INTRODUCTION TO

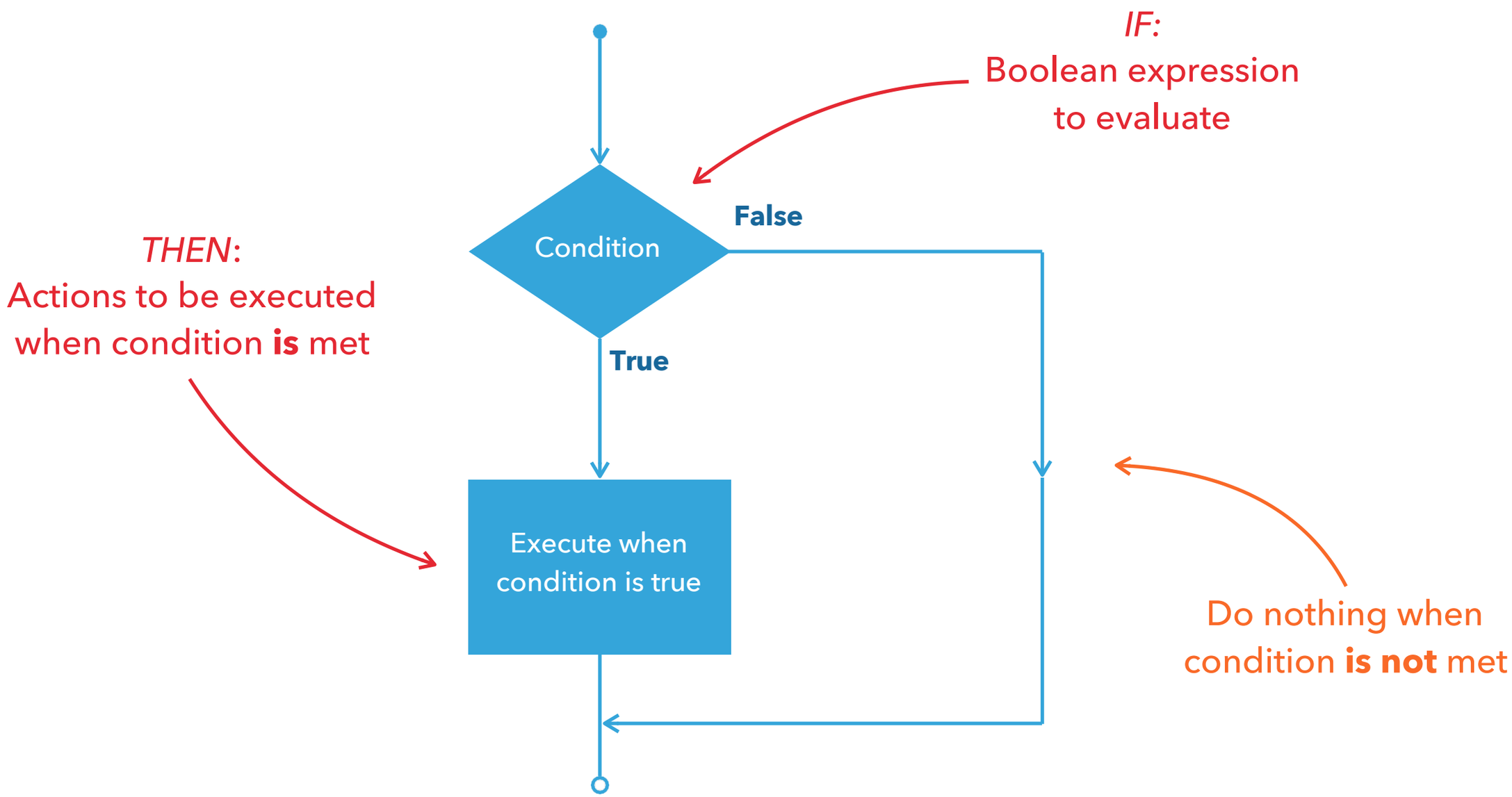
JAVA

CONDITIONAL
FLOW CONTROL

CONDITIONAL STATEMENTS

- Control code execution by specifying certain conditions
  - When conditional statement is **met** (equals to 'true')
  - When conditional statement is **not met** (equals to 'false')
- There are two main conditional statements:
  - **If** statement
  - **Switch** statement

DECISION MAKING FLOWCHART: IF



IF STATEMENT: SYNTAX

Keyword specifying conditional statement

Variable or expression with boolean result

```
if (statement) {
    //Code to execute
    //When statement is true
}
```

