



TECHIN



03 Loginiai operatoriai, if, switch

Turinys

- Lyginimo operatoriai;
- boolean tipas;
- Šakotieji algoritmai (if, if-else ir switch);
- Loginiai operatoriai (AND, OR, NOT)
- Switch

Lyginimo operatoriai | Relational Operators

```
(a == b)    // (ar lygu)
(a != b)    // (ar nelygu)
(a > b)     // (a daugiau už b)
(a >= b)    // (a daugiau arba lygu b)
(a < b)     // (a mažiau už b)
(a <= b)    // (a mažiau arba lygu už b)
```



boolean tipo kintamasis

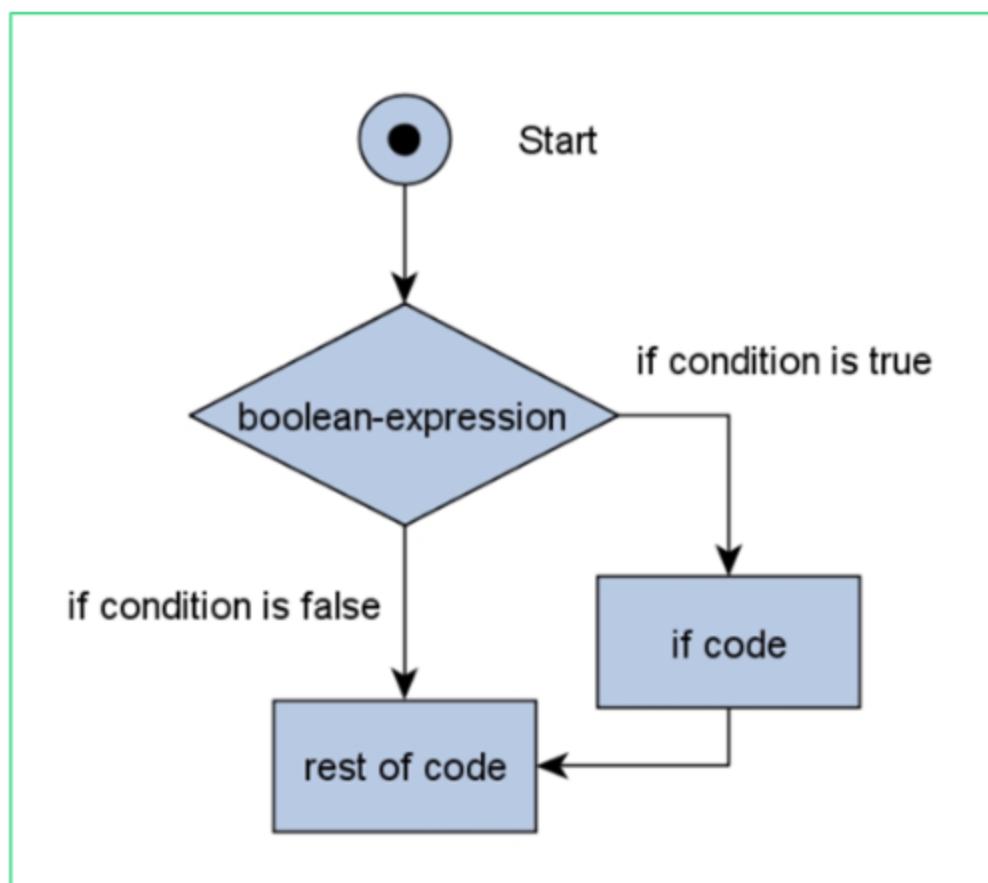
```
int one = 1;  
int two = 2;  
int three = 3;  
int four = 4;  
  
boolean oneIsOne = one == one; // true  
  
boolean res1 = two <= three; // true  
boolean res2 = two != four; // true  
boolean res3 = two > four; // false  
boolean res4 = one == three; // false
```



