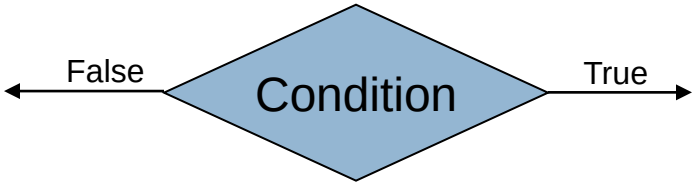
MAKING DECISIONS

Chapter 2

IF Statement

- If Statements are used to choose between actions



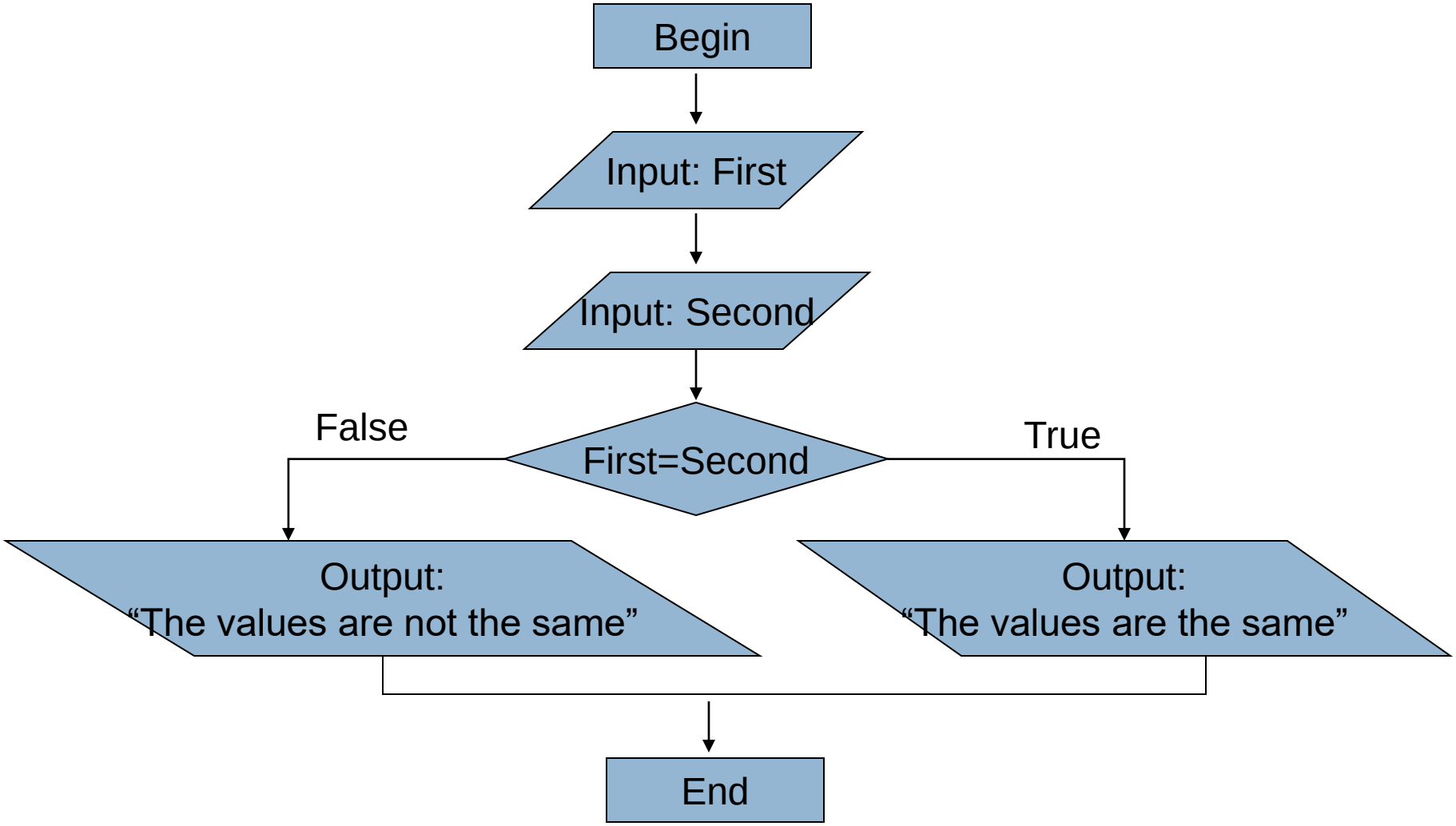
  - A condition is a Boolean expression
  - When executed, the condition is evaluated
    - If the condition is true, control flows along the true arrow
    - If the condition is false, control flows along the false arrow
  - The IF statement ends where the true and false branches reconnect

Relational Operations

Operator	Description	Expression	Result (X = 2, Y =3)
=	Equal	X=2 X=Y	True False
<>	Not Equal	Y<>5 Y<>3	True False
>	Greater than	X > 1 X > Y	True False
<	Less than	X < Y X < 2	True False
>=	Greater Than Or Equal	X >= 2 X >= Y	True False
<=	Less Than Or Equal	X <= 2 X <= 1	True False

Java will handle Equal and Not Equal differently

A Simple IF Statement



Weekly Paycheck with Overtime Example

Nested IF Statements

- IF statement contained within the true or false branch of another IF statement
- It can contain any number of if statements
- Example

  If you are at UTC

    If you are a student

      You have a schedule

Long-Distance Billing Example

Test Two Numbers (Class Exercise)

- Read 2 numbers and determine if they are equal or one is greater than the other. If the values are equal print a message saying they are equal. If not, print a message saying which one is largest.

Compound Conditions

- Conditions with multiple comparisons

- Consists of two conditions within parentheses joined by a logical operator
  - NOT
  - AND
  - OR
  - XOR

Logical Operations

Operator	Description
NOT	Returns the opposite of the condition
AND	Returns TRUE if and only if both conditions are TRUE
OR	Returns TRUE if at least one of the conditions is TRUE
XOR	Returns TRUE if the conditions have opposite values

Check on Compound Conditions

- Evaluate each of the following compound conditions. Assume X = 3 and Y = 7. Your answer should be true or false.
  1. (x = 1) AND (Y = 7)
  2. (X = 1) OR (Y = 7)
  3. (X < Y) AND (Y > 10)
  4. (X ^ 3 = 27) AND (Y MOD 2 = 1)
  5. (X ^ 3 = 27) OR (Y MOD 2 = 1)
  6. (X = 3) XOR (Y Mod 2 = 1)
  7. (X = 1) XOR (Y = 7)

Compound Condition Solution for Long-Distance Billing Example

Question

- Can we write (A<B<C)?

- NO!!
  - You need to have explicit tests (A<B) and (B<C)
  - Join together with AND
  - Put each test in a parentheses

Example of Finding the Smallest Number

- Smallest Number- Four Solutions
  - Solution 1- Nested Conditions
  - Solution 2- Compound Conditions
  - Solution 3- Nested and Compound Conditions
  - Solution 4- Placeholder Variable

Solution 1- Example

Solution 2- Example

Solution 3- Example

Solution 4- Example

Smallest of Five

- Write a program that displays the smallest of five input values that may include duplicate values.