Solved problem

```
// This program demonstrates the use of a compound if-statement
// that decides whether a key depressed by the user is numeric.
// The program uses cin.get() to input a character at a time.

#include <iostream>

using namespace std;

int main()
{
  char ch;

  cout << "Please press a key, then press enter: ";

  ch = cin.get();

  cout << endl;
  if ( (ch < '0') || (ch > '9'))
    cout << "The key you pressed was not a digit." << endl;
  else
    cout << "The key you pressed was a digit." << endl;

  return 0;
}
```

Program Output

```
Please press a key, then press enter: 7
The key you pressed was a digit.
```

Exercises

[1] To show that C++ uses short-circuit evaluation in compound conditions, consider the following program.

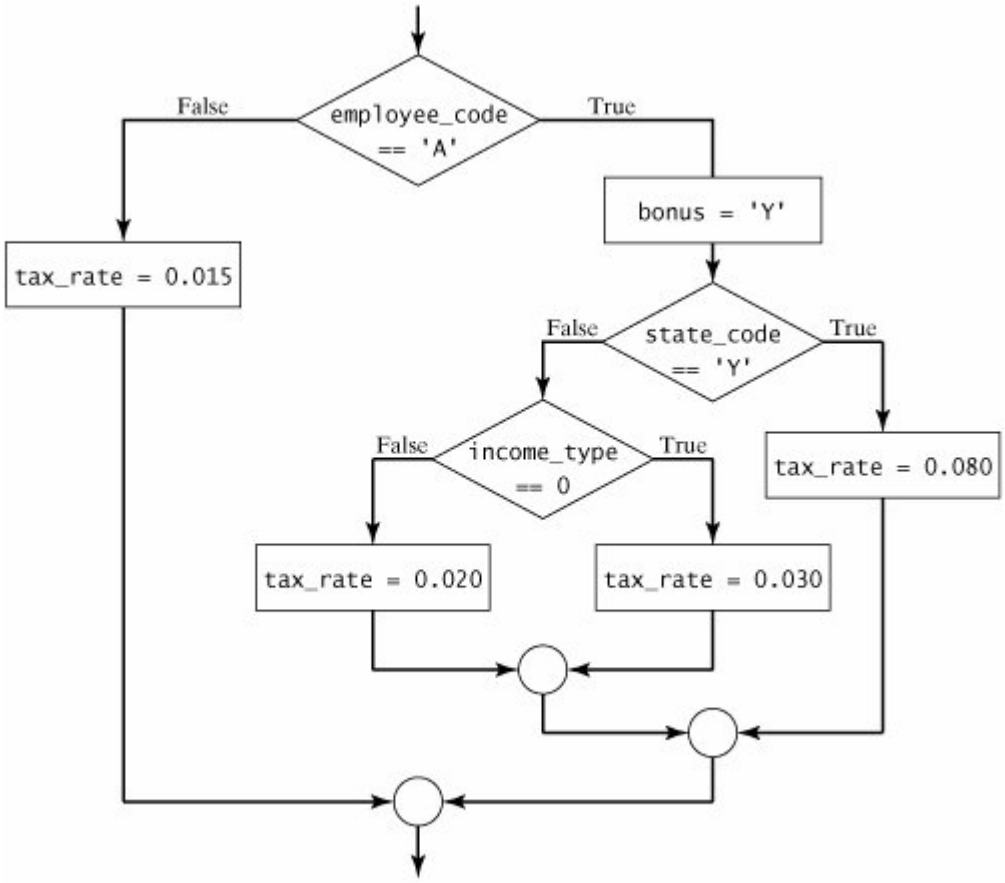
```
#include <iostream>

using namespace std;

int main()
{
  int i = 3,
      j = 5;
  if ( (i == 3) || (++j > 0) )
    cout << "i = " << i << ", j = " << j << endl;
  return 0;
}
```

What do you think the output should be? Remember how the preincrement operator works. When you execute the program, is the output what you expect? If not, explain what happens.

[2] Translate the flowchart of the next figure into C++ code using a nested `if`.



[3] The first example in this section contained the following nested `if` statement.

```
if (employee_code == 'A')
{
  if (state_code == 'Y')
     tax = gross_pay * 0.07;
  else
    tax = gross_pay * 0.045;
  special_tax = hours * 0.02;
}
else
{
  tax = 0.00;
  special_tax = 0.00;
}
```

Write short programs to see what happens if you omit the first pair of braces. Does the resulting program compile? If the program does compile, what does the nested `if` assign to `tax` and `special_tax`?

Programming Problems

1. Write a program for The Department of Motor Vehicles (DMV) to calculate the registration fees for automobiles. The DMV classifies automobiles as type 1, for luxury, or as type 2, for all others. The registration fee for an automobile is $35.00. If the automobile is a luxury vehicle, add a surcharge of $15.00. The DMV also classifies automobiles as city vehicles (class 1) or non-city vehicles (class 2). An automobile that is registered in the city of Metropolis must pay an additional surcharge of $20.00, no matter what its type. Your program should prompt the user for the luxury type (either 1 or 2) and for the city class (either 1 or 2) of the automobile. The program should display the total registration fee for the vehicle. Design the program to process any number of automobiles.

2. Write a program for a mail-order software company to calculate shipping and handling charges for its orders. The program should prompt the user for the weight of the order in ounces. If the weight is eight ounces or less, then there is a flat rate charge of $1.50. If the weight of the order is more than eight ounces but less than 32 ounces, the charge is $1.50 plus $0.50 for each ounce over eight. If the weight of the order is 32 ounces or greater, the charge is $13.50 plus $0.75 for each ounce over 32. The program should display the weight of the order and the shipping and handling charge. Design the program to process any number of orders. At the end of the program, display the total number of orders processed and the total of the shipping and handling charges.

3. The Big Racket Tennis Club wants you to write a program to calculate the yearly dues for its members. The program should prompt the user for the membership type (either 'I' for individual, or 'F' for family) and the number of years the person has been a member. Calculate the dues as follows: If the person is a family member and has been a club member for more than three years, the dues are $2400.00. If the person is a family member and has been a club member for three years or less, the dues are $3000.00. If the person is an individual member and has been a club member for more than five years, the dues are $1500.00. If the person is an individual member and has been a club member for five years or less, the dues are $1900.00.