Programming Language (630203)
Fall 2010/2011 – Lecture Notes # 7

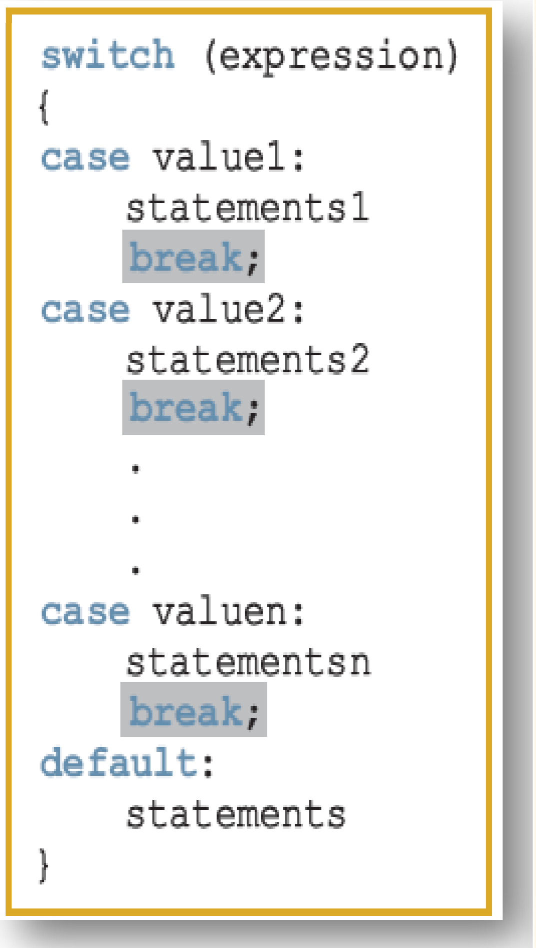
Selection Control Structures in C++ (switch Structure)

Objectives of the Lecture

- **switch Structures**
- **Avoiding Bugs by Avoiding Partially Understood Concepts and Techniques: Revisited**
- **Example 1 & Example 2**

switch Structures

- **switch structure**: alternate to if-else
- switch (integral) expression is evaluated first
- Value of the expression determines which corresponding action is taken
- Expression is sometimes called the **selector**



```
switch (expression)
{
case value1:
      statements1
      break;
case value2:
      statements2
      break;
      .
      .
      .
case valuen:
      statementsn
      break;
default:
      statements
}
```

