Solved problem

```cpp
// This program illustrates the use of a for-loop to calculate the monthly interest
// on a CD. The user enters the amount deposited, the term, and the interest rate.
// The program outputs a table listing the interest, accumulated interest, and
// account balance for each period.

#include <iostream>
#include <iomanip>
using namespace std;
int main()
{
  double annual_rate,     // Annual interest rate as a percent
         monthly_rate,    // Per period interest rate
         deposit,         // Amount of deposit
         acct_balance,    // Monthly account balance
         interest,        // Monthly interest
         total_interest;  // Total interest
  int    month,           // Counts the periods of the CD
         term;            // Term of the CD in months

  // Set output for currency
  cout << setprecision(2)<< setiosflags(ios::fixed) << setiosflags(ios::showpoint);
  cout << "Enter amount deposited in CD: ";
  cin >> deposit;
  cout << endl;
  cout << "Enter term of CD in number of months: ";
  cin >> term;
  cout << endl;
  cout << "Enter the annual CD interest rate in %: ";
  cin >> annual_rate;

  monthly_rate = (annual_rate / 100) / 12;
  total_interest = 0.00;
  acct_balance = deposit;
  cout << endl << endl;
  cout << "PERIOD     INTEREST TOTAL INTEREST  NEW BALANCE" << endl;
  cout << "-------------------------------------------" << endl;
  for (month = 1; month <= term; ++month)
  {
    interest = monthly_rate * acct_balance;
    acct_balance += interest;
    total_interest += interest;
    cout << endl << setw(4) << month
         << setw(14) << interest
         << setw(13) << total_interest
         << setw(15) << acct_balance;
  }
  cout << endl;
  cout << "-------------------------------------------" << endl << endl;
  cout << "\tSummary" << endl << endl;
  cout << "Initial Deposit:" << setw(8) << deposit << endl;
  cout << "Interest:       " << setw(8) << total_interest << endl;
  cout << "Final Total:    " << setw(8) <<  acct_balance << endl;

  return 0;
}
```

Program Output

```
Enter amount deposited in CD: 1000.00

Enter term of CD in number of months: 12

Enter the annual CD interest rate in %: 7.5

PERIOD     INTEREST   TOTAL INTEREST  NEW BALANCE
---------------------------------------------------
   1            6.25            6.25        1006.25
   2            6.29           12.54        1012.54
   3            6.33           18.87        1018.87
   4            6.37           25.24        1025.24
   5            6.41           31.64        1031.64
   6            6.45           38.09        1038.09
   7            6.49           44.58        1044.58
   8            6.53           51.11        1051.11
   9            6.57           57.68        1057.68
  10            6.61           64.29        1064.29
  11            6.65           70.94        1070.94
  12            6.69           77.63        1077.63
---------------------------------------------------
        Summary

Initial Deposit: 1000.00
Interest:          77.63
Final Total:     1077.63
```

Exercises

[1] Write a `for` loop that is equivalent to the following `while` loop.

```
int count = 0;
while (count < 20)
{
  cout << "Hello" << endl;
  ++count;
}
```

[2] The loop counter can be a non-integer. For example, consider the following code, which displays the tax on amounts ranging from $2.50 to $3.00 in increments of $0.10. (What is the purpose of the `cout` statement that follows the `for` statement?)

```
double price;
cout << setprecision(2) << setiosflags(ios::fixed) << setiosflags(ios::showpoint);
    for (price = 2.50; price <= 3.00; price += 0.10)
      cout << "Tax on " << setw(4) << price
           << " is " << setw(4) << price * 0.0825 << endl;
    cout << endl;
```

[3] what is the function of the cin.get in this example, implement and discuss?

```
#include <iostream>

using namespace std;
```

```
        int main()
        {
          char ch;                      // Used to store the input character
          int num_chars = 0;       // Counts the number of characters
          cout << "Enter any number of characters terminated by return."
              << endl << endl;
          ch = cin.get();
          while (ch != '\n')
          {
            ++num_chars;
            ch = cin.get();
          }
          cout << endl;
          cout << "You entered " << num_chars << " characters." << endl;
          return 0;
        }
```

Programming Problems

[1] Write a program that displays all the even integers between 1 and 100, inclusive

[2] Write a program that performs multiplication of integers by repeated addition. The program should ask the user to enter two integers, which the program stores in num1 and num2. Using an accumulator, the program should then add num1 to itself num2 times. Finally, the program should display the resulting product.

[3] Write a program that raises an integer to a positive integer power. The program should prompt the user to enter the base and the exponent. The program should calculate the power by multiplying base by itself exponent times. Finally, the program should display the result. Test your program by making it calculate 2^5 and 5^4.

[4] A cattle-feed company needs a program to help process feed orders. The program is to process an indeterminate number of orders. Each customer orders one or both of two types of feed, A and B. Feed A costs $2.50 per 100 pounds and feed B costs $3.15 per 100 pounds. Amounts less than 100 pounds are to be charged proportionally. For each customer, the program should ask the user to enter the actual number of pounds ordered for each of feeds A and B to the nearest tenth of a pound. The program should display the amount and cost of each type of feed and the total cost of the order. When no more customers are to be processed, the program should display the total number of customers processed, the total amount of feed A ordered, and the total amount of feed B ordered to the nearest tenth of a pound, and the total receipts. Write the required program.

[5] A computer science instructor needs a program that averages the grades she receives on a quiz she gives to her class. Each grade is an integer between 0 and 100. She does not know the number of grades at this time. Write a program that asks the user to enter quiz grades one at a time. After the user has completed entering grades, the program should display the number of grades entered and the sum of the grades entered. The program should also display the average of the grades, rounded to the nearest tenth.

[6] A computer science instructor wants you to write a program to compute final grades for her Introduction to Computers course. The program is to process an indeterminate number of students. For each student the program should ask the user to enter the mid-term and final exam scores and then display the student's final grade. The final grade is the sum of 45% of the mid-term exam score and 55% of the final exam score. After it processes all the students, the program should display the number of students it processed, and the average mid-term exam score, average final exam score, and average final grade all to the nearest tenth. Write the required program.