
switch Selection Structure

10/16/06 CS150 Introduction to Computer Science 1 1

Switch Statements (4.13)

- Another form of selection statement
- Similar to an `if` statement
 - but not exactly!
- Useful for lots of alternatives

```
if ( x == 1 )
{
}
else if ( x == 2 )
{
}
else if ( x == 3 )
{
}
else
{
}
```

10/16/06 CS150 Introduction to Computer Science 1 2

Example

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

This **switch** sets the average life span of a light bulb based on its wattage

How is this different from an **if** statement?

10/16/06 CS150 Introduction to Computer Science 1 3

Syntax

```
switch ( integer_expression ) // selector
{
  case constant_integer_expression_1:
    statements1;
    break;
  case constant_integer_expression_2:
    statements2;
    break;
  ...
  case constant_integer_expression_n:
    statementsn;
    break;
  default:
    statements;
}
```

10/16/06

CS150 Introduction to Computer Science 1

4

Important!

- Selector must be
 - A variable of any of the integer data types (including char) (what are the integer data types?)
 - An expression whose value is any of the integer data types
- Each possible value is a separate case
- **break** stops statements for case, otherwise continue with statements for next case

10/16/06

CS150 Introduction to Computer Science 1

5

Example – Musical Notes

```
char musical_note;
cin >> musical_note;
switch (musical_note)
{
  case 'c':
    cout << "do" << endl;
    break;
  case 'd':
    cout << "re" << endl;
    break;
  case 'e':
    cout << "mi" << endl;
    break;
  case 'f':
    cout << "fa" << endl;
    break;
  case 'g':
    cout << "so" << endl;
    break;
  case 'a':
    cout << "la" << endl;
    break;
  case 'b':
    cout << "ti" << endl;
    break;
  default:
    cout << "An invalid note was read." << endl;
}
}
```

10/16/06

CS150 Introduction to Computer Science 1

6

Example

```
switch (color)
{
  case 'R':
  case 'r':
    cout << "red" << endl;
  case 'B':
  case 'b':
    cout << "blue" << endl;
  case 'Y':
  case 'y':
    cout << "yellow" << endl;
}
```

- What happens when color is 'r'? 'B'? 'Y'? 'Z'?

10/16/06

CS150 Introduction to Computer Science 1

7

Example

```
switch (x > y)
{
  case 1:
    cout << "x greater" << endl;
    break;
  case 0:
    cout << "y greater or equal" << endl;
    break;
}
```

- Write as if statement

10/16/06

CS150 Introduction to Computer Science 1

8

Questions

- Can you write any switch statement as an if? Why or why not?

- Can you write any if statement as a switch? Why or why not?

10/16/06

CS150 Introduction to Computer Science 1

9

Example

```
int grade; // one grade
int aCount = 0; // number of As
int bCount = 0; // number of Bs
int cCount = 0; // number of Cs
int dCount = 0; // number of Ds
int fCount = 0; // number of Fs

cout << "Enter the letter grades." << endl
    << "Enter the EOF character to end input."
    << endl;

// loop until user types end-of-file key sequence
while ((grade = cin.get()) != EOF)
{
```

10/16/06

CS150 Introduction to Computer Science 1

10

Example

```
switch ( grade )
{
case 'A':
case 'a':
    ++aCount;
    break;
case 'B':
case 'b':
    ++bCount;
    break;
case 'C':
case 'c':
    ++cCount;
    break;
case 'D':
case 'd':
    ++dCount;
    break;
}
```

10/16/06

CS150 Introduction to Computer Science 1

11

Example

```
case 'F':
case 'f':
    ++fCount;
    break;
case '\n':
case '\t':
case ' ':
    break;
default:
    cout << "Incorrect letter grade entered."
        << " Enter a new grade." << endl;
    break;
}
}
```

10/16/06

CS150 Introduction to Computer Science 1

12

`cin.get()`

- Used to read one character from the keyboard at a time
- Also reads new lines, spaces, and tabs as a character
 - `'\n'`: new line
 - `'\t'`: tab
 - `' '`: space

10/16/06

CS150 Introduction to Computer Science 1

13

ASCII Values

- All characters have integer values called ASCII values
 - `'a'`: 97
 - `'b'`: 98
 - `'z'`: 122
 - `'A'`: 65
 - `'B'`: 66
 - `'Z'`: 90

10/16/06

CS150 Introduction to Computer Science 1

14

EOF

- An integer constant defined in the `iostream` library
- On Unix it is:
 - `<ctrl-d>`
- On Windows it is:
 - `<ctrl-z>`

10/16/06

CS150 Introduction to Computer Science 1

15

Change to switch

```
if (speed > 35)
{
    fee = 20.00;
}
else if (speed > 50)
{
    fee = 40.00;
}
else if (speed > 75)
{
    fee = 60.00;
}
```

10/16/06

CS150 Introduction to Computer Science 1

16

Examples

- Write an `if` statement that prints out the level of schooling. (0, none; 1 through 6, elementary; 7 through 8, middle school; 9 through 12, high school; > 12, college)

```
int levelOfSchooling;
cin >> levelOfSchooling;
```

- Write a switch statement to do the same

10/16/06

CS150 Introduction to Computer Science 1

17
