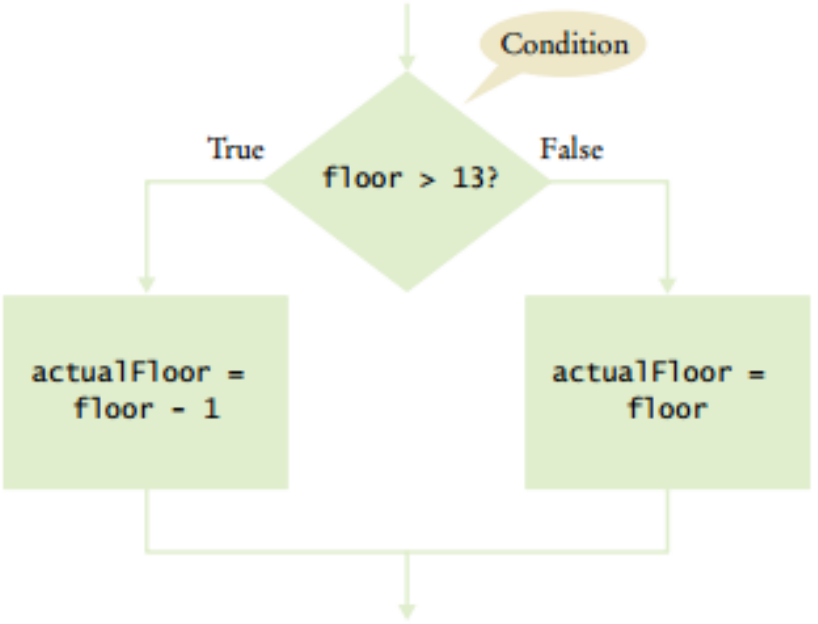
CS 234

Review - Decisions

Decisions

- If statement
- Relational operators
- Multiple alternatives
- Switch
- Nested Branches
- Boolean and Relational operators

IF statement



Relational operators

Java	Math Notation	Description
>	>	Greater than
>=	≥	Greater than or equal
<	<	Less than
<=	≤	Less than or equal
==	=	Equal
!=	≠	Not equal

Multiple Alternatives

```
public class Main
{
    public static void main(String[] args) {

        String digitName = "";
        int digit = 5;

        if (digit == 1) { digitName = "one"; }
        if (digit == 2) { digitName = "two"; }
        if (digit == 3) { digitName = "three"; }
        if (digit == 4) { digitName = "four"; }
        if (digit == 5) { digitName = "five"; }
        if (digit == 6) { digitName = "six"; }
        if (digit == 7) { digitName = "seven"; }
        if (digit == 8) { digitName = "eight"; }
        if (digit == 9) { digitName = "nine"; }
        // else { digitName = "something different"; }

        System.out.println("The digit is:"+ digitName);
    }
}
```

Multiple Alternatives

```
public class Main
{
public static void main(String[] args) {

          String digitName;
          int digit = 9;

        if (digit == 1) { digitName = "one"; }
        else if (digit == 2) { digitName = "two"; }
        else if (digit == 3) { digitName = "three"; }
        else if (digit == 4) { digitName = "four"; }
        else if (digit == 5) { digitName = "five"; }
        else if (digit == 6) { digitName = "six"; }
        else if (digit == 7) { digitName = "seven"; }
        else if (digit == 8) { digitName = "eight"; }
        else if (digit == 9) { digitName = "nine"; }
        else { digitName = ""; }

        System.out.println("The digit is:"+ digitName);
}
}
```

Switch

```
public class Main
{
public static void main(String[] args) {

    String digitName;
    int digit = 9;

        switch (digit)
        {
            case 1: digitName = "one"; break;
            case 2: digitName = "two"; break;
            case 3: digitName = "three"; break;
            case 4: digitName = "four"; break;
            case 5: digitName = "five"; break;
            case 6: digitName = "six"; break;
            case 7: digitName = "seven"; break;
            case 8: digitName = "eight"; break;
            case 9: digitName = "nine"; break;
            default: digitName = ""; break;
        }
          System.out.println("The digit is:"+ digitName);
}
}
```

