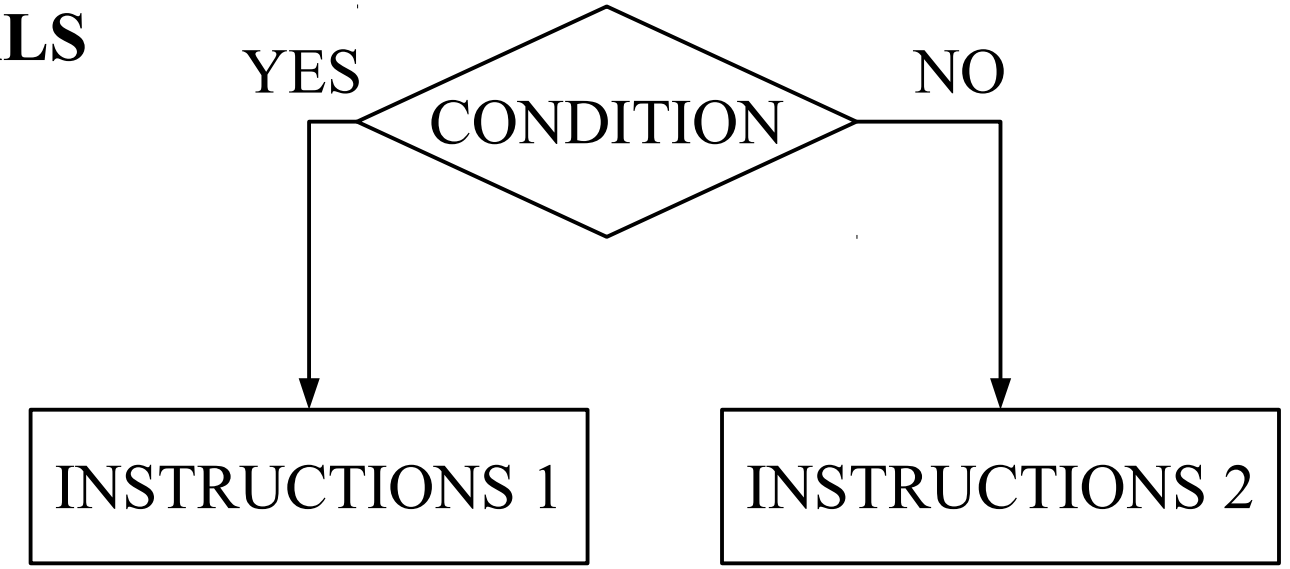
CONDITIONALS

DIAGRAM



JAVA

This part is optional

```
if (CONDITION)
    {
        INSTRUCTIONS 1
    }
else
    {
        INSTRUCTIONS 2
    }
```

PARTS OF A CONDITIONAL

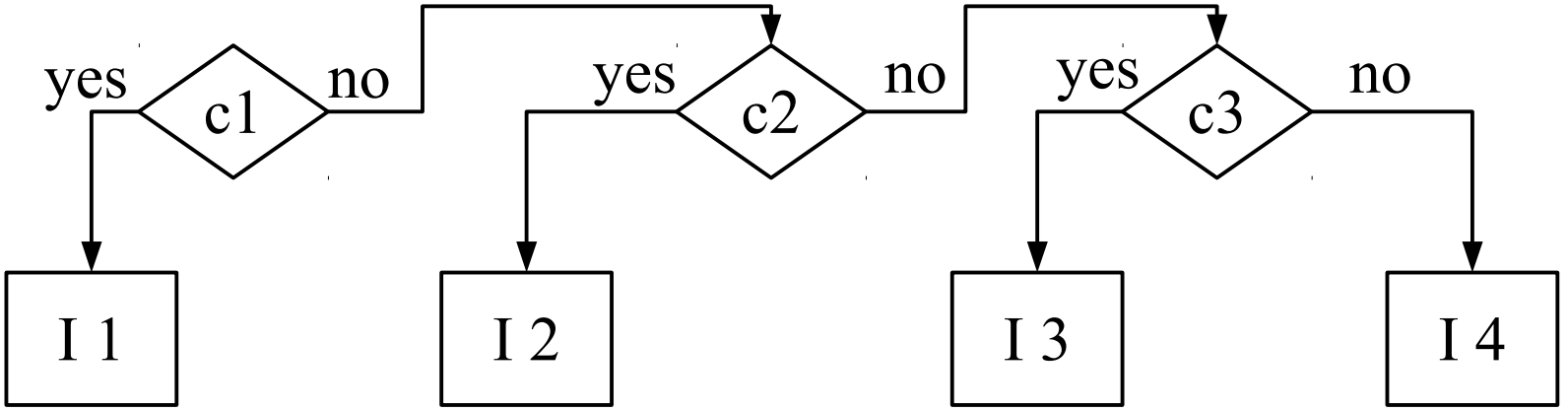
```
if (CONDITION)
    {
        INSTRUCTIONS 1
    }
else
    {
        INSTRUCTIONS 2
    }
```

The CONDITION is a boolean expression that can have a true or false value

The INSTRUCTIONS are a sequence of instructions (block).

