CASE STUDY

4 Crazy Al's Computer Emporium

Crazy Al's Computer Emporium is a retail seller of home computers. The sales staff at Crazy Al's work strictly on commission. At the end of the month, each salesperson's commission is calcuated according to Table 4A.

Table 4A Crazy Al's Commission Rate Structure

Sales This Month	Commission Rate
Less than $10,000	5%
$10,000–$14,999	10%
$15,000–$17,999	12%
$18,000–$21,999	14%
$22,000 or more	16%

For example, a salesperson with $16,000 in monthly sales will earn a 12% commission ($1,920.00). Another salesperson with $20,000 in monthly sales will earn a 14% commission ($2,800.00).

Because the staff only gets paid once per month, Crazy Al's allows each employee to take up to $1,500 per month in advance. When sales commissions are calculated, the amount of each employee's advanced pay is subtracted from the commission. If any salesperson's commissions are less than the amount of their advance, they must reimburse Crazy Al's for the difference.

Here are two examples: Beverly and John have $21,400 and $12,600 in sales, respectively. Beverly's commission is $2,996 and John's commission is $1,260. Both Beverly and John took $1,500 in advance pay. At the end of the month, Beverly gets a check for $1,496, but John must pay $240 back to Crazy Al's.

You've been asked to write a program that eases the task of calculating the end-of-month commission. Table 4B lists the variables needed.

Table 4B Variables Used in the Crazy Al's Commission Program

Variable	Description
`sales`	A `double` variable to hold a salesperson's total monthly sales.
`rate`	A `double` variable to hold the salesperson's commission rate.
`commission`	A `double` variable to hold the commission.
`advance`	A `double` variable to hold the amount of advanced pay the salesperson has drawn.
`remainingPay`	A `double` variable to hold the amount of commission still to be paid.

Program Design

General Pseudocode

The following general pseudocode lists the steps the program must perform.

```
Input the salesperson's monthly sales
Input the amount of advance pay drawn
Determine the commission rate
Calculate the commission amount
Calculate amount of commission still to be paid at end of month
```

Detailed Pseudocode

The following detailed pseudocode includes the actual variable names used in the program, the branching logic needed to determine the salesperson's commission rate, and the calculations needed to find the commission amount and the remaining commission to be paid at the end of the month.

```
Input sales
Input advance
If sales < 10,000
   rate = 5%
Else If sales < 15,000
   rate = 10%
Else If sales < 18,000
   rate = 12%
Else If sales < 22,000
   rate = 14%
Else
   rate = 16%
End If
commission = sales * rate
remainingPay = commission – advance
Display sales, rate, commission, advance, remainingPay
```

The Program

The next step, after the pseudocode has been checked for logic errors, is to expand the pseudocode into the final program. The source code listing for this program follows.

CrazyAI.cpp

```
// This program is used by Crazy Al's Computer Emporium
// to calculate the monthly pay of commissioned salespeople.

#include <iostream>
#include <iomanip>
using namespace std;

int main()
{
   double sales,          // Monthly sales
          rate,           // Commission rate
          commission,     // Commission amount
          advance,        // Advanced pay drawn
          remainingPay;   // Amount of commission remaining to be paid

   // Get salesperson's sales and amount of advanced pay
   cout << "Enter the salesperson's monthly sales: ";
   cin  >> sales;
   cout << "Enter the amount of advanced pay for this ";
   cout << "salesperson: ";
   cin  >> advance;

   // Determine the commission rate
   if (sales < 10000)
      rate = 0.05;
   else if (sales < 14999)
      rate = 0.1;
   else if (sales < 17999)
      rate = 0.12;
   else if (sales < 21999)
      rate = 0.14;
   else
      rate = 0.16;

   // Calculate sales commission and remaining pay
   commission = sales * rate;
   remainingPay = commission - advance;

```

```
39    // Display the results
40    cout << fixed << showpoint << setprecision(2);
41    cout << "\nPay Results\n";
42    cout << "-----------\n";
43    cout << "Sales:          $" << setw(8) << sales << endl;
44    cout << "Commission Rate: " << setw(8) << rate  << endl;
45    cout << "Commission:     $" << setw(8) << commission << endl;
46    cout << "Advanced Pay:   $" << setw(8) << advance << endl;
47    cout << "Remaining Pay:  $" << setw(8) << remainingPay << endl;
48
49    return 0;
50 }
```

Program Output with Example Input Shown in Bold

```
Enter the salesperson's monthly sales: 12505[Enter]
Enter the amount of advanced pay for this salesperson: 450[Enter]

Pay Results
-----------
Sales:            $12505.00
Commission Rate:       0.10
Commission:       $ 1250.50
Advanced Pay:     $  450.00
Remaining Pay:    $  800.50
```