

Decision statement: switch statement

Used when it is necessary to make decision between many alternatives of integral values

➤ Basic syntax:

```
switch (expression)
{
    case constant-1: statement
                    ...
                    statement
    case constant-2: statement
                    ...
                    statement
    ...
    case constant-n: statement
                    ...
                    statement
    default:        statement
                    ...
                    statement
}
```

Notes:

- (1) Expression should always evaluate to be a value of integral type (e.g., int, char)
In most cases, the expression consists of a single identifier of integral type
- (2) The expression followed by each case label must be a constant expression
- (3) No two case labels may have the same name
- (4) Two case labels may be associated with the same statements
- (5) Default case is optional. Statements in default case are executed when none of the case labels were matched. One switch statement can have at most one default case.
- (6) Each case acts as an entry point for program execution, all statements below the matched entry point will be executed, unless a break statement is encountered.

Example 1

```
int value;
cin >> value;

switch (value)
{
    case 5:  cout << "55555" << endl;
    case 4:  cout << " 4444"  << endl;
    case 3:  cout << "  333"   << endl;
    case 2:  cout << "   22"    << endl;
    case 1:  cout << "    1"     << endl;
    default: cout << "     *"    << endl;
}
```

what will be the output if the input from user is 4? 2? 0?

What if we only want to execute one of the cases?

- ### ➤ **break statement:** cause the program execution to jump out of the switch statement and go to the closing brace, and continue with the code that follows the switch.

Basic syntax:

```
break;
```

Determine the life expectancy of a light bulb

```
int watts, life;
cin >> watts;

switch (watts)
{
    case 25:  life = 2500;
              break;
    case 40:
    case 60:  life = 1000;
              break;
    case 75:
    case 100: life = 750;
              break;
    default:  life = 0;
              break;
}
```

calculate the letter grade for a score

```
char grade;
int temp;
int score;

cin >> score;
temp = score / 10;
switch (temp)
{
    case 10:
    case 9 : grade = 'A';
              break;
    case 8 : grade = 'B';
              break;
    case 7 : grade = 'C';
              break;
    case 6 : grade = 'D';
              break;
    default: grade = 'F';
              break;
}
```

```
cout << "The grade for score " << score <<
" is " << grade << endl;
```

Practice question : use switch statement to write a C++ function **ComputeWaterBill** that will calculate and return the amount of the water bill for a customer whose type is 'H' for home use, 'C' for commercial use, and 'I' for industrial use. The rates are as follows:

Type	Rate
-----	-----
H	\$5.00 plus 0.0005 per gallon water used
C	\$1000.00 for first 4 million gallons and \$0.00025 per additional gallon
I	\$1000.00 if usage is 4 million gallons or less; \$2000.00 for usage over 4 million but less than 10 million gallons; and \$3500.00 for use of 10 million or more gallons

Return a value of -1 if there is an error in the input arguments (e.g., an illegal type or a negative usage.)