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Lab Session 7

Directions: Use this to write the results of your lab experiments, and return this form and all program printouts to the instructor at the end of lab session. For all programs you write or modify, make sure you entered your name, lab and exercise number.

Lab 6.5

(2 points) Exercise 1: Fill in the following scope chart by listing the identifiers (function names, variables, constants):

GLOBAL	main()	main() (inner block 1)	main() (inner block 2)	findArea()	findCircumference()
PI	PI	PI	PI	PI	PI
RATE	RATE	RATE	RATE	RATE	RATE
	radius	radius	Radius	Rad	Length
		area	Circumference	answer	Distance

(3 points) Exercise 2 & 3: Using the comments you filled out in Exercise 1, modify and complete `scope.cpp`, for each `cout` instruction that reads:

```
cout << " LIST THE IDENTIFIERS THAT are active here" << endl;
```

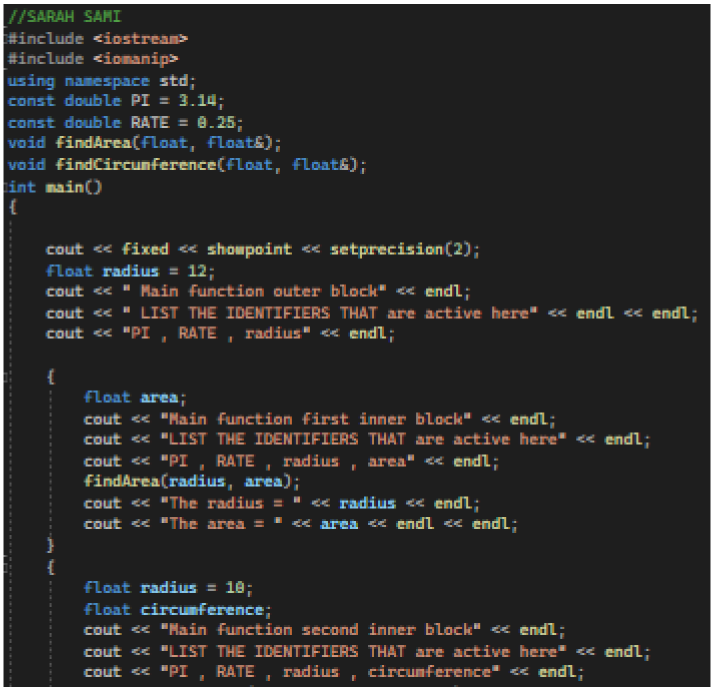
Replace the words in all caps with a list of all identifiers active at that location. Change it to the following form:

```
cout << "area, radius and PI are active here" << endl;
```

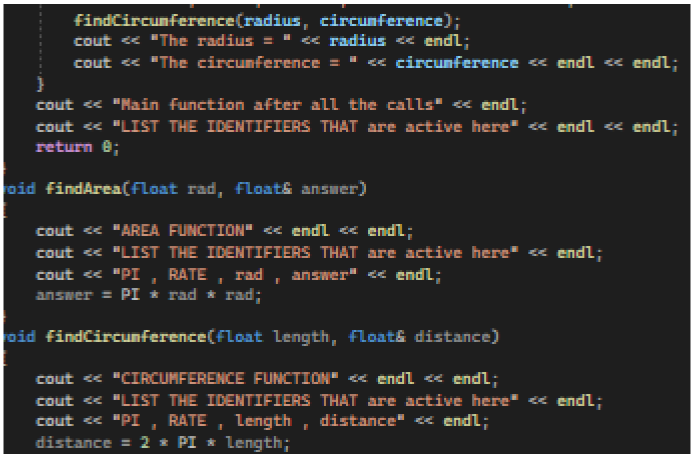
Fill in source code to perform tasks in the comments, and attach the completed printout of `scope.cpp`