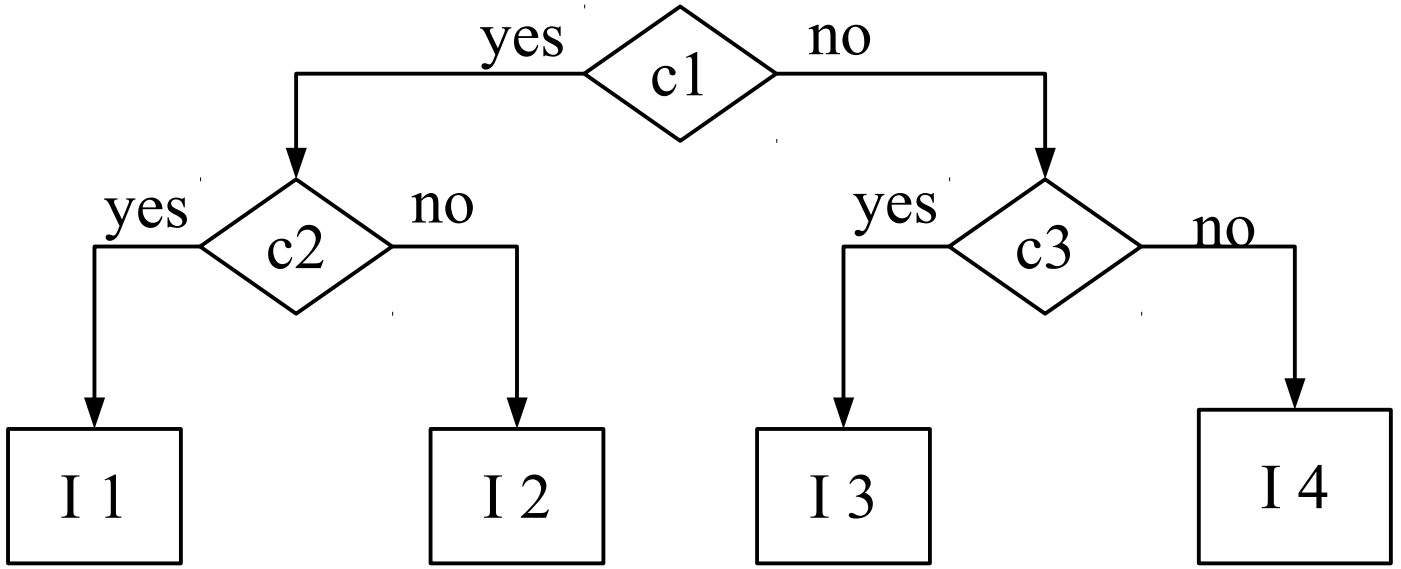
If the CONDITION is true, INSTRUCTIONS 1 will be executed, Otherwise INSTRUCTIONS 2 will be executed