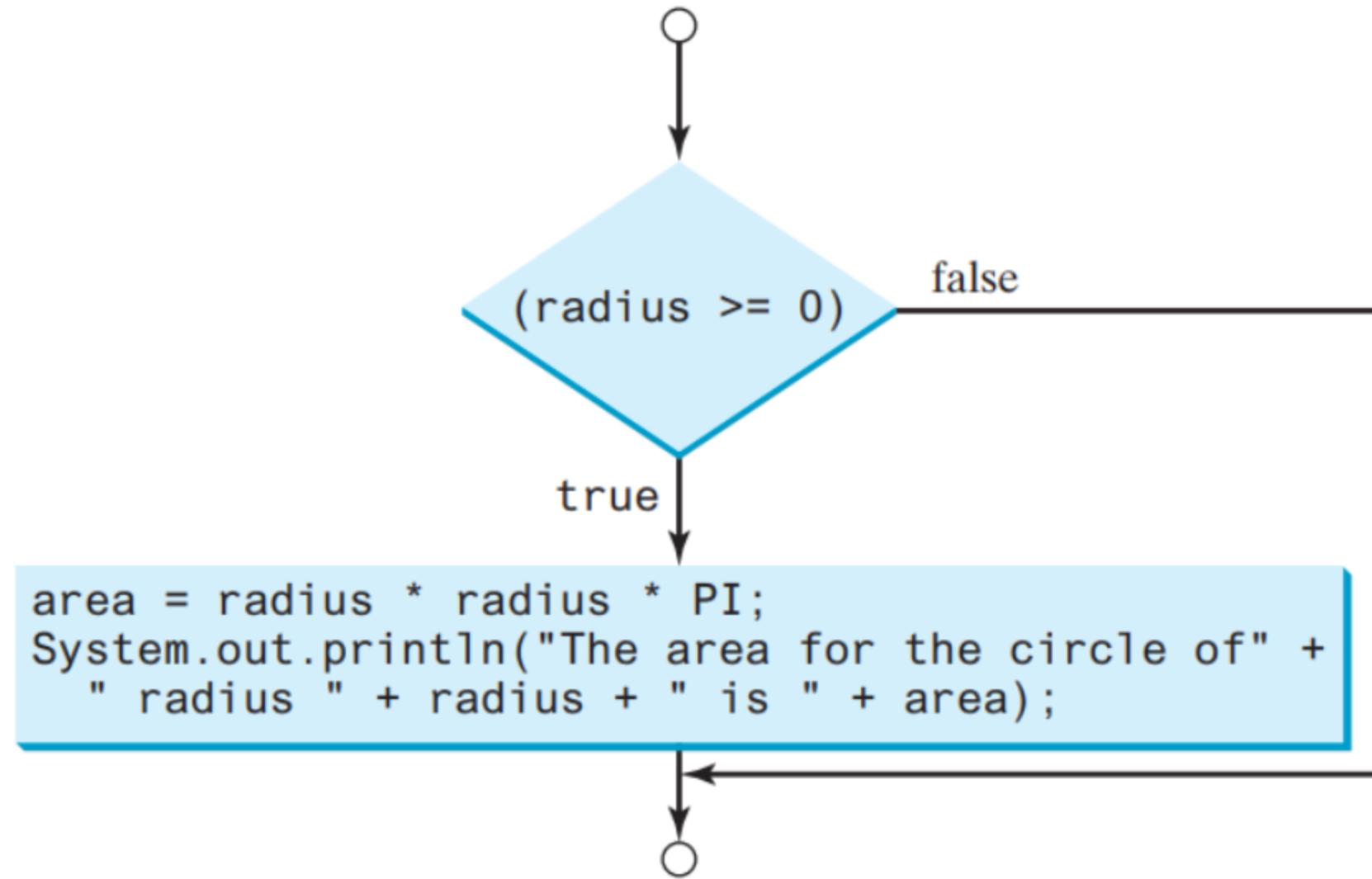
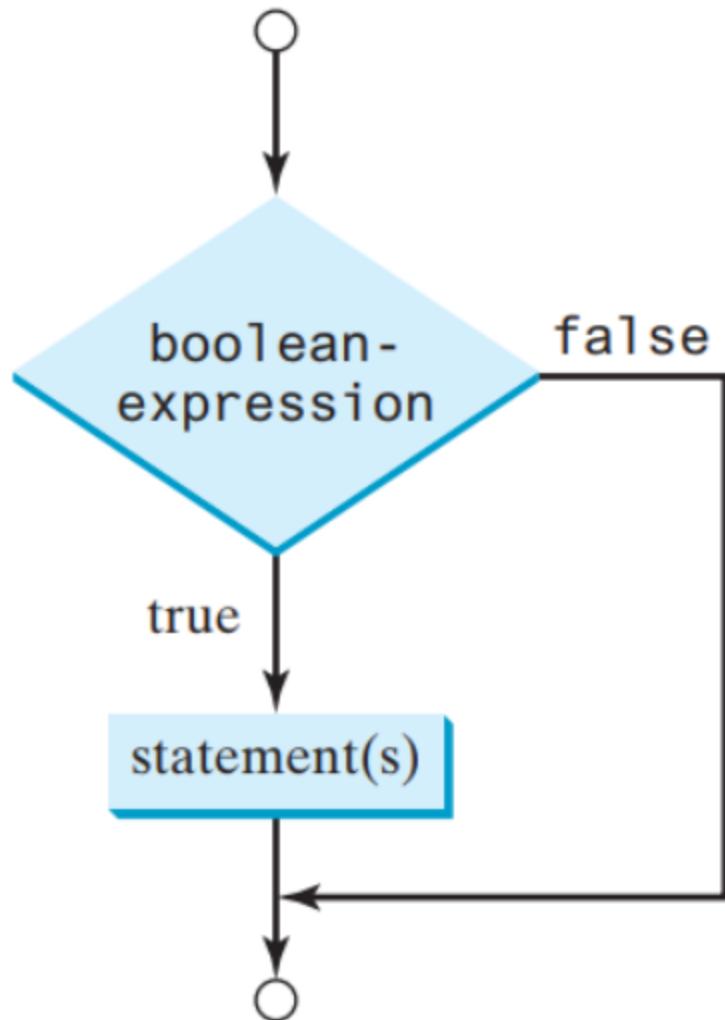
if

```
// if-then  
if ( booleanExpression ) {  
    true-block ;  
}
```

```
if (mark >= 50) {  
    System.out.println("Congratulation!");  
    System.out.println("Keep it up!");  
}
```