Note: area = πr^2

circumference = $2\pi r$



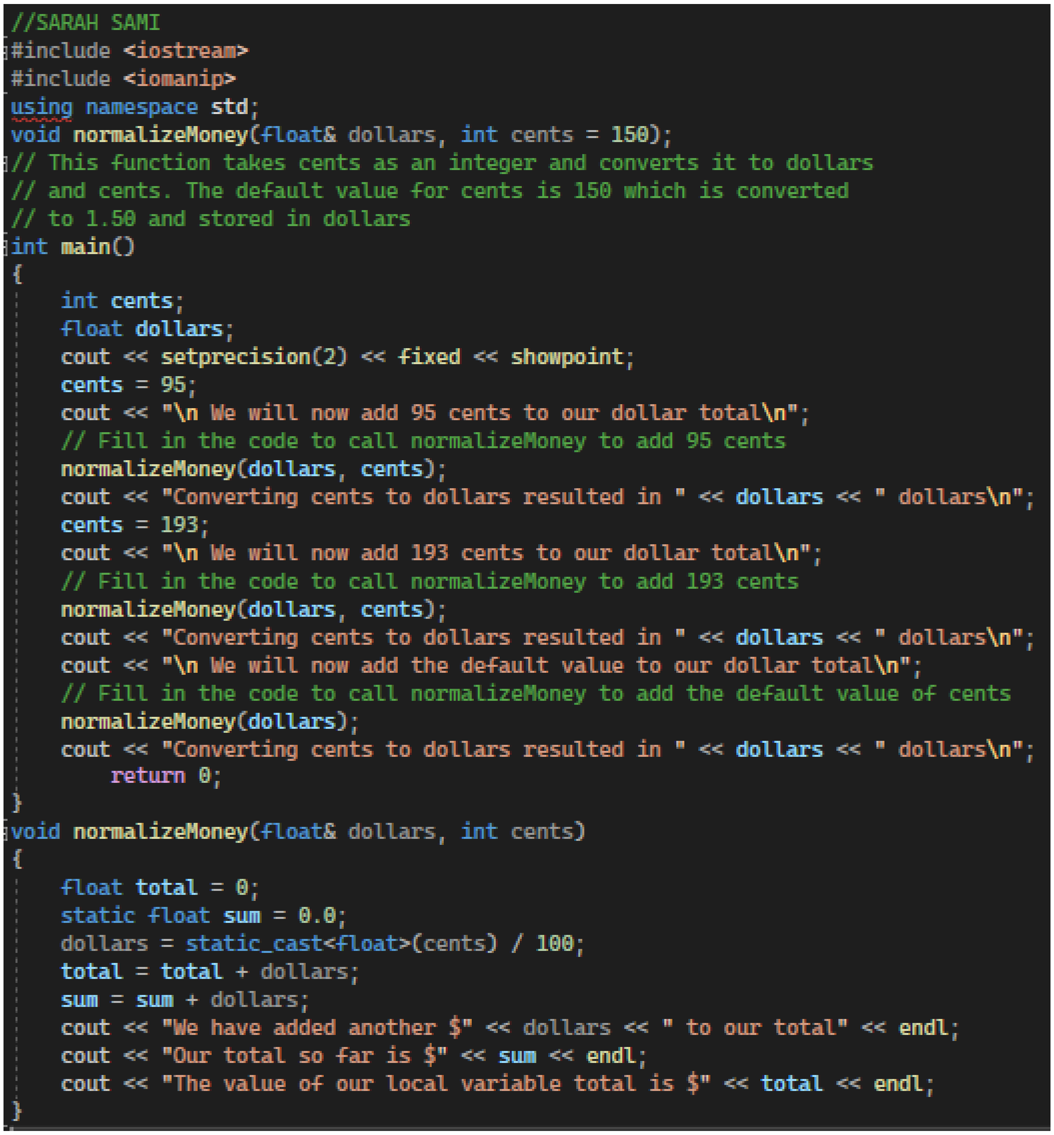
```
//SARAH SAMI
#include <iostream>
#include <iomanip>
using namespace std;
const double PI = 3.14;
const double RATE = 0.25;
void findArea(float, float&);
void findCircumference(float, float&);
int main()
{

    cout << fixed << showpoint << setprecision(2);
    float radius = 12;
    cout << " Main function outer block" << endl;
    cout << " LIST THE IDENTIFIERS THAT are active here" << endl << endl;
    cout << "PI , RATE , radius" << endl;

    {
        float area;
        cout << "Main function first inner block" << endl;
        cout << "LIST THE IDENTIFIERS THAT are active here" << endl;
        cout << "PI , RATE , radius , area" << endl;
        findArea(radius, area);
        cout << "The radius = " << radius << endl;
        cout << "The area = " << area << endl << endl;
    }
    {
        float radius = 10;
        float circumference;
        cout << "Main function second inner block" << endl;
        cout << "LIST THE IDENTIFIERS THAT are active here" << endl;
        cout << "PI , RATE , radius , circumference" << endl;
```



```
        findCircumference(radius, circumference);
        cout << "The radius = " << radius << endl;
        cout << "The circumference = " << circumference << endl << endl;
    }
    cout << "Main function after all the calls" << endl;
    cout << "LIST THE IDENTIFIERS THAT are active here" << endl << endl;
    return 0;
}
oid findArea(float rad, float& answer)
{
    cout << "AREA FUNCTION" << endl << endl;
    cout << "LIST THE IDENTIFIERS THAT are active here" << endl;
    cout << "PI , RATE , rad , answer" << endl;
    answer = PI * rad * rad;
}
oid findCircumference(float length, float& distance)
{
    cout << "CIRCUMFERENCE FUNCTION" << endl << endl;
    cout << "LIST THE IDENTIFIERS THAT are active here" << endl;
    cout << "PI , RATE , length , distance" << endl;
    distance = 2 * PI * length;
```