IF STATEMENT: EXAMPLE

Boolean variable expression

```java
boolean flag = true;

if (flag) {
    System.out.print("True");
}
```

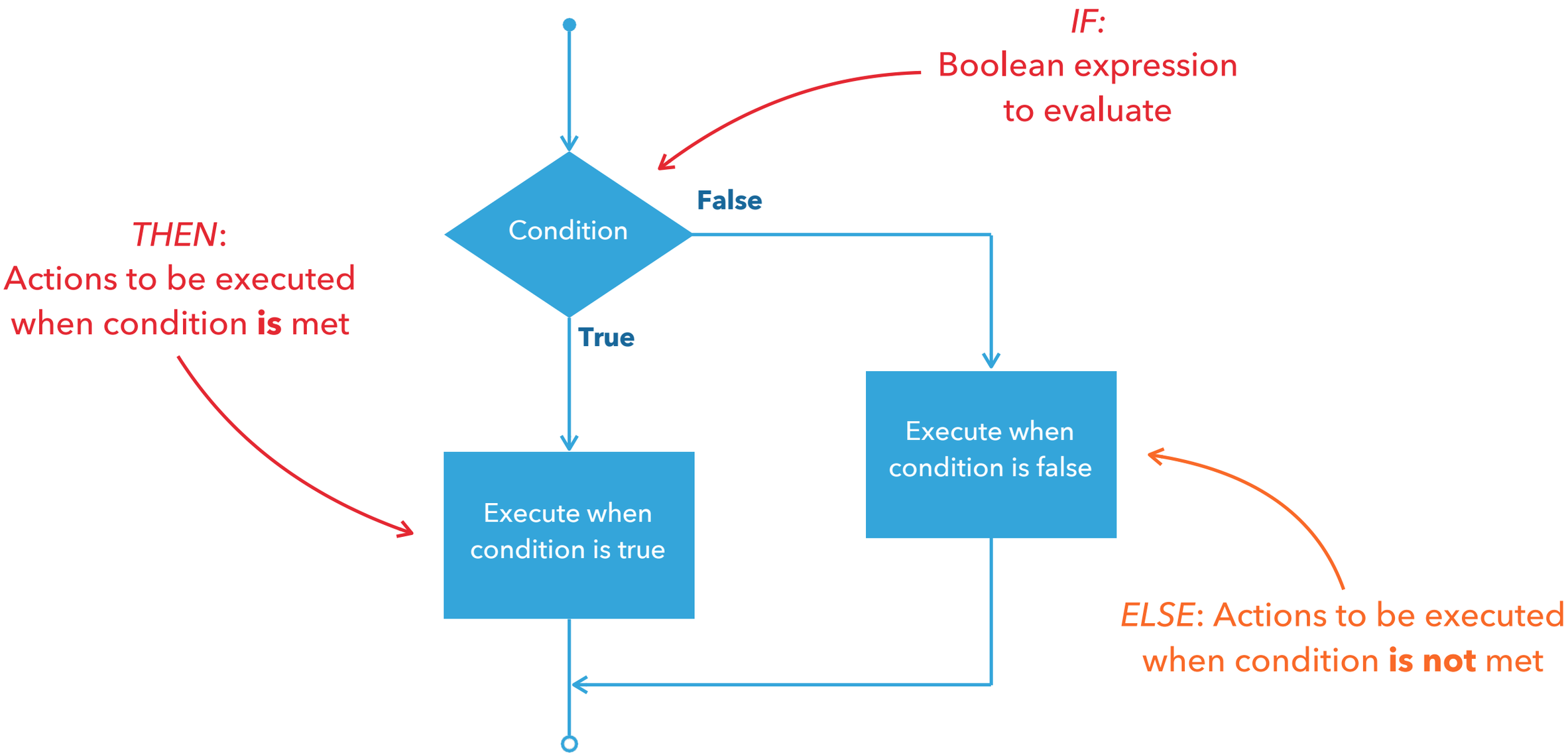
Inline expression

```java
int x = 5;

if (x > 10) {
    System.out.print("x > 10");
}
```

IF STATEMENT RULES RECAP

- Consists of a **boolean expression** followed by **one or more** statements
- Boolean expression can be **composed** of multiple subexpressions

DECISION MAKING FLOWCHART: IF – ELSE



IF – ELSE STATEMENT: SYNTAX

Keyword specifying conditional statement

Variable or expression with boolean result

```
if (statement) {
    //Code to execute
    //When statement is true
} else {
    //Code to execute
    //When statement is false
}
```