if



if

```
//jei kintamojo radius reikšmė neigama, sakiniai nebus vykdomi

if (radius >= 0) {
    double area = radius * radius * Math.PI;
    System.out.println("The area for the circle of radius "
        + radius + " is " + area);
}
```



if (skliaustai)

- Jei vykdomas sakinys vienas, galime skliausti (patartina), bet galime rašyti ir be figūrinių skliaustų

```
int number = 11;

if (number > 10) System.out.println("The number was greater than 10");
```

```
int number = 11;

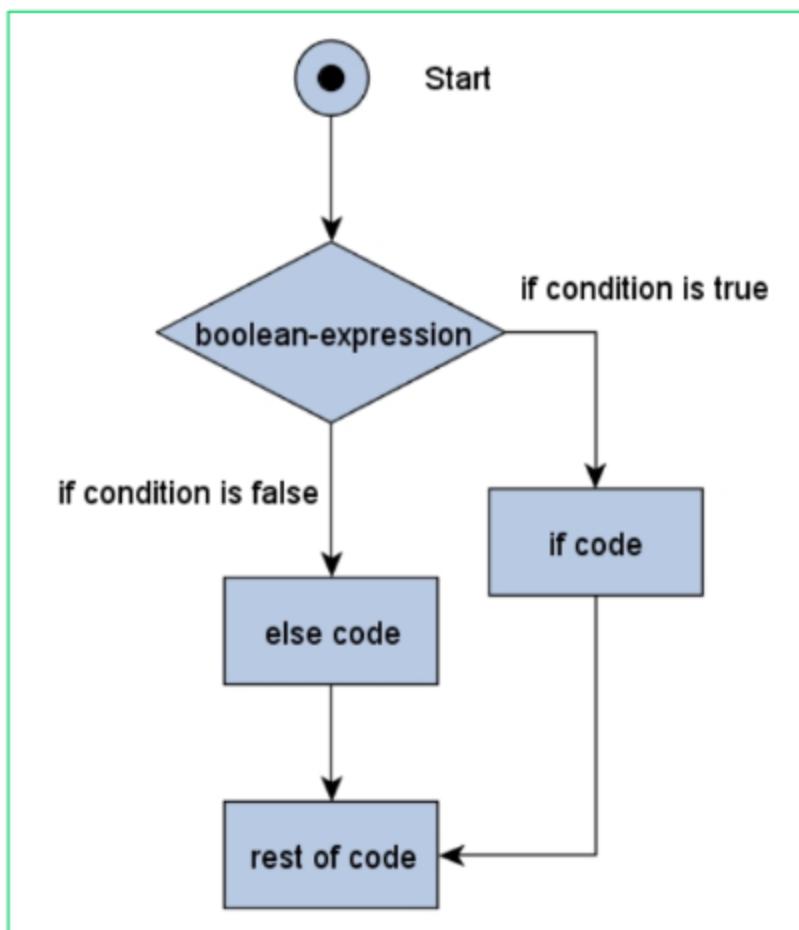
if (number > 10) {
    System.out.println("The number was greater than 10");
}
```