CASCADED CONDITIONAL



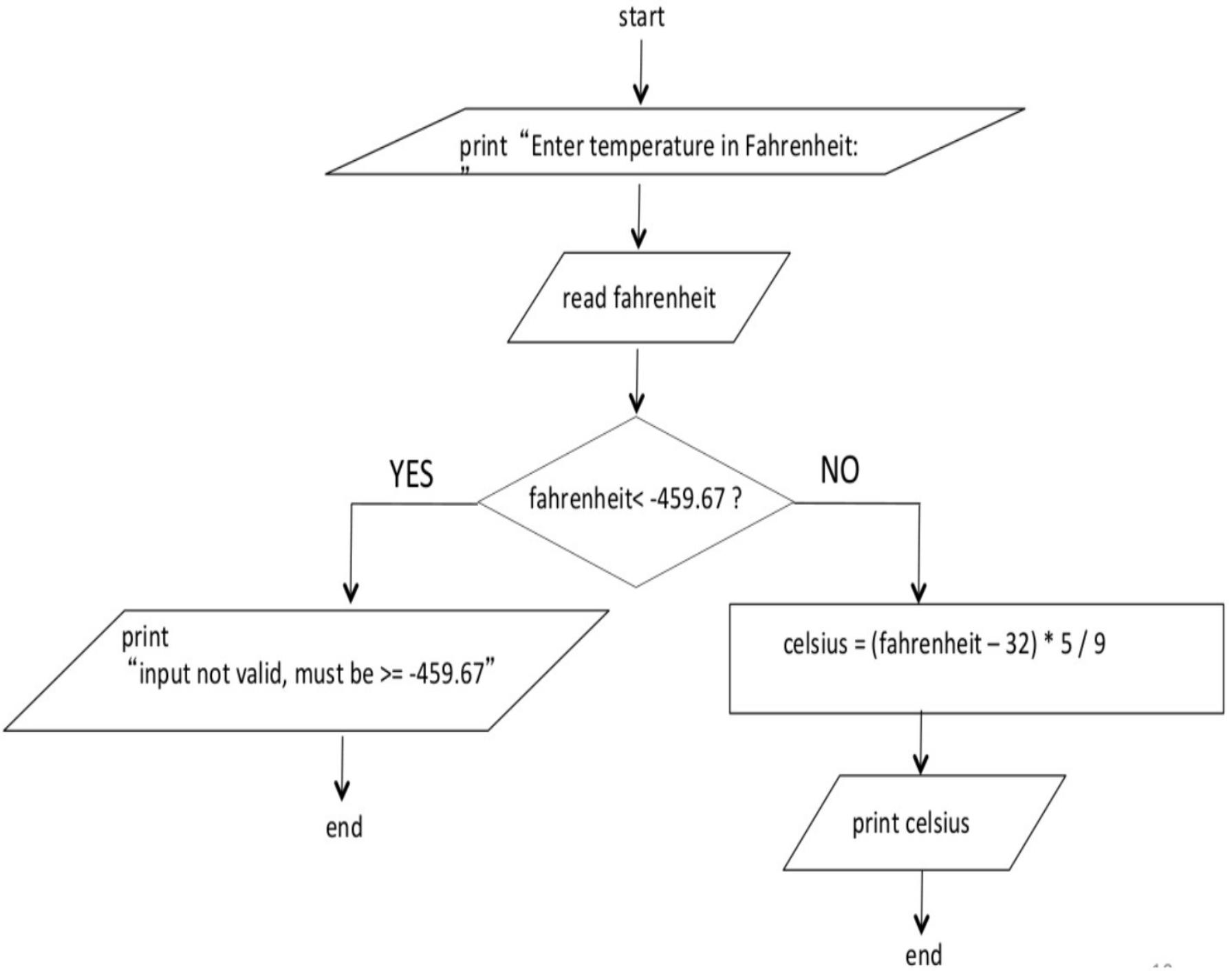

```
if (c1){
    I1
}
else if (c2) {
    I2
}
else if (c3) {
    I3
}
else{
    I4
}
```

NESTED CONDITIONAL




```
if (c1){
    if (c2){
        I1
    }
    else{
        I2
    }
}
else{
    if (c3){
        I3
    }
    else{
        I4
    }
}
```

PROBLEM Fahrenheit to Celsius with error checking



FIGURING OUT WHAT WE NEED

- Two variables: F and C
- The types of the variables must be double (or float)
- We need an instruction to read a value from the user and put it in a variable.

The IO class has the following methods

INPUT:

- readBoolean()
- readChar()
- readDouble()
- readInt()
- ReadString()
- readLine()

OUTPUT:

- outputBooleanAnswer(v)
- outputDoubleAnswer(v)
- outputIntAnswer(v)
- outputCharAnswer(v)
- outputStringAnswer(v)
- reportBadInput()

Examples:

```
int x;
x=IO.readInt();
```

```
Int n=3;
IO.outputIntAnswer(n);
```

TRANSLATING INTO A PROGRAM IN JAVA

```
public static void main(String[] args){
    double fahr;
    double celsius;

    System.out.print("Enter Temperature in Fahrenheit: ");
    fahr=IO.readDouble();
    if (fahr<-459.67){
        System.out.println("Invalid Input");
    }
    else{
        celsius=(fahr-32)*(5/9);
        IO.outputDoubleAnswer(celsius);
    }
}
```

Will this work?

Check the expression in a red circle. Do a diagram with type and value to see what happens.

How can we fix it?

CASTING

```
public static void main(String[] args){
    double fahr;
    double celsius;

    System.out.print("Enter Temperature in Fahrenheit: ");
    fahr=IO.readDouble();
    if (fahr<-459.67){
        System.out.println("Invalid Input");
    }
    else{
        celsius=(fahr-32)*((double)5/9);
        IO.outputDoubleAnswer(celsius);
    }
}
```

We can assign the type of a literal by writing the type that we want it to be in parenthesis before its value:
(double) 5
will have the value of 5, but its type will be double instead of int

SIMPLER SOLUTION WITHOUT CASTING

Using operator precedence:

celsius = (fahr-32)*5/9

fahr – 32 will be a double because fahr is a double
(fahr-32)*5 will be a double
(fahr-32)*5/9 will be a double

TESTING

Input	Expected Output	Output
32	0	0
100	37.78	37.78
-600	error	error

After every program change, all cases must be tested again!