Lab 6.6

(3 points) Exercise 2: Retrieve and complete `money.cpp` so the program takes in cents and converts it to dollars. Attach the completed `money.cpp` making sure the program displays three blocks of output that look like this:

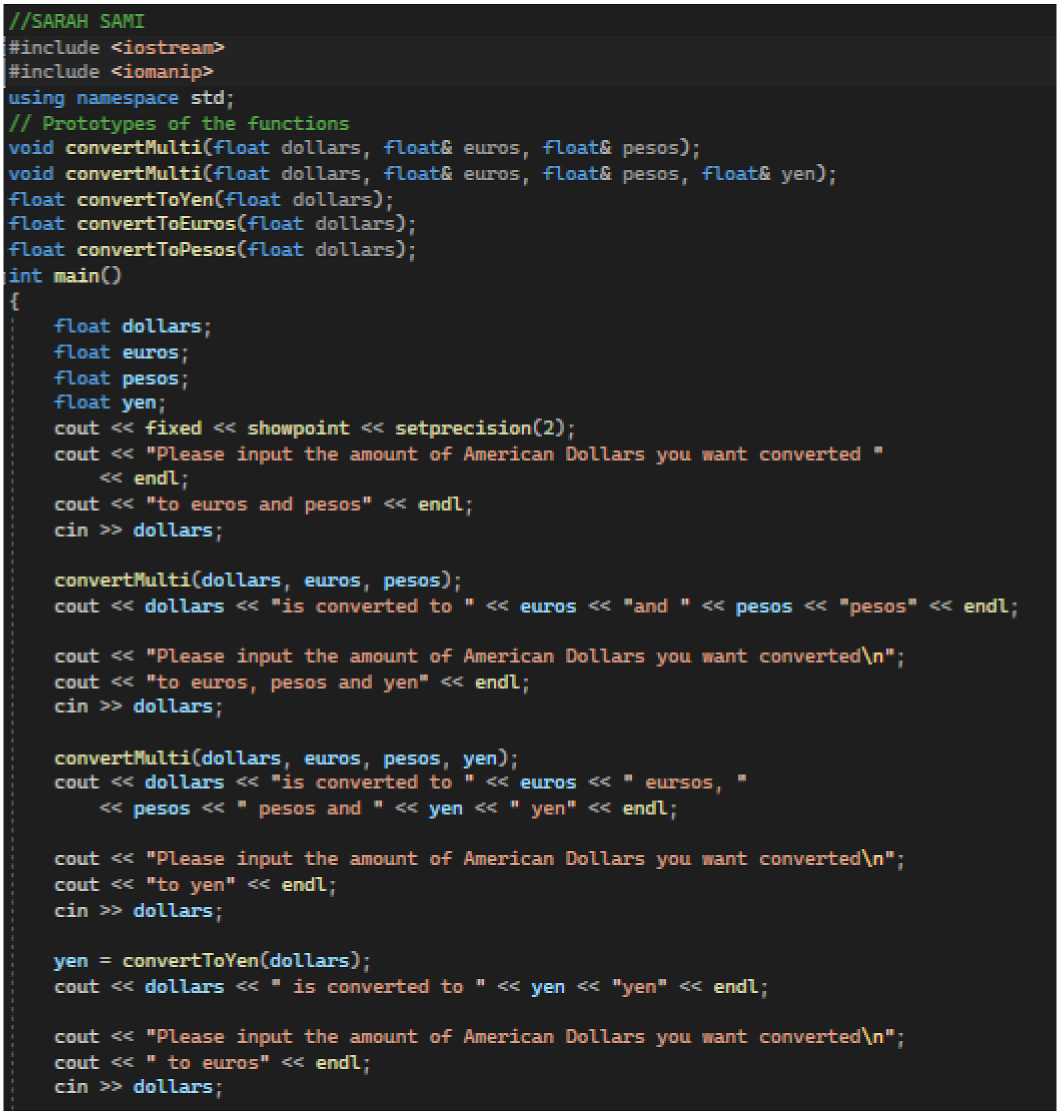


```
//SARAH SAMI
#include <iostream>
#include <iomanip>
using namespace std;
void normalizeMoney(float& dollars, int cents = 150);
// This function takes cents as an integer and converts it to dollars
// and cents. The default value for cents is 150 which is converted
// to 1.50 and stored in dollars
int main()
{
    int cents;
    float dollars;
    cout << setprecision(2) << fixed << showpoint;
    cents = 95;
    cout << "\n We will now add 95 cents to our dollar total\n";
    // Fill in the code to call normalizeMoney to add 95 cents
    normalizeMoney(dollars, cents);
    cout << "Converting cents to dollars resulted in " << dollars << " dollars\n";
    cents = 193;
    cout << "\n We will now add 193 cents to our dollar total\n";
    // Fill in the code to call normalizeMoney to add 193 cents
    normalizeMoney(dollars, cents);
    cout << "Converting cents to dollars resulted in " << dollars << " dollars\n";
    cout << "\n We will now add the default value to our dollar total\n";
    // Fill in the code to call normalizeMoney to add the default value of cents
    normalizeMoney(dollars);
    cout << "Converting cents to dollars resulted in " << dollars << " dollars\n";
        return 0;
}
void normalizeMoney(float& dollars, int cents)
{
    float total = 0;
    static float sum = 0.0;
    dollars = static_cast<float>(cents) / 100;
    total = total + dollars;
    sum = sum + dollars;
    cout << "We have added another $" << dollars << " to our total" << endl;
    cout << "Our total so far is $" << sum << endl;
    cout << "The value of our local variable total is $" << total << endl;
}
```