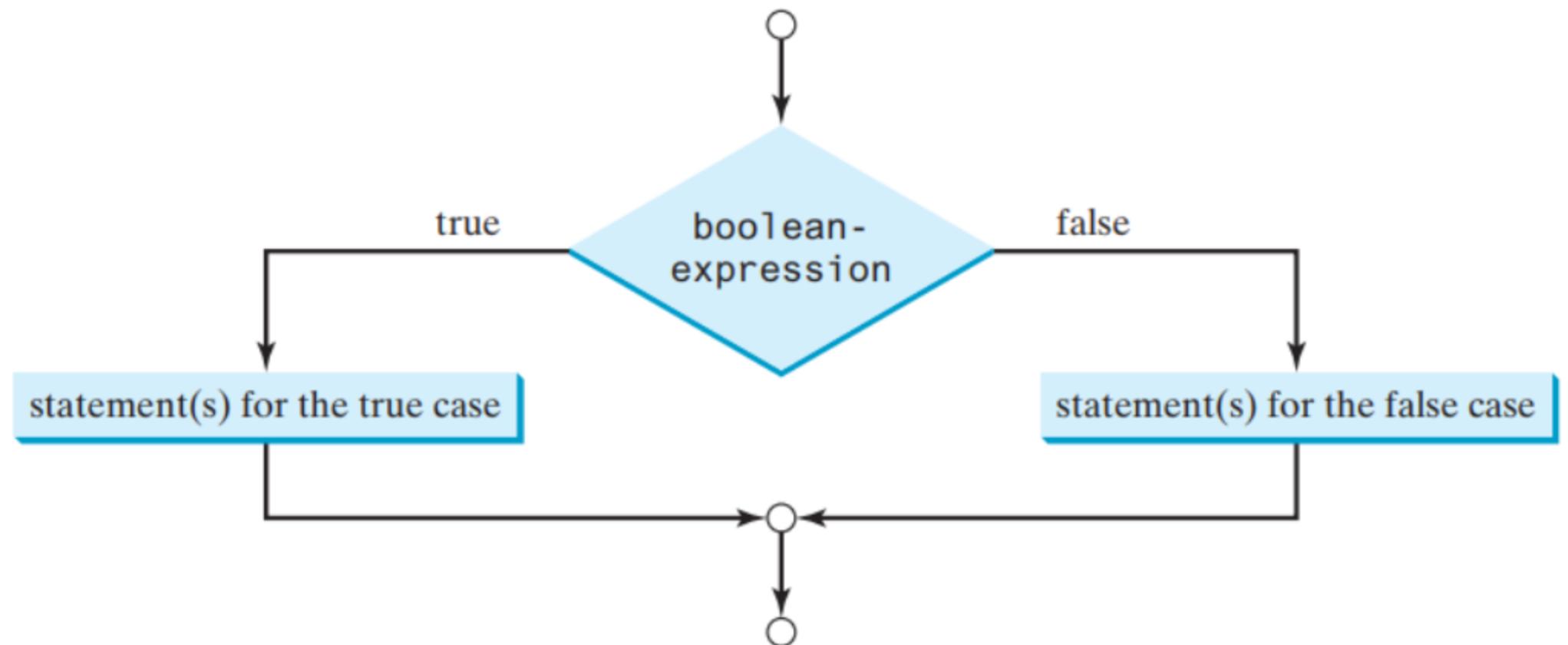
if-else

```
// if-then-else  
if ( booleanExpression ) {  
    true-block ;  
} else {  
    false-block ;  
}
```

```
if (mark >= 50) {  
    System.out.println("Congratulation!");  
    System.out.println("Keep it up!");  
} else {  
    System.out.println("Try Harder!");  
}
```