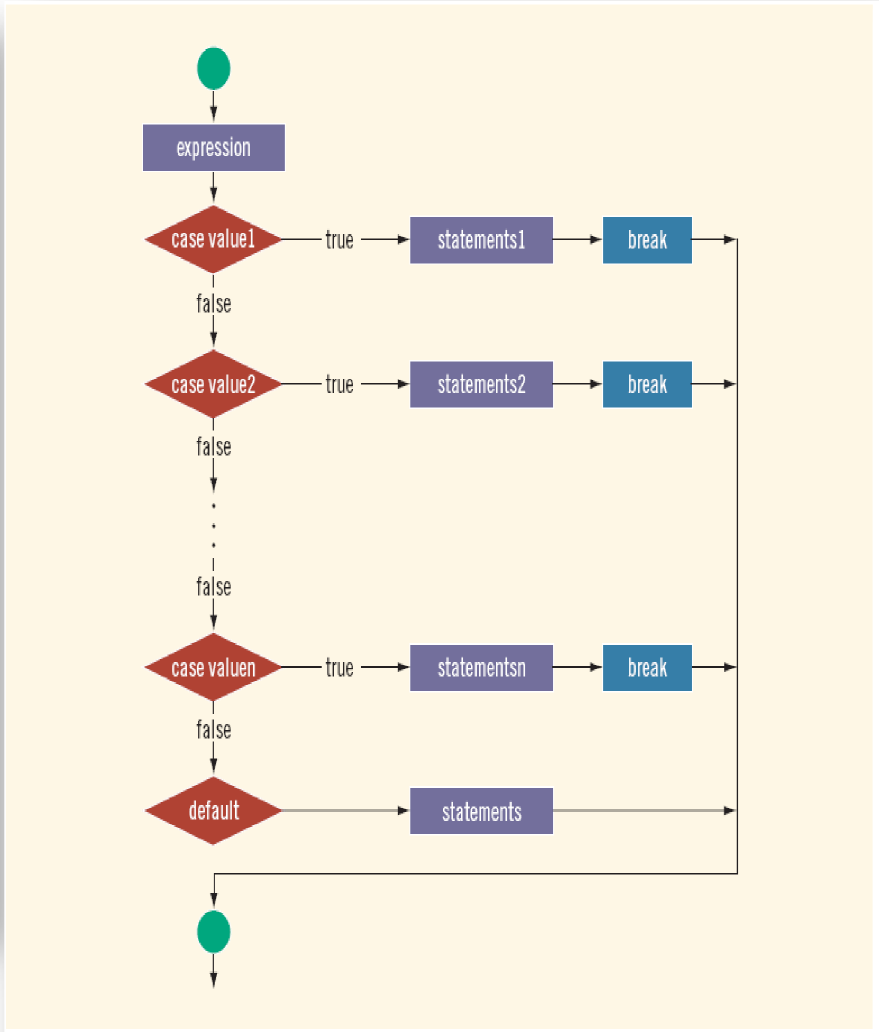
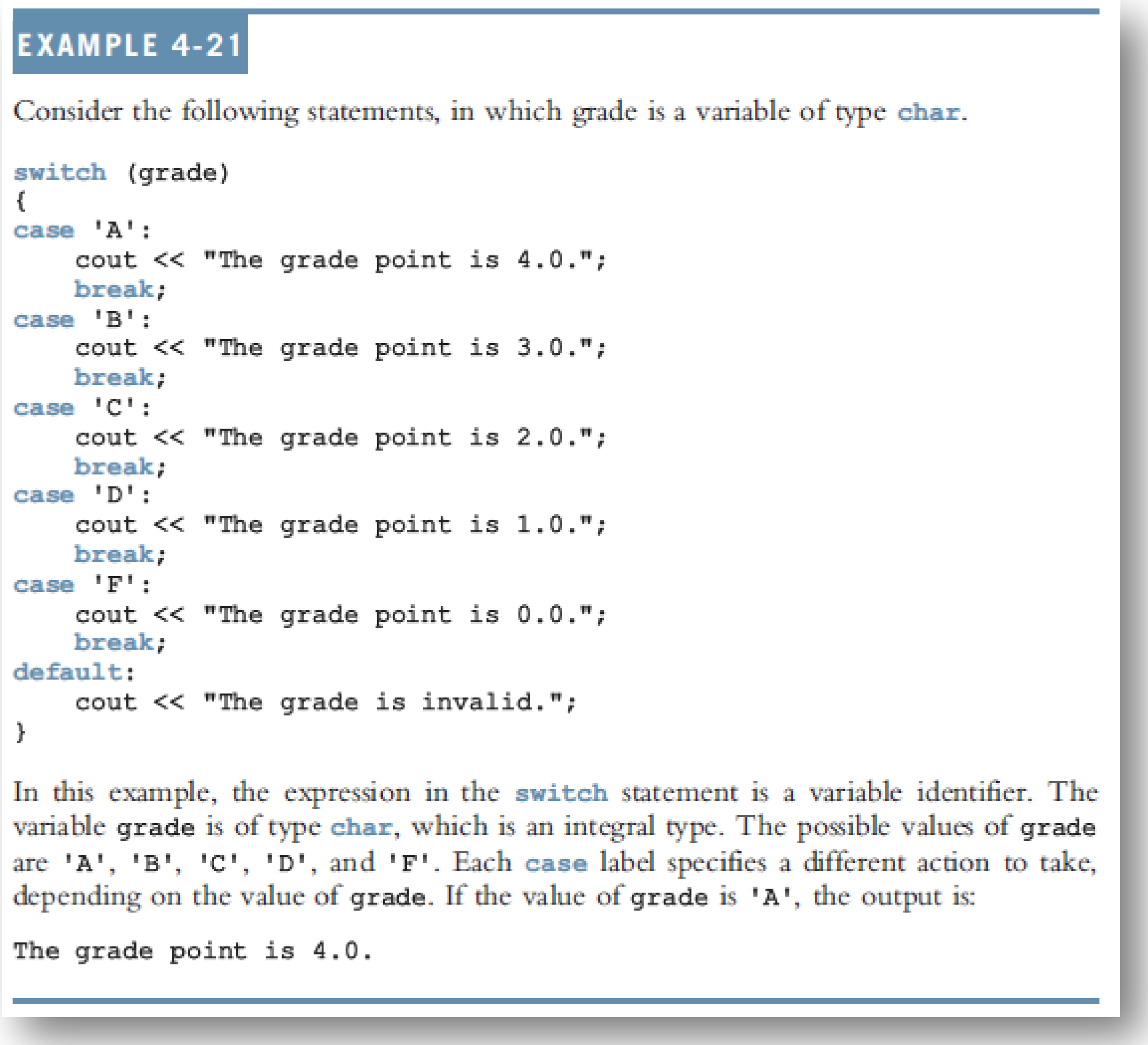


