3.3 More if-else

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.

```
Figure 3.3.1: Nested if-else.
```

Feedback?

PARTICIPATION ACTIVITY

3.3.1: 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;
}</pre>
```

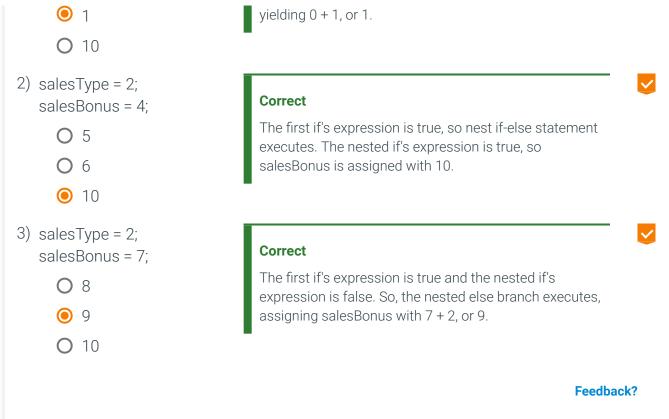
1) salesType = 1; salesBonus = 0;





salesType is 1, so the first if's expression is false. The else branch executes and increases salesBonus by 1,





Multiple distinct if statements

Sometimes the programmer has multiple if statements in sequence, which looks 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 3.3.2: Multiple distinct if statements.

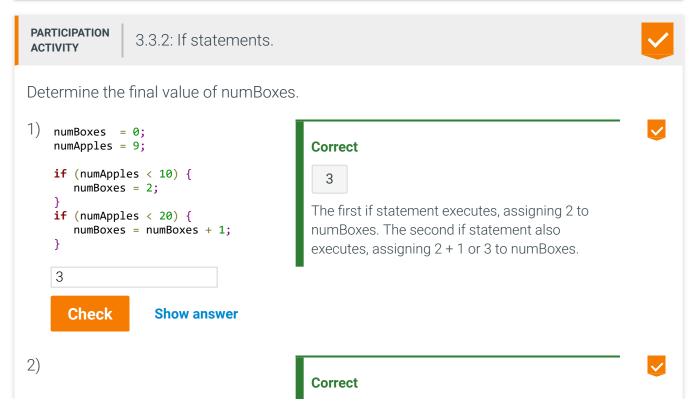
```
Enter age: 12
Enjoy your early years.
...

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.
```

```
#include <iostream>
using namespace std;
int main() {
   int userAge;
   cout << "Enter age: ";</pre>
   cin >> userAge;
   // Note that more than one "if" statement can
execute
   if (userAge < 16) {</pre>
      cout << "Enjoy your early years." << endl;</pre>
   if (userAge > 15) {
      cout << "You are old enough to drive." << endl;</pre>
   if (userAge > 17) {
      cout << "You are old enough to vote." << endl;</pre>
   if (userAge > 24) {
      cout << "Most car rental companies will rent to</pre>
you." << endl;
   }
   if (userAge > 34) {
      cout << "You can run for president." << endl;</pre>
   return 0;
}
```

Feedback?



```
numBoxes = 0;
numApples = 9;

if (numApples < 10) {
    if (numApples < 5) {
        numBoxes = 1;
    }
    else {
        numBoxes = 2;
    }
}
else if (numApples < 20) {
    numBoxes = numBoxes + 1;
}</pre>
Check Show answer
```

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The first branch executes, which is a nested ifelse. The second nested branch executes, assigning 2 to numBoxes. The numApples < 20 branch is skipped because it is part of the ifelse for which the if branch was taken.

Feedback?

CHALLENGE ACTIVITY

3.3.1: Enter the output for the multiple if-else branches.



Jump to level 1

Type the program's output.

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

int main() {
   int numItems;

   numItems = 5;

   if (numItems < 2) {
      cout << "c" << endl;
   }

   if (numItems < 9) {
      cout << "f" << endl;
   }

   if (numItems == 5) {
      cout << "k" << endl;
   }

   cout << "r" << endl;
}</pre>
```

f k r

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