if-else



if-else

```
if (radius >= 0) {  
    //sakiniai vykdomi jei kintamojo radius reikšmė neneigiamai  
    double area = radius * radius * Math.PI;  
    System.out.println("The area for the circle of radius "  
                      + radius + " is " + area);  
} else {  
    //tekstas spausdinamas tik jei radius < 0  
    System.out.println("Negative input");  
}
```



Pavyzdys (if-else)

```
int number = 4;

if (number > 5) {
    System.out.println("Your number is greater than five!");
} else {
    System.out.println("Your number is equal to or less than five!");
}
```

```
int number = 4;

if (number > 5) {
    System.out.println("Your number is greater than five!");
    System.out.println("... ");
    System.out.println("... ");
} else {
    System.out.println("Your number is equal to or less than five!");
    System.out.println("... ");
    System.out.println("... ");
}
```



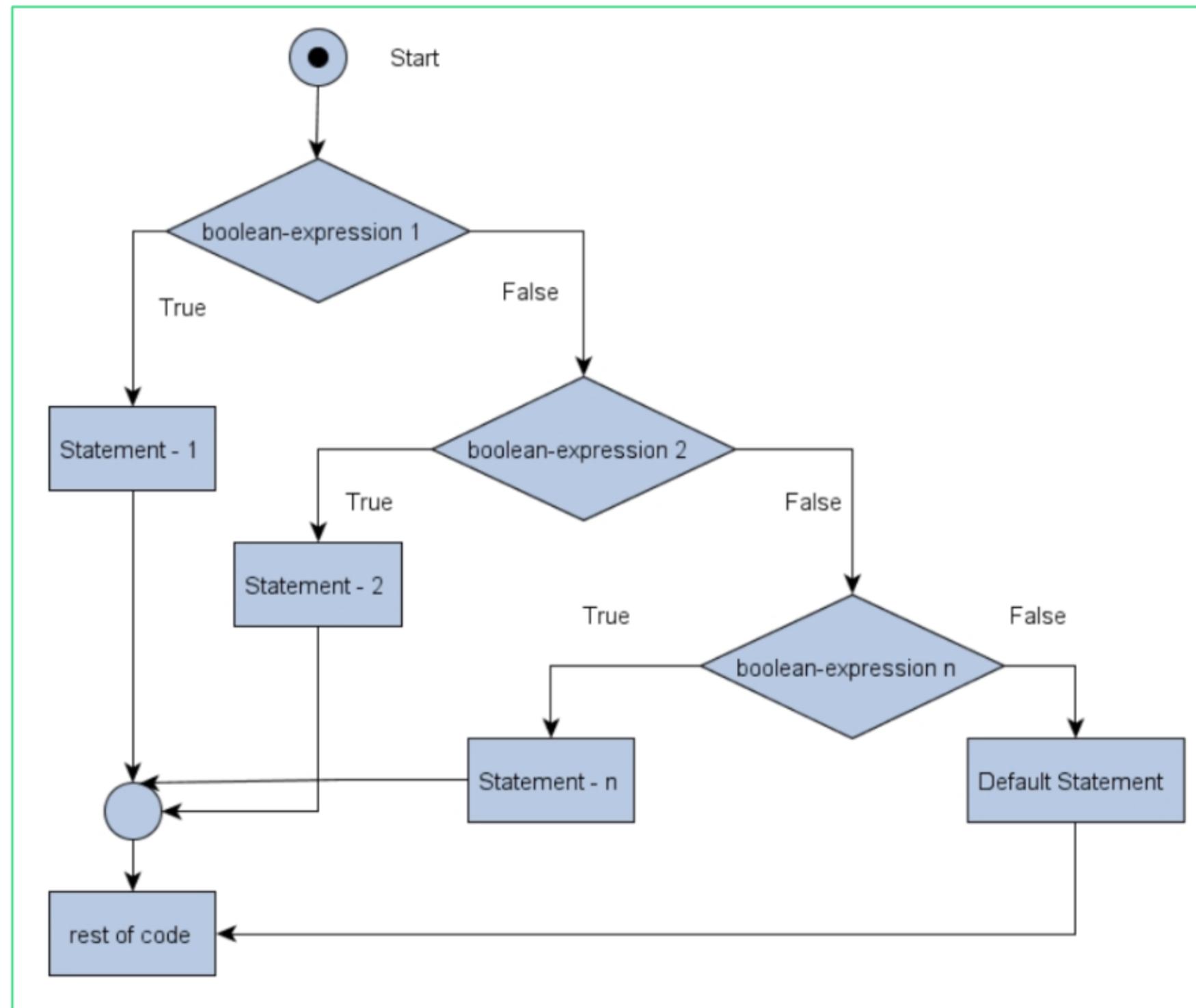
if-else ladder

```
// nested-if
if ( booleanExpr-1 ) {
    block-1 ;
} else if ( booleanExpr-2 ) {
    block-2 ;
} else if ( booleanExpr-3 ) {
    block-3 ;
} else if ( booleanExpr-4 ) {
    .....
} else {
    elseBlock ;
}
```

```
if (mark >= 80) {
    System.out.println("A");
} else if (mark >= 70) {
    System.out.println("B");
} else if (mark >= 60) {
    System.out.println("C");
} else if (mark >= 50) {
    System.out.println("D");
} else {
    System.out.println("F");
}
```