Keyword specifying alternative code block

IF – ELSE STATEMENT: EXAMPLE

Boolean variable expression

```java
boolean flag = false;

if (flag) {
    System.out.print("True");
} else {
    System.out.print("False");
}
```

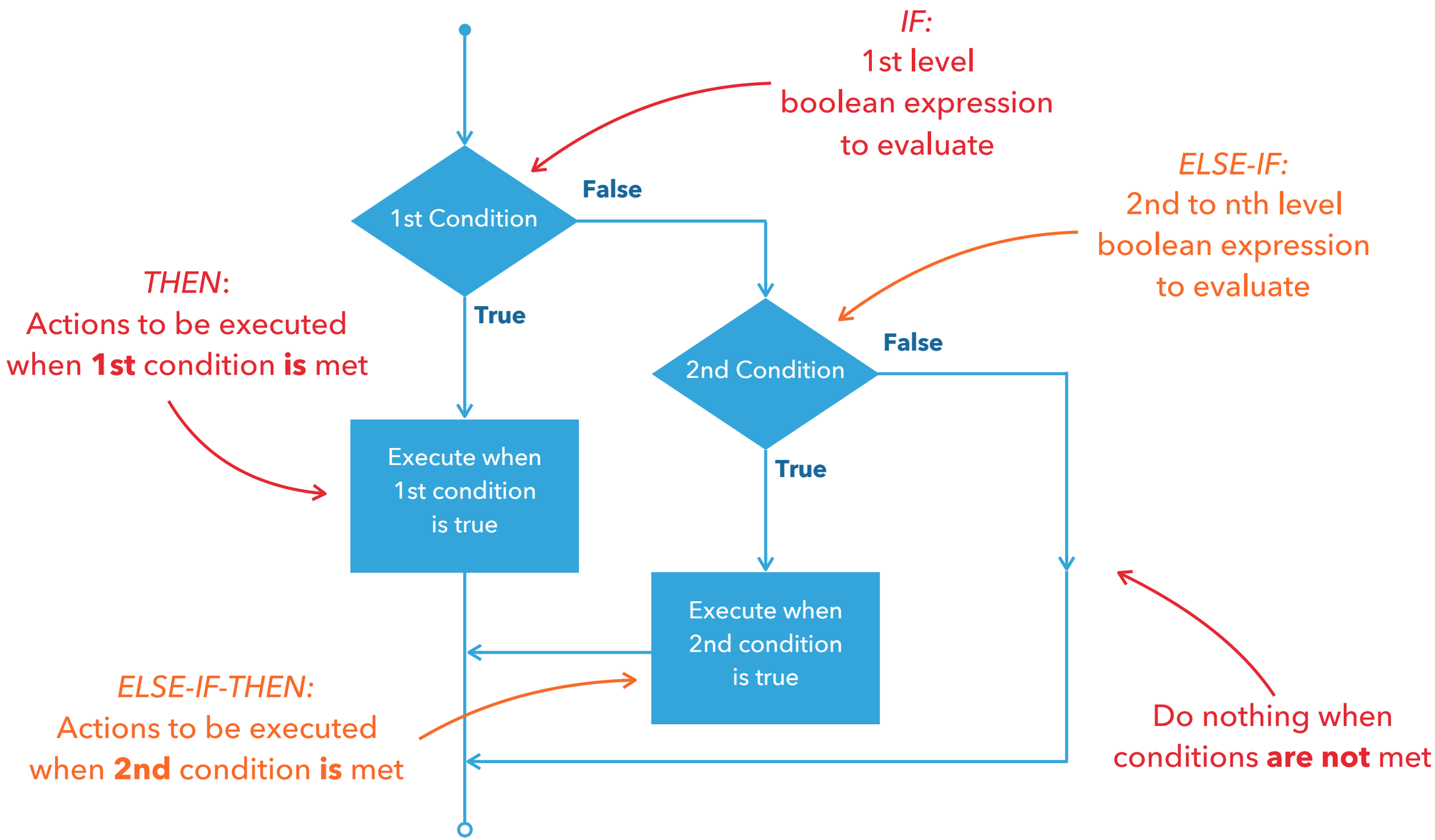
Inline expression

```java
int x = 5;

if (x > 10) {
    System.out.print("x > 10");
} else {
    System.out.print("x =< 10");
}
```

IF – ELSE STATEMENT RULES RECAP

- If statement can be followed by an **optional** else statement, which executes when the boolean expression is **false**