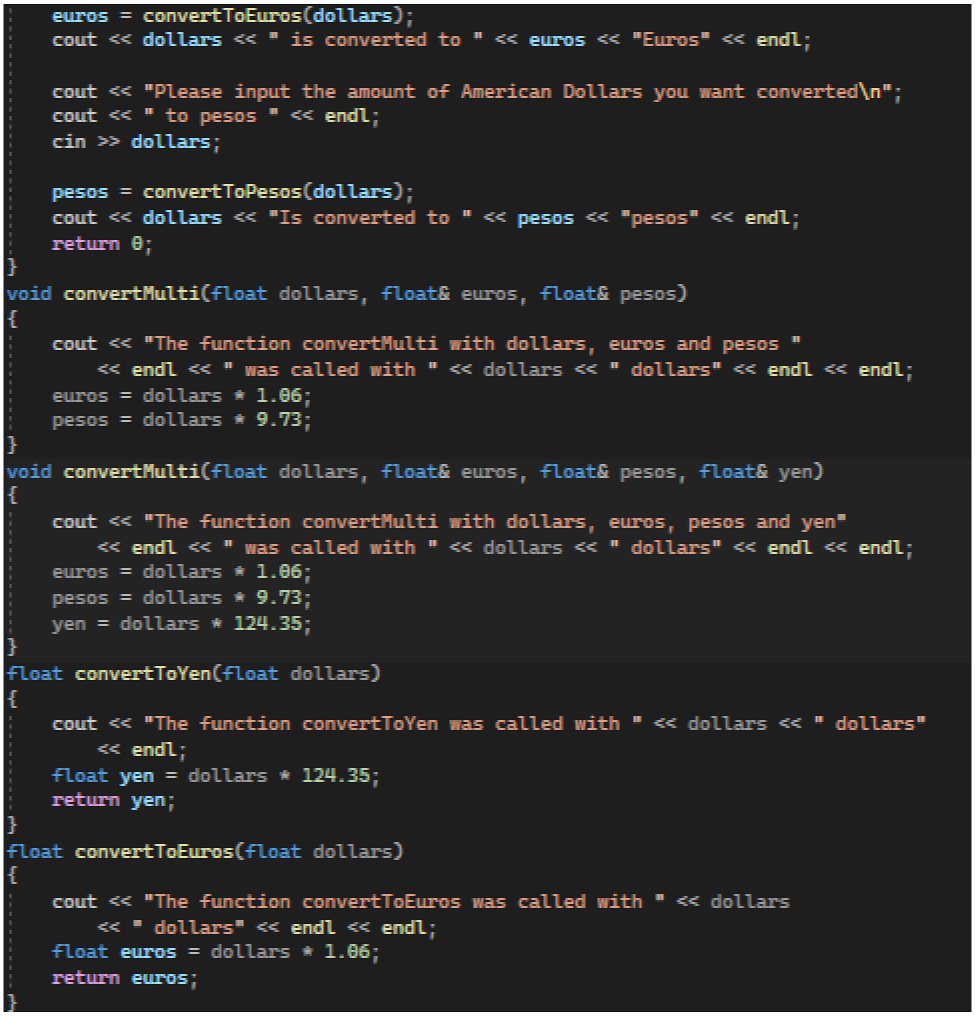
```
We will now add 95 cents to our total
We have added another $0.95 to our total
Our total so far is $0.95
The value of our local variable total is $0.95
Converting cents to dollars resulted in 0.95 dollars

We will now add 193 cents to our total
We have added another $1.93 to our total
Our total so far is $2.88
The value of our local variable total is $1.93
Converting cents to dollars resulted in 1.93 dollars

We will now add the default value to our total
We have added another $1.50 to our total
Our total so far is $4.38
The value of our local variable total is $1.50
Converting cents to dollars resulted in 1.50 dollars
Press any key to continue
```

Lab 6.7

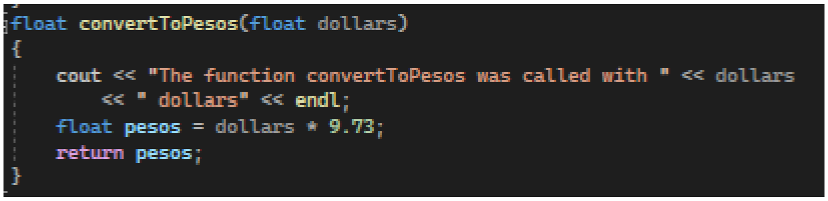
(3 points) Exercise 1 & 2: Retrieve `convertmoney.cpp` and observe how it works. Notice the use of stubs and overloaded functions. Complete `convertmoney.cpp` by turning all stubs into workable functions. Make sure true functions are called differently than procedures, and that the functions return the converted dollars into the proper currency. Your program output should match the sample run in the lab manual. The exchange rates should be defined as constants in the global section, and you should use the following:



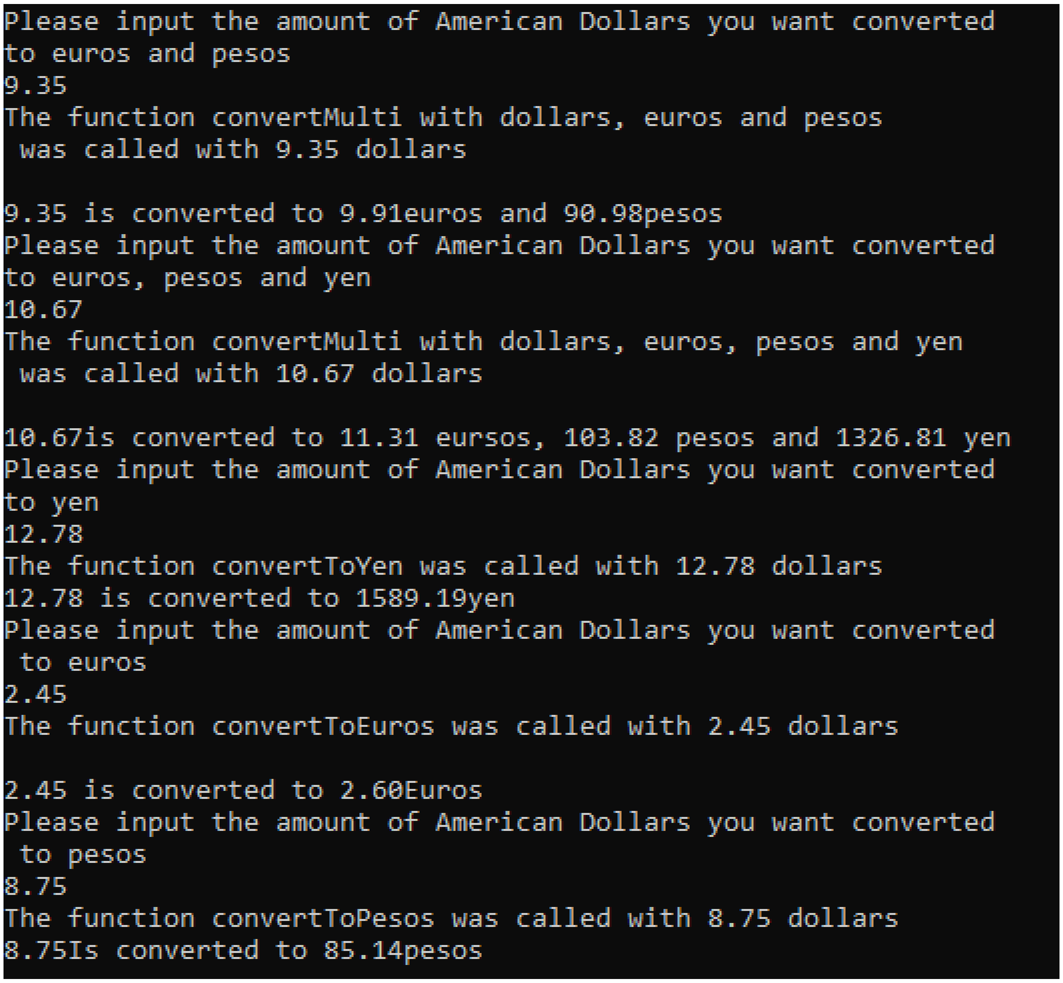
```cpp
//SARAH SAMI
#include <iostream>
#include <iomanip>
using namespace std;
// Prototypes of the functions
void convertMulti(float dollars, float& euros, float& pesos);
void convertMulti(float dollars, float& euros, float& pesos, float& yen);
float convertToYen(float dollars);
float convertToEuros(float dollars);
float convertToPesos(float dollars);
int main()
{
    float dollars;
    float euros;
    float pesos;
    float yen;
    cout << fixed << showpoint << setprecision(2);
    cout << "Please input the amount of American Dollars you want converted "
        << endl;
    cout << "to euros and pesos" << endl;
    cin >> dollars;

    convertMulti(dollars, euros, pesos);
    cout << dollars << "is converted to " << euros << "and " << pesos << "pesos" << endl;

    cout << "Please input the amount of American Dollars you want converted\n";
    cout << "to euros, pesos and yen" << endl;
    cin >> dollars;

    convertMulti(dollars, euros, pesos, yen);
    cout << dollars << "is converted to " << euros << " eursos, "
        << pesos << " pesos and " << yen << " yen" << endl;

    cout << "Please input the amount of American Dollars you want converted\n";
    cout << "to yen" << endl;
    cin >> dollars;

    yen = convertToYen(dollars);
    cout << dollars << " is converted to " << yen << "yen" << endl;

    cout << "Please input the amount of American Dollars you want converted\n";
    cout << " to euros" << endl;
    cin >> dollars;
```



```
    euros = convertToEuros(dollars);
    cout << dollars << " is converted to " << euros << "Euros" << endl;

    cout << "Please input the amount of American Dollars you want converted\n";
    cout << " to pesos " << endl;
    cin >> dollars;

    pesos = convertToPesos(dollars);
    cout << dollars << "Is converted to " << pesos << "pesos" << endl;
    return 0;
}
void convertMulti(float dollars, float& euros, float& pesos)
{
    cout << "The function convertMulti with dollars, euros and pesos "
