (cost - salvage) / (cost * life);
        value = cost - cost * rate * time;
    }
    void Display() {
        cout << "the asset value after year " << time << " is ";
        cout << value << endl;
    }
};
```

Student Name _____

Section _____

PROJECT SIX**STEP 2 Open MS Visual C ++ and Write the Program Code**

After you type the code for the class definition, code the `main()` function directly below the class definition.

Figure 4 `main()` Function for the Depreciation Program

```
void main()
{
    //Depreciation Application: Sammy Student Programmer

    //instantiate a class object
    Depreciate x;

    //object calls member functions
    x.getInfo();
    x.Compute();
    x.Display();
}
```

STEP 3 Compile and Run your Program

Build, compile and run your program. Test the operation of your program using appropriate numbers for your input variables. Use the information provided within **Figure 1**.

STEP 4 Modify Your Program Code

With your program running properly, modify the `main()` function and the class definition such that your program will display the compute depreciation schedule shown previously in **Figure 2**.

STEP 5 Print your Program Code and your Run Time Output

When completed, print your program source code as well as the program output(s). Attach the hardcopies to your lab cover sheet for credit.