DECISION MAKING FLOWCHART: IF – ELSE IF



IF – ELSE IF STATEMENT: SYNTAX

Keyword specifying conditional statement

Variable or expression with boolean result

```
if (statement1) {
    //Code to execute
    //When statement1 is true
} else if (statement2) {
    //Code to execute
    //When statement2 is true
}
```

Keyword specifying alternative conditional code block

IF – ELSE IF STATEMENT: EXAMPLE

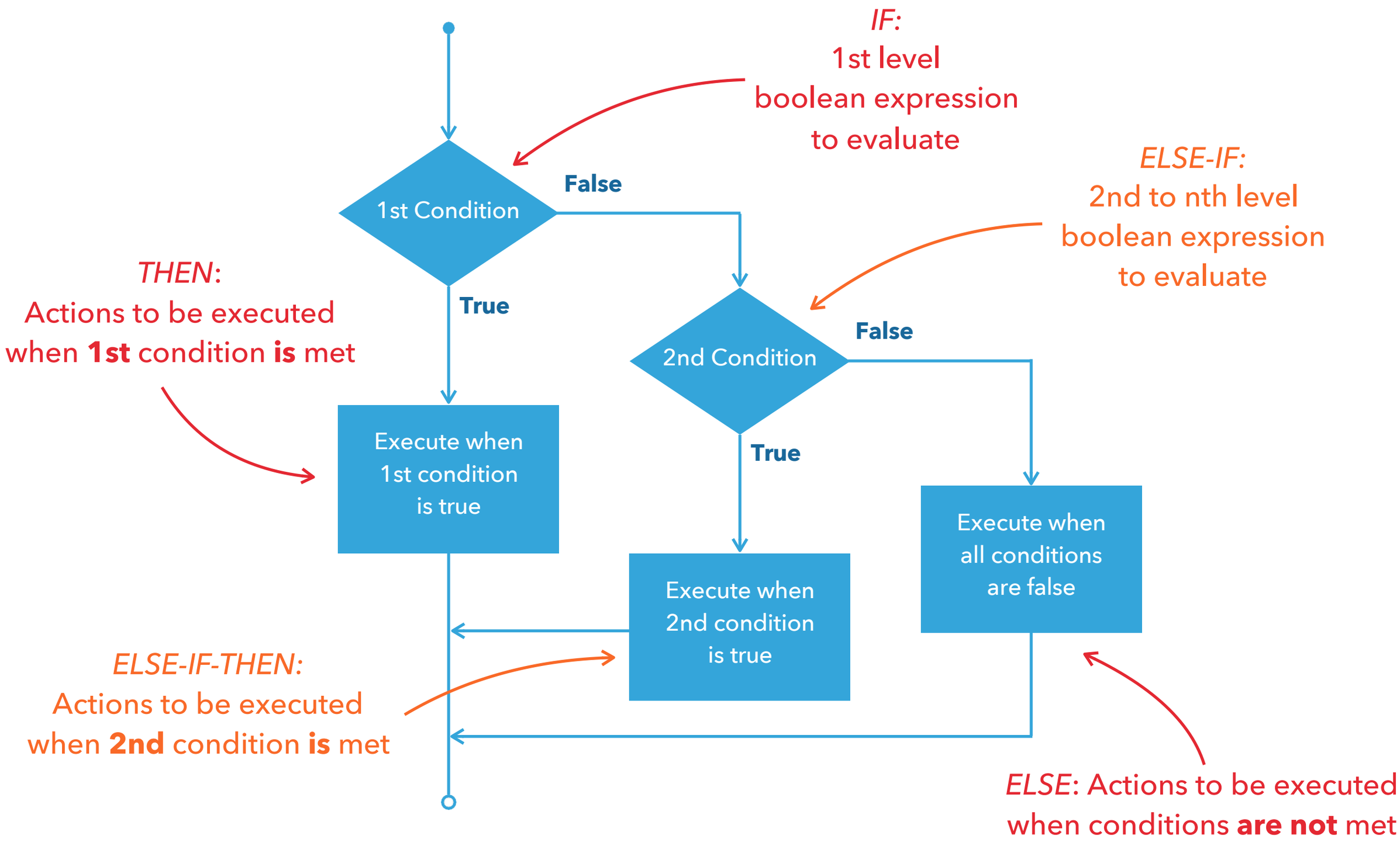
Boolean variable expression

```java
boolean flag1 = false;
boolean flag2 = true;

if (flag1) {
    System.out.print("flag1");
} else if (flag2) {
    System.out.print("flag2");
}
```

Inline expression

```java
int x = 7;

if (x == 3) {
    System.out.print("x == 3");
} else if (x == 7) {
    System.out.print("x == 7");
}
```