Šakotieji algoritmai (if-else ladder)



if-else ladder

- Su kokiais skaičiaus veiks neteisingai?

```
int number = 3;

if (number == 1) {
    System.out.println("The number is one.");
} else if (number == 2) {
    System.out.println("The number is two.");
} else if (number == 3) {
    System.out.println("The number is three!");
} else {
    System.out.println("Quite a lot!");
}
```



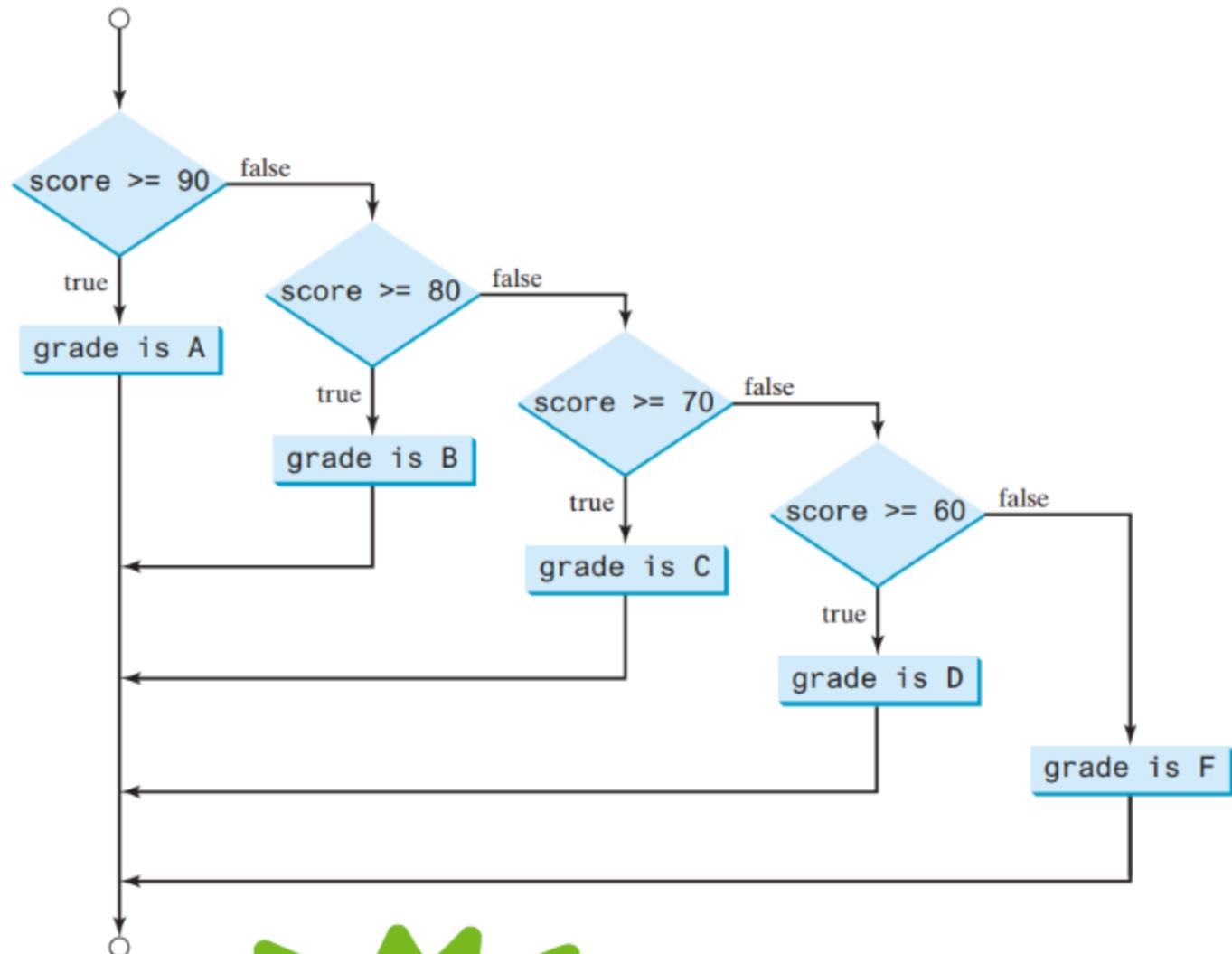
if-else ladder

- Kodėl šitas kodas veiks neteisingai?

```
if (score >= 60)
    System.out.println("D");
else if (score >= 70)
    System.out.println("C");
else if (score >= 80)
    System.out.println("B");
else if (score >= 90)
    System.out.println("A");
else
    System.out.println("F");
```



if-else ladder



```
if (score >= 90)
    System.out.print("A");
else if (score >= 80)
    System.out.print("B");
else if (score >= 70)
    System.out.print("C");
else if (score >= 60)
    System.out.print("D");
else
    System.out.print("F");
```



Žinoma rašant if sakinius
naudojame riestinius skliaustus
{}, nors veikia ir be jų



LOGICAL OPERATORS

Operators && (AND)	Operator (OR)	Operator ! (NOT)
true && true → true	true true → true	!true → false
true && false → false	true false → true	!false → true
false && true → false	false true → true	
false && false → false	false false → false	
true && true && false → false	false false true → true	



LOGICAL OPERATORS (NOT, AND)

```
//NOT
```

```
boolean f = false; // f is false  
