Learning Objectives - Switch Case Statement

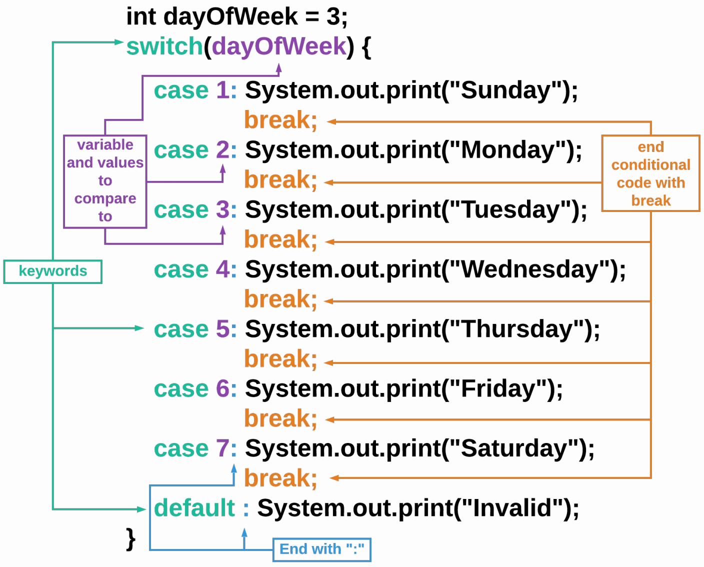
- **Identify when to apply switch statements instead of nested if-else**

- **Describe the switch case syntax**

Switch Case Statement Syntax

Swith Case Statement Syntax

The switch case is a way to make a decision with multiple outcomes. Instead of nesting or sequencing many if statements, Java allows you to write the following:



```
int dayOfWeek = 3;
switch(dayOfWeek) {
    case 1: System.out.print("Sunday");
            break;
    case 2: System.out.print("Monday");
            break;
    case 3: System.out.print("Tuesday");
            break;
    case 4: System.out.print("Wednesday");
            break;
    case 5: System.out.print("Thursday");
            break;
    case 6: System.out.print("Friday");
            break;
    case 7: System.out.print("Saturday");
            break;
    default : System.out.print("Invalid");
}
```

variable and values to compare to
keywords
end conditional code with break
End with ":"

.guides/img/switch-case

Here are the rules for writing a switch case statement:

- Start with `switch` followed by the variable that is going to be tested in parentheses `()`
- All of the `cases` are surrounded by curly braces `{}`
- Each `case` is followed by a value (numeric or String) and a colon `:`
- After each `:` write the code that should run if the variable is equal to that value
- After each section of code, include `break;`
- As the very last case, use `default:` and specify what should happen if none of the above cases are true

```
int dayOfWeek = 3;

switch(dayOfWeek) {

    case 1: System.out.print("Sunday"); //only prints if dayOfWeek == 1
                break;
    case 2: System.out.print("Monday"); //only prints if dayOfWeek == 2
                break;
    case 3: System.out.print("Tuesday"); //only prints if dayOfWeek == 3
                break;
    case 4: System.out.print("Wednesday"); //only prints if dayOfWeek == 4
                break;
    case 5: System.out.print("Thursday"); //only prints if dayOfWeek == 5
                break;
    case 6: System.out.print("Friday"); //only prints if dayOfWeek == 6
                break;
    case 7: System.out.print("Saturday"); //only prints if dayOfWeek == 7
                break;
    default : System.out.print("Invalid"); //only prints if none of the above are true

}
```

Code Visualizer

challenge

What happens if you:

- Change `dayOfWeek` to `5`?
- Change `dayOfWeek` to `0`?
- Change `dayOfWeek` to `3` and remove all the `break` statements?

Code Visualizer

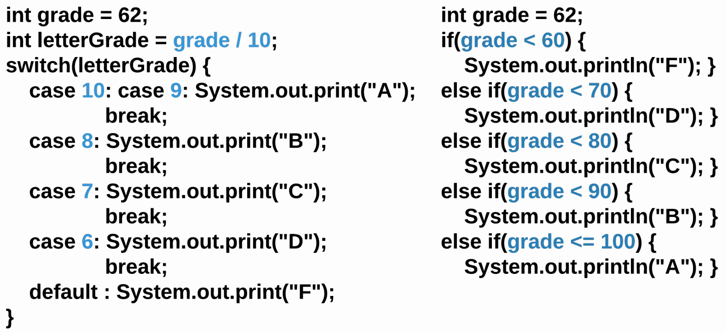
Switch Case vs If Else

Switch Case vs If Else

Java allows you to use either `switch case` or a series of `if else` to handle decisions with multiple outcomes. There are a couple reasons you would use one over the other.