DECISION MAKING FLOWCHART: IF – ELSE IF – ELSE



IF – ELSE IF – ELSE STATEMENT: SYNTAX

Keyword specifying conditional statement

Variable or expression with boolean result

```
if (statement1) {
    //Code to execute
    //When statement1 is true
} else if (statement2) {
    //Code to execute
    //When statement2 is true
} else {
    //Code to execute
    //When all statements are false
}
```

Keyword specifying alternative conditional code block

Keyword specifying alternative code block

IF – ELSE IF – ELSE STATEMENT: EXAMPLE

Boolean variable expression

```java
boolean flag1 = false;
boolean flag2 = false;

if (flag1) {
    System.out.print("flag1");
} else if (flag2) {
    System.out.print("flag2");
} else {
    System.out.println("none");
}
```

Inline expression

```java
int x = 7;

if (x == 3) {
    System.out.print("x == 3");
} else if (x == 7) {
    System.out.print("x == 7");
} else {
    System.out.print("NOTA");
}
```

IF – ELSE IF – ELSE STATEMENT RULES RECAP

- An if can have **zero** or **one** else's and its must come after any else if's
- An if can have **zero** to **many** else if's and they must come **before** else
- Once an else if **succeeds**, **none** of the **remaining** else if's or else's will be tested

SWITCH STATEMENT OVERVIEW

- Provides an **effective** way to deal with a section of code that could branch in **multiple directions** based on **single variable**
- **Doesn't** support the conditional operators that the **if statement** does
- **Can't** handle **multiple** variables

SWITCH STATEMENT: SYNTAX

Keyword specifying switch statement

Single variable to test against

```
switch (singleVariable) {
    case value1:
        //Code to execute
        //When value1 matches
        break;

    case value2:
        //Code to execute
        //When value2 matches
        //Without break it
        //Falls through cases
        //Until first break

    default:
        //Code to execute
        //When none of the above
        //Values match
}
```

Variable must match one of these (else - if)

Keyword telling to stop switch execution right here

Fallback case (else)

SWITCH STATEMENT: EXAMPLE

```
String drink = "coffee";

switch (drink) {
    case "coffee":
        System.out.println("I would go for Java!");
        break;

    case "tea":
        System.out.println("Everything but Lipton");
        break;

    default:
        System.out.println("Ugh.. What?");
}
```

BUILDING BOOLEAN EXPRESSIONS

THE EQUALITY AND RELATIONAL OPERATORS

Operator	Operation
==	Equal to
!=	Not equal to
>	Greater than
>=	Greater than or equal to
<	Less than
<=	Less than or equal to

CONDITIONAL OPERATORS

Operator	Operation
&&	Conditional AND
||	Conditional OR
!	Conditional NOT

COMPLEX BOOLEAN STATEMENT EXAMPLE

Make sure that BOTH statements are true

Check if x is greater than 5

Check if x is lesser than 15

```
int x = 10;

if ((x > 5) && (x < 15)) {
    System.out.print("Within bounds!");
}
```

BASIC CODE TESTING APPROACH

TASK OBJECTIVES

1. Write class that returns **max number** from two given numbers
2. Write test scenarios to **verify** method works as **expected**
3. **Run** test scenarios

1. WRITE CLASS SOLVING GIVEN PROBLEM

```
public class QuickMaths {

    public int max(int a, int b) {
        if (a > b) {
            return a;
        } else {
            return b;
        }
    }

}
```

2.A. WRITE TEST CLASS WITH VERIFICATION SCENARIOS

```java
public class QuickMathsTest {

    public void test1() {

        QuickMaths victim = new QuickMaths();

        int a = 3;
        int b = 5;

        int expectedResult = 5;

        int actualResult = victim.max(3, 5);

        check(actualResult, expectedResult, "test1");

    }

    public void check(int actualResult, int expectedResult, String testName) {
        if (actualResult == expectedResult) {
            System.out.println(testName + " has passed!");
        } else {
            System.out.println(testName + " has failed!");
            System.out.println("Expected " + expectedResult + " but was " + actualResult);
        }
    }

}
```

2.B. INSTANTIATE TEST CLASS AND CALL VERIFICATION METHODS

```
public class QuickMathsTest {

    public static void main(String[] args) {

        QuickMathsTest testRunner = new QuickMathsTest();
        testRunner.test1();

    }

    ...

}
```

3. RUN AND CHECK RESULTS

```
test1 has passed!

Process finished with exit code 0
```