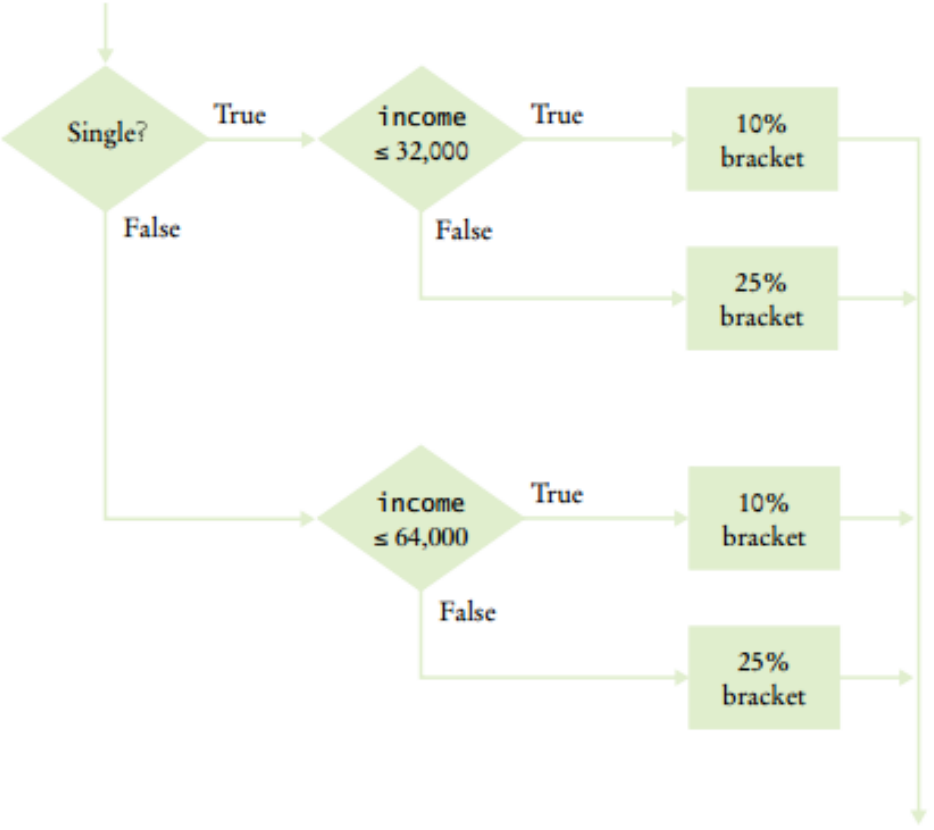
Don’t forget the **break**

Nested branches

- IF inside IF

If your status is Single and if the taxable income is	the tax is	of the amount over
at most $32,000	10%	$0
over $32,000	$3,200 + 25%	$32,000
If your status is Married and if the taxable income is	**the tax is**	**of the amount over**
at most $64,000	10%	$0
over $64,000	$6,400 + 25%	$64,000

Nested branches



Nested branches

```
if (maritalStatus.equals("s"))          //Single
      {
         if (income <= RATE1_SINGLE_LIMIT)
         {
            tax1 = RATE1 * income;
         }
         else
         {
             tax1 = RATE1 * RATE1_SINGLE_LIMIT;
             tax2 = RATE2 * (income - RATE1_SINGLE_LIMIT);
         }
      }
else                                    // Married
      {
         if (income <= RATE1_MARRIED_LIMIT)
         {
            tax1 = RATE1 * income;
         }
         else
         {
             tax1 = RATE1 * RATE1_MARRIED_LIMIT;
             tax2 = RATE2 * (income - RATE1_MARRIED_LIMIT);
         }
      }

double totalTax = tax1 + tax2;
```

Boolean operators

Operator	Description	Example
&&	AND	x=6 y=3 x<10 && y>1 Return True
||	OR	x=6 y=3 x==5 || y==5 Return False
!	NOT	x=6 y=3 !(x==y) Return True

Boolean operator

```java
public class Main
{
    public static void main(String[] args) {

        int num1 = 15;
        int num2 = -5;
        int num3 = 7;

        if(num1 > num2)
        {
            if (num1 > num3)
                System.out.println(num1 + " is the highest number.");
            else
                System.out.println(num3 + " is the highest number.");
        }
        else if (num2 > num3)
            System.out.println(num2 + " is the highest number.");
        else
            System.out.println(num3 + " is the highest number.");
    }
}
```

```
15 is the highest number.
```

Boolean operator

```java
public class Main
{
    public static void main(String args[])
    {
        int num1 = 15;
        int num2 = -5;
        int num3 = 7;

        if (num1 > num2 && num1 > num3)
            System.out.println( num1 + " is the highest number.");
        else if (num2 > num1 && num2 > num3)
            System.out.println( num2 + " is the highest number.");
        else
            System.out.println( num3 + " is the highest number.");
    }
}
```

```
15 is the highest number.
```

Boolean operator

```java
public class Main
{
    public static void main(String[] args) {

        int num1 = 15;
        int num2 = -5;
        int num3 = 7;

        if(num1 > num2)
        {
            if (num1 > num3)
                System.out.println(num1 + " is the highest number.");
            else
                System.out.println(num3 + " is the highest number.");
        }
        else if (num2 > num3)
            System.out.println(num2 + " is the highest number.");
        else
            System.out.println(num3 + " is the highest number.");
    }
}
```

```java
public class Main
{
   public static void main(String args[])
   {
      int num1 = 15;
      int num2 = -5;
      int num3 = 7;

      if (num1 > num2 && num1 > num3)
         System.out.println( num1 + " is the highest number.");
      else if (num2 > num1 && num2 > num3)
         System.out.println( num2 + " is the highest number.");
      else
         System.out.println( num3 + " is the highest number.");
   }
}
```

Boolean operator

```java
import java.util.Scanner;
public class Main
{
    public static void main(String[] args) {
        Scanner in = new Scanner(System.in);
        System.out.println("Write the age for Emma: ");
        int emma = in.nextInt();
        System.out.println("Write the age for John: ");
        int john = in.nextInt();
        System.out.println("Write the age for Sara");
        int sara = in.nextInt();

        System.out.println("Is Johns' age between Emma's and Sara's?");
        System.out.println(emma<john && john < sara);
    }
}
```

```
Write the age for Emma:
8
Write the age for John:
10
Write the age for Sara
34
Is Johns' age between Emma's and Sara's?
true
```

Short circuit evaluation

```
**********************************************************
public class Main
{
    public static void main(String[] args) {

        int a = 1;
        int b = 0;

//      System.out.println( a / b);

//      System.out.println( a >= 2 && (a/b)>2);

//      System.out.println( a>=2 || (a / b)>2);

//      System.out.println(a>0 || (a/b)>2);


    }
}
```

AND Truth Table

A	B	Y
0	0	0
0	1	0
1	0	0
1	1	1

OR Truth Table

A	B	Y
0	0	0
0	1	1
1	0	1
1	1	1