#1: If Else is used for ranges - Switch Case is for values

Switch case can only check for equality (i.e. `num == 5`) so if you need to check for a range (i.e. `num > 50 && num <= 60`).



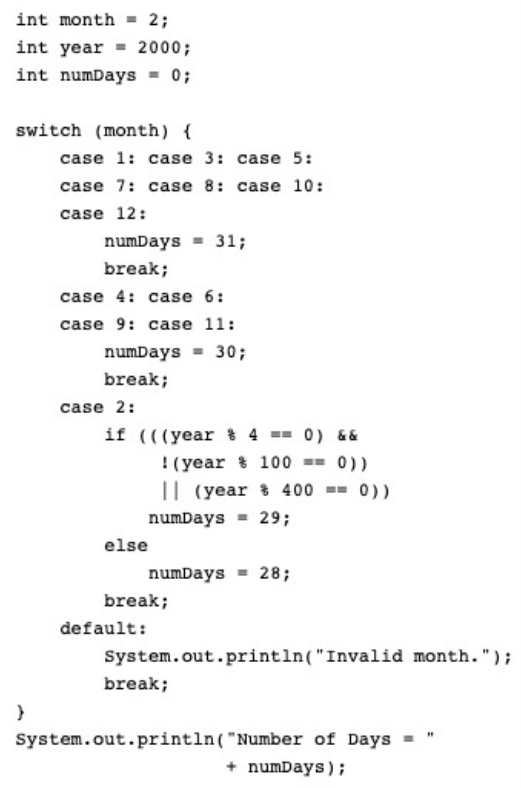
```
int grade = 62;
int letterGrade = grade / 10;
switch(letterGrade) {
    case 10: case 9: System.out.print("A");
             break;
    case 8: System.out.print("B");
             break;
    case 7: System.out.print("C");
             break;
    case 6: System.out.print("D");
             break;
    default : System.out.print("F");
}
```

```
int grade = 62;
if(grade < 60) {
    System.out.println("F"); }
else if(grade < 70) {
    System.out.println("D"); }
else if(grade < 80) {
    System.out.println("C"); }
else if(grade < 90) {
    System.out.println("B"); }
else if(grade <= 100) {
    System.out.println("A"); }
```

.guides/img/Switch-Case-vs-If-Else

▼ **What is `case 10: case 9:`?**

Sometimes, the code for multiple cases is the same. Instead of repeating code, you can list multiple cases before the code. Here is another example:



```
int month = 2;
int year = 2000;
int numDays = 0;

switch (month) {
    case 1: case 3: case 5:
    case 7: case 8: case 10:
    case 12:
        numDays = 31;
        break;
    case 4: case 6:
    case 9: case 11:
        numDays = 30;
        break;
    case 2:
        if (((year % 4 == 0) &&
             !(year % 100 == 0))
             || (year % 400 == 0))
            numDays = 29;
        else
            numDays = 28;
        break;
    default:
        System.out.println("Invalid month.");
        break;
}
System.out.println("Number of Days = "
                   + numDays);
```

In some cases, as shown above, you can exploit patterns to force ranges into a switch case, but frequently that is not possible and it also makes the code less readable. For example, above, the user has to realize that `letterGrade` is using integer division to retrieve the ten's place of the original grade.

```
int grade = 62;
int letterGrade = grade / 10;
switch(letterGrade) {
    case 10: case 9: System.out.print("A");
                 break;
    case 8: System.out.print("B");
                 break;
    case 7: System.out.print("C");
                 break;
    case 6: System.out.print("D");
                 break;
    default : System.out.print("F");
}
```

Code Visualizer

#2: If Else is used for handling multiple variables

Switch case can only compare against values - not variables. For example, if you wanted to compare the inputted day of the week with the current day of the week you would need to use an `if else`. Switch can handle values (dayOfWeek == “Sunday”) but not variables (dayOfWeek == today).

#3: If Else is used for compound conditionals

To check multiple conditions, an `if else` is needed.

An example would be a multiple choice grader:

```
int studentAnswer = 3;
String feedback1 = "This answer is wrong because....";
String feedback2 = "This answer is correct! You know this
because...";
String feedback3 = "This answer is wrong. While the first part
is correct...";
String feedback;

int correctAnswer = 2;
int points = 0;

switch(studentAnswer) {
    case 1: feedback = feedback1; break;
    case 2: feedback = feedback2; break;
    case 3: feedback = feedback3; break;
    default: feedback = "Invalid answer choice";
}

System.out.println(feedback);
```

challenge

Convert to an If Else

- Change the `switch` statement above into an if else
- Add a check to see if `studentAnswer == correctAnswer`
- If the student’s answer is correct, increment (++) the `points` variable.
- Print out the students earned points at the end of the program using the `points` variable

Code Visualizer