boolean t = !f; // t is true
```

```
//AND
```

```
boolean b1 = false && false; // false  
boolean b2 = false && true; // false  
boolean b3 = true && false; // false  
boolean b4 = true && true; // true  
boolean b5 = true && true && false; //false
```



LOGICAL OPERATORS (OR, XOR)

```
//OR  
boolean b1 = false || false; // false  
boolean b2 = false || true; // true  
boolean b3 = true || false; // true  
boolean b4 = true || true; // true  
boolean b5 = false || false || true; //true
```

```
//XOR (exclusive OR)  
boolean x1 = false ^ false; // false  
boolean x2 = false ^ true; // true  
boolean x3 = true ^ false; // true  
boolean x4 = true ^ true; // false
```



AND &&

```
System.out.println("Is the number between 5-10?");  
int number = 7;  
  
if (number > 4 && number < 11) {  
    System.out.println("Yes! :)");  
} else {  
    System.out.println("Nope :(");  
}
```

(sąlyga1 && sąlyga2)
Jeigu abi sąlygos yra teisingos,
tai visa (bendra) sąlyga yra teisinga



Didžiausios/mažiausios reikšmės paieška

```
int a = 10, b = 15, c = 5;  
int max;  
  
if((a > b) && (a > c)){  
    max = a;  
}else if ((b > c) && (b > a)){  
    max = b;  
}else  
    max = c;  
System.out.println("Max: " + max);
```



OR ||

```
System.out.println("Is the number less than 0 or greater than 100?");  
int number = 145;  
  
if (number < 0 || number > 100) {  
    System.out.println("Yes! :)");  
} else {  
    System.out.println("Nope :(");  
}
```