        << endl << " was called with " << dollars << " dollars" << endl << endl;
    euros = dollars * 1.06;
    pesos = dollars * 9.73;
}
void convertMulti(float dollars, float& euros, float& pesos, float& yen)
{
    cout << "The function convertMulti with dollars, euros, pesos and yen"
        << endl << " was called with " << dollars << " dollars" << endl << endl;
    euros = dollars * 1.06;
    pesos = dollars * 9.73;
    yen = dollars * 124.35;
}
float convertToYen(float dollars)
{
    cout << "The function convertToYen was called with " << dollars << " dollars"
        << endl;
    float yen = dollars * 124.35;
    return yen;
}
float convertToEuros(float dollars)
{
    cout << "The function convertToEuros was called with " << dollars
        << " dollars" << endl << endl;
    float euros = dollars * 1.06;
    return euros;
}
```



```
float convertToPesos(float dollars)
{
    cout << "The function convertToPesos was called with " << dollars
        << " dollars" << endl;
    float pesos = dollars * 9.73;
    return pesos;
}
```



```
Please input the amount of American Dollars you want converted
to euros and pesos
9.35
The function convertMulti with dollars, euros and pesos
 was called with 9.35 dollars

9.35 is converted to 9.91euros and 90.98pesos
Please input the amount of American Dollars you want converted
to euros, pesos and yen
10.67
The function convertMulti with dollars, euros, pesos and yen
 was called with 10.67 dollars

10.67is converted to 11.31 eursos, 103.82 pesos and 1326.81 yen
Please input the amount of American Dollars you want converted
to yen
12.78
The function convertToYen was called with 12.78 dollars
12.78 is converted to 1589.19yen
Please input the amount of American Dollars you want converted
 to euros
2.45
The function convertToEuros was called with 2.45 dollars

2.45 is converted to 2.60Euros
Please input the amount of American Dollars you want converted
 to pesos
8.75
The function convertToPesos was called with 8.75 dollars
8.75Is converted to 85.14pesos
```