

Object Oriented Programming in Java

Branching with Switch Statement & Expression

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Branching with Switch Statement

Switch Statement Basics:

- Controls program flow based on selector variable
- Supported types:
 - `byte, short, char, int`
 - `Character, Byte, Short, Integer`
 - `enum` types
 - `String` (Java SE 7+)

Branching with Switch Statement

Example

```
int quarter = 2;
String quarterLabel;
switch (quarter) {
    case 0: quarterLabel = "Q1 - Winter"; break;
    case 1: quarterLabel = "Q2 - Spring"; break;
    case 2: quarterLabel = "Q3 - Summer"; break;
    case 3: quarterLabel = "Q4 - Fall"; break;
    default: quarterLabel = "Unknown quarter";
}
```

Branching with Switch Statement

Break and Fall-Through

- `break` terminates switch block
- Without `break`, execution falls through to next case

```
int month = 2;
List<String> futureMonths = new ArrayList<>();
switch (month) {
    case 1: futureMonths.add("January");
    case 2: futureMonths.add("February");
    case 8: futureMonths.add("August");break;
    default: break;
}
// futureMonths contains [February, August]
```

Branching with Switch Statement

Multiple Case Labels

- Single block can handle multiple cases

```
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: // February calculation  
        break;  
    default:  
        System.out.println("Invalid month");  
}
```

Branching with Switch Statement

switch vs if-then-else

- **Switch:** single discrete values

```
// Good for switch
switch (month) {
    case 1: System.out.println("Jan"); break;
    // ...
}
```

Branching with Switch Statement

switch vs if-then-else

- **if-then-else**: ranges or conditions

```
// Requires if-else
if (temp < 0) {
    System.out.println("Ice");
} else if (temp < 100) {
    System.out.println("Liquid");
} else {
    System.out.println("Vapor");
}
```

Branching with Switch Statement

String in Switch

- Available since Java SE 7
- Case-sensitive comparison (use `toLowerCase()`)

```
String month = "February";
int monthNumber;
switch (month.toLowerCase()) {
    case "january": monthNumber = 1; break;
    case "february": monthNumber = 2; break;
    // ...
    default: monthNumber = 0; break;
}
```


Branching with Switch Statement

Handling Null Values

- Switch throws `NullPointerException` with null selector
- Always check for null first

```
String month = null;
if (month == null) {
    System.out.println("Month is null");
} else {
    switch (month.toLowerCase()) {
        // cases...
    }
}
```

Branching with Switch Expressions

Switch Expressions (Java SE 14+)

- More concise syntax
- No fall-through behavior
- Can return values
- Multiple constants per case

Branching with Switch Expressions

Traditional switch statement

```
Day day = Day.MONDAY;  
int len = 0;  
switch (day) {  
    case MONDAY, FRIDAY, SUNDAY:  
        len = 6;  
        break;  
    // ... other cases ...  
}
```

Branching with Switch Expressions

Switch expression

```
int len = switch (day) {  
    case MONDAY, FRIDAY, SUNDAY -> 6;  
    case TUESDAY                 -> 7;  
    case THURSDAY, SATURDAY      -> 8;  
    case WEDNESDAY               -> 9;  
};
```

Branching with Switch Expressions

Producing Values

- Entire switch can return a value
- Single expression: implicit return
- Block: use `yield` keyword

Simple expression

```
String quarterLabel = switch  
(quarter) {  
    case 0 -> "Q1 - Winter";  
    case 1 -> "Q2 - Spring";  
    default -> "Unknown quarter";  
};
```

Branching with Switch Expressions

Block with yield

```
String label = switch (quarter) {  
    case 0 -> {  
        System.out.println("Q1 - Winter");  
        yield "Q1 - Winter";  
    }  
    default -> "Unknown quarter";  
};
```

Branching with Switch Expressions

Exhaustiveness

- Switch expressions must cover all cases
- Default clause often needed
- Exception for complete enum coverage

```
enum Season { SPRING, SUMMER, FALL, WINTER }  
String weather = switch (season) {  
    case SPRING -> "Rainy";  
    case SUMMER -> "Sunny";  
    case FALL    -> "Windy";  
    case WINTER -> "Snowy";  
    // No default needed - all cases covered  
};
```

Branching with Switch Expressions

Colon Syntax

- Traditional `case L:` syntax supported
- Requires explicit `yield`
- Fall-through still applies

```
String quarterLabel = switch (quarter) {  
    case 0:  
        System.out.println("Winter");  
        yield "Q1 - Winter";  
    case 1:  
        yield "Q2 - Spring";  
    default:  
        yield "Unknown quarter";  
};
```


Branching with Switch Expressions

Null Handling

- Traditional switch throws NPE on null
- Java 17+ preview: null case support

```
String month = null;
String season = switch (month) {
    case "Jan", "Feb", "Dec" -> "Winter";
    case null -> "No month provided"; // Java 17+ preview
    default -> "Unknown season";
};
```

Best Practice: Always check for null before switching