FIGURE 4-4 switch statement

- One or more statements may follow a case label.
- Braces are not needed to turn multiple statements into a single compound statement.
- The break statement may or may not appear after each statement.
- switch, case, break, and default are reserved words



EXAMPLE 4-21

Consider the following statements, in which grade is a variable of type `char`.

```
switch (grade)
{
case 'A':
    cout << "The grade point is 4.0.";
    break;
case 'B':
    cout << "The grade point is 3.0.";
    break;
case 'C':
    cout << "The grade point is 2.0.";
    break;
case 'D':
    cout << "The grade point is 1.0.";
    break;
case 'F':
    cout << "The grade point is 0.0.";
    break;
default:
    cout << "The grade is invalid.";
}
```

In this example, the expression in the `switch` statement is a variable identifier. The variable `grade` is of type `char`, which is an integral type. The possible values of `grade` are `'A'`, `'B'`, `'C'`, `'D'`, and `'F'`. Each `case` label specifies a different action to take, depending on the value of `grade`. If the value of `grade` is `'A'`, the output is:

```
The grade point is 4.0.
```

Avoiding Bugs by Avoiding Partially Understood Concepts and Techniques: Revisited

- To output results correctly

The switch structure must include a break statement after each cout statement

Example 1

```
//Program: Effect of break statements in a switch structure
#include <iostream>
using namespace std;
int main()
{
    int num;
    cout << "Enter an integer between 0 and 7: ";      //Line 1
    cin >> num;                                        //Line 2
    cout << endl;                                      //Line 3
    cout << "The number you entered is " << num
         << endl;                                      //Line 4
     switch(num)                                        //Line 5
    {
    case 0:                                            //Line 6
    case 1:                                            //Line 7
        cout << "Learning to use ";                    //Line 8
    case 2:                                            //Line 9
        cout << "C++'s ";                              //Line 10
    case 3:                                            //Line 11
        cout << "switch structure." << endl;           //Line 12
        break;                                         //Line 13
    case 4:                                            //Line 14
        break;                                         //Line 15
    case 5:                                            //Line 16
        cout << "This program shows the effect ";      //Line 17
    case 6:                                            //Line 18
    case 7:                                            //Line 19
        cout << "of the break statement." << endl;     //Line 20
        break;                                         //Line 21
    default:                                           //Line 22
        cout << "The number is out of range." << endl; //Line 23
    }
    cout << "Out of the switch structure." << endl;    //Line 24
    return 0;                                          //Line 25
}
```

Example 2

```
//Grade program with bugs.
#include <iostream>                                 //Line 1
using namespace std;                                //Line 2
int main()                                          //Line 3
{                                                   //Line 4
    int testScore;                                  //Line 5

    cout << "Enter the test score: ";               //Line 6
    cin >> testScore;                               //Line 7
    cout << endl;                                   //Line 8
    switch (testScore / 10)                         //Line 9
    {                                               //Line 10
    case 0:                                         //Line 11
    case 1:                                         //Line 12
    case 2:                                         //Line 13
    case 3:                                         //Line 14
    case 4:                                         //Line 15
    case 5:                                         //Line 16
        cout << "The grade is F." << endl;          //Line 17
    case 6:                                         //Line 18
        cout << "The grade is D." << endl;          //Line 19
    case 7:                                         //Line 20
        cout << "The grade is C." << endl;          //LIne 21
    case 8:                                         //Line 22
        cout << "The grade is B." << endl;          //Line 23
    case 9:                                         //Line 24
    case 10:                                        //Line 25
        cout << "The grade is A." << endl;          //Line 26
    default:                                        //Line 27
        cout << "Invalid test score." << endl;      //Line 28
    }                                               //Line 29
    return 0;                                       //Line 30
}                                                   //Line 31
```