

Java Foundations

switch Statement



Objectives

- This lesson covers the following objectives:
 - Create a switch control structure
 - Compare if/else constructs with switch control structures
 - Understand the purpose of the break keyword



What About Using an if/else Statement?

- Consider the scenario where you need to write a Java program to implement the following:
 - User enters a school grade between 9 to 12 and the program prints the name of the grade
- First, let's start with a solution using an if/else statement

Solution: if/else Statement

```
Scanner in = new Scanner(System.in);
System.out.println("Enter your grade");
int grade = in.nextInt();
if (grade == 9){
    System.out.println("You are a freshman");
}
else if (grade == 10) {
    System.out.println("You are a sophomore");
}
else if (grade == 11) {
    System.out.println("You are a junior");
}
else if (grade == 12) {
    System.out.println("You are a senior");
}
else {
    System.out.println("Invalid grade");
}
//endif
```

Complex conditions with a chained if construct tend to be confusing to read and hard to maintain

The switch Statement

- The switch statement provides more efficient syntax for choosing among several alternatives

```
switch (<variable or expression>) {  
    case <literal value>: //code_block1  
        [break;]  
    case <literal value>: // code_block2  
        [break;]  
    default: //default_code  
} //end switch
```

Solution: switch Statement

```
Scanner in = new Scanner(System.in);  
System.out.println("What grade are you in?");  
int grade = in.nextInt();  
switch (grade) {  
    case 9:  
        System.out.println("You are a freshman");  
        break;  
    case 10:  
        System.out.println("You are a sophomore");  
        break;  
    case 11:  
        System.out.println("You are a junior");  
        break;  
    case 12:  
        System.out.println("You are a senior");  
        break;  
    default:  
        System.out.println("Invalid grade");  
} //end switch
```

The switch statement

- Compared with the if/else statement the switch statement:
 - Is more streamlined than chained if statements
 - Is easier to read and maintain
 - Simplifies the organization of the various branches of code that can be executed
 - Offers better performance
 - Can be used for complex conditions

When to Use switch Constructs

- Use when you are testing:
 - Equality (not a range)
 - A single value
 - For fixed known values at compile time
 - int, short, byte, char, or String

```
int month = 8;
month = in.nextInt();

switch (month) {
    case 1: case 3: case 5: case 7:
    case 8: case 10: case 12: System.out.print("31 days");
                                break;
    case 2: if(isLeapYear)){
        ..
    }
```

Only a single value can be tested

Known values

String in a switch Statement: Example

```
String typeOfDay;  
String dayOfWeekArg = "Thursday";  
  
switch (dayOfWeekArg) {  
    case "Monday": typeOfDay = "Start of work week";  
                    break;  
    case "Tuesday":  
    case "Wednesday":  
    case "Thursday": typeOfDay = "Midweek";  
                    break;  
    case "Friday": typeOfDay = "End of work week";  
                    break;  
    case "Saturday":  
    case "Sunday": typeOfDay = "Weekend";  
                    break;  
    default: System.out.print("Invalid");  
}  
//end switch
```

Exercise 1



- Import and open the SwitchEx project
- Modify SwitchEx1.java to implement the following with the switch statement
 - The user enters the month as a number
 - The corresponding month name must be displayed
 - For any invalid month, the output must be displayed as "Invalid month"

switch Statement: Keywords

- The following keywords are used in a switch statement:
 - **switch**: Specifies the variable to test for value
 - **case**: Compares the value of the switch variable
 - **default**: When the input doesn't match the cases, then the default statement is executed, however, the default statement is optional
 - **break**: Is used as the last statement in each case statement list, a break statement causes control to transfer to the end of the switch statement

What Is a break Keyword?

- Is used as the last statement in each case statement list and it causes control to transfer outside the switch



What Is a break Keyword?

```
char option = 'A';
int aCount = 0, bCount = 0, cCount = 0;

switch (option) {
    case 'A': aCount++;
              System.out.println("Count of A " + aCount);
              break;
    case 'B': bCount++;
              System.out.println("Count of B " + bCount);
              break;
    case 'C': cCount++;
              System.out.println("Count of C " + cCount);
              break;
} //end switch
//additional code . . .
```

Exercise 2



- Import and open the SwitchEx project
- Observe SwitchEx2.java and execute the program
- Observe the output



Exercise 2

- Modify the switch statement as follows:
- Remove the break statements for case 'A'
 - Execute the program
 - Observe the output
- Remove the break statements for case 'A' and case 'B'
 - Execute the program
 - Observe the output

What Is switch Fall Through?

- switch fall through is a condition that occurs if there are no break statements at the end of each case statement
- All statements after the matching case label are executed in sequence, regardless of the expression of subsequent case labels, until a break statement is encountered.

Understanding switch Fall Through

- Expected Output:

- The values of the count variables are incremented by 1

```
char option = 'A';
int aCount = 0, bCount = 0, cCount = 0;

switch (option) {
    case 'A': aCount++;
              System.out.println("Count of A " + aCount);

    case 'B': bCount++;
              System.out.println("Count of B " + bCount);
              break;
    case 'C': cCount++;
              System.out.println("Count of B " + cCount);
              break;
} //end switch
```

No break statement, so it continues
execution with the next two case statements

switch Fall Through: Example

```
int month = 12;
switch (month) {
    case 2: System.out.println("28 days (29 in leap years)");
            break;
    case 4:
    case 6:
    case 9:
    case 11: System.out.println("30 days");
             break;
    case 1:
    case 3:
    case 5:
    case 7:
    case 8:
    case 12: System.out.println("31 days");
             break;
    default: System.out.println("Illegal month number");
             break;
} //end switch
```

Summary

- In this lesson, you should have learned how to:
 - Create a switch control structure
 - Compare if/else constructs with switch control structures
 - Understand the purpose of the break keyword

