

## ↑3.6 Detecting ranges with gaps

Students:  
Section 3.7 is a part of 2 assignments: **CSC108 CH03.1-3.10 C3A** ▾  
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Includes: CA  
Due: 02/20/2025, 11:59 PM EST

## 3.7 Detecting multiple features with branches

### Multiple distinct if statements

A programmer can use multiple if statements in sequence to detect multiple features with independent actions. Multiple sequential if statements look similar to a multi-branch if-else statement but has a very different meaning. Each if-statement is independent, and thus more than one branch can execute, in contrast to the multi-branch if-else arrangement.

Figure 3.7.1: Multiple distinct if statements.

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

int main() {
    int userAge;

    cout << "Enter age: ";
    cin >> userAge;

    // Note that more than one "if" statement can execute
    if (userAge < 16) {
        cout << "Enjoy your early years." << endl;
    }

    if (userAge > 15) {
        cout << "You are old enough to drive." << endl;
    }

    if (userAge > 17) {
        cout << "You are old enough to vote." << endl;
    }

    if (userAge > 24) {
        cout << "Most car rental companies will rent to you." << endl;
    }

    if (userAge > 34) {
        cout << "You can run for president." << endl;
    }

    return 0;
}
```

Enter age: 12  
Enjoy your early years.  
...  
Enter age: 27  
You are old enough to drive.  
You are old enough to vote.  
Most car rental companies will rent to you.  
...  
Enter age: 99  
You are old enough to drive.  
You are old enough to vote.  
Most car rental companies will rent to you.  
You can run for president.

Feedback?

PARTICIPATION ACTIVITY | 3.7.1: If statements.

Determine the final value of numBoxes.

1) numBoxes = 0;  
numApples = 9;  
  
if (numApples < 10) {  
 numBoxes = 2;  
}  
if (numApples < 20) {  
 numBoxes = numBoxes + 1;  
}

[ ]

**Check** Show answer

2) numBoxes = 0;  
numApples = 9;  
  
if (numApples < 10) {  
 if (numApples < 5) {  
 numBoxes = 1;  
 }  
 else {  
 numBoxes = 2;  
 }  
}  
else if (numApples < 20) {  
 numBoxes = numBoxes + 1;  
}

[ ]

**Check** Show answer

Feedback?

CHALLENGE ACTIVITY | 3.7.1: Enter the output for the multiple if-else branches.

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### Nested if-else statements

A branch's statements can include any valid statements, including another if-else statement, which are known as **nested if-else** statements. Nested if statements are commonly used to make decisions that are based on multiple features. Ex: To calculate a discount based on both the number of items purchased and the total cost of those items, one if statement checks the number of items purchased and a nested if statement can check the total cost.

Figure 3.7.2: Nested if-else.

```
if (numItems > 3) {
    if (totalCost > 100) {           // numItems > 3 and totalCost > 100
    }
    else if (totalCost > 50) {      // numItems > 3 and totalCost > 50
        saleDiscount = 10;
    }
} else if (numItems > 0) {
    ...
}
```

Feedback?

PARTICIPATION ACTIVITY | 3.7.2: Nested if-else statements.

Determine the final value of salesBonus given the initial values specified below.

```
if (salesType == 2) {
    if (salesBonus < 5) {
        salesBonus = 10;
    }
    else {
        salesBonus = salesBonus + 2;
    }
}
else {
    salesBonus = salesBonus + 1;
}
```

1) salesType = 1; salesBonus = 0;

• 0

• 1

• 10

2) salesType = 2; salesBonus = 4;

• 5

• 6

• 10

3) salesType = 2; salesBonus = 7;

• 8

• 9

• 10

[ ]

**Check** Next level

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Activity summary for assignment: **CSC108 CH03.1-3.10 C3A** ▾

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↓3.8 Common branching errors