(sąlyga1 || sąlyga2)
Jeigu **nors viena sąlyga teisinga,**
tai visa (bendra) sąlyga yra teisinga



LOGICAL OPERATORS

```
boolean cold = false;  
boolean dry = true;  
boolean summer = false; // suppose now is autumn  
  
boolean trekking = dry && (!cold || summer); // true, let's go to trek!
```



SHORT-CIRCUIT EVALUATION

- `&& ||` (short-circuit evaluation)
- `& | ^` (full evaluation)

true &&	evaluated
false &&	not evaluated
false &	evaluated
false	evaluated
true	not evaluated
true	evaluated
true ^	evaluated
false ^	evaluated

```
// false && ... -> false
// true || ... -> true
int a = 1;
boolean b1 = false && ++a > 1; //a is 1
boolean b2 = false & ++a > 1; //a is 2
```



String tipo kintamuju palyginimas

```
String text = "course";

if (text.equals("marzipan")) {
    System.out.println("The variable text contains the text marzipan");
} else {
    System.out.println("The variable text does not contain the text marzipan");
}
```

```
String text = "course";
String anotherText = "horse";

if (text.equals(anotherText)) {
    System.out.println("The texts are the same!");
} else {
    System.out.println("The texts are not the same!");
}
```



SWITCH

```
// switch-case-default
switch ( selector ) {
    case value-1:
        block-1; break;
    case value-2:
        block-2; break;
    case value-3:
        block-3; break;
    .....
    case value-n:
        block-n; break;
    default:
        default-block;
}
```

```
char oper; int num1, num2, result;
.....
switch (oper) {
    case '+':
        result = num1 + num2; break;
    case '-':
        result = num1 - num2; break;
    case '*':
        result = num1 * num2; break;
    case '/':
        result = num1 / num2; break;
    default:
        System.out.println("Unknown operator");
}
```



SWITCH

- A switch works only with four primitives and their wrappers as well as with the enum type and the String class:
 - byte and Byte
 - short and Short
 - int and Integer
 - char and Character
 - enum
 - String



Pavyzdys (switch)

```
switch (year % 12) {  
    case 0: System.out.println("monkey"); break;  
    case 1: System.out.println("rooster"); break;  
    case 2: System.out.println("dog"); break;  
    case 3: System.out.println("pig"); break;  
    case 4: System.out.println("rat"); break;  
    case 5: System.out.println("ox"); break;  
    case 6: System.out.println("tiger"); break;  
    case 7: System.out.println("rabbit"); break;  
    case 8: System.out.println("dragon"); break;  
    case 9: System.out.println("snake"); break;  
    case 10: System.out.println("horse"); break;  
    case 11: System.out.println("sheep");  
}
```



Pavyzdys (switch)

```
switch (day) {  
    case 1:  
    case 2:  
    case 3:  
    case 4:  
    case 5:  
        System.out.println("Weekday");  
        break;  
    case 0:  
    case 6:  
        System.out.println("Weekend");  
}
```



Switch expression

```
//introduced in JDK 12

int day = 0;

System.out.println(
    switch (day) {
        case 1, 2, 3, 4 -> "Weekday";
        case 0, 6 -> "Weekend";
        default -> throw new IllegalStateException("Invalid day: " + day);
});
```



Pavyzdis (switch)

```
char grade = 'C';

switch(grade) {
    case 'A' :
        System.out.println("Excellent!");
        break;
    case 'B' :
    case 'C' :
        System.out.println("Well done");
        break;
    case 'D' :
        System.out.println("You passed");
    case 'F' :
        System.out.println("Better try again");
        break;
    default :
        System.out.println("Invalid grade");
}
System.out.println("Your grade is " + grade);
```



Ar yra klaidų?



Ternary operator

- The ternary operator is used to perform conditional assignment.

result = condition ? trueCase : elseCase;

```
int a = 4;  
int b = 5;  
int max = a;  
  
if (a > b) {  
    max = a;  
} else {  
    max = b;  
}
```

```
int max = a > b ? a : b;
```



Ternary operator

- Java allows us to nest one ternary operator into another one, but it can be less readable than the corresponding conditional statement. If you do this, be careful.

```
int a = 1;  
int b = 2;  
  
String result = a == b ? "equal" :  
               a > b ? "more" : "less";
```

