

CN4001/ CD4001

Software Development

Topic 4: Making Choices

Part 2

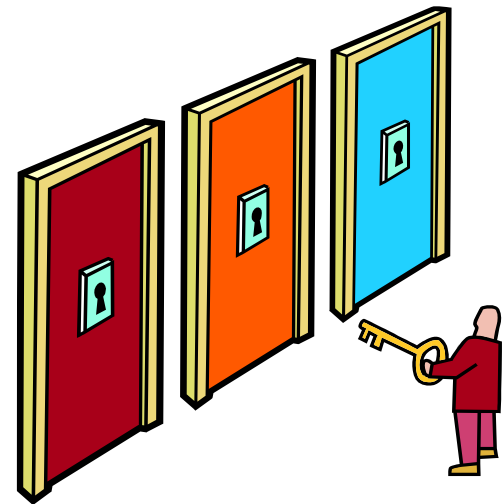


Selection in Java

if statement

if...else statement

switch statement



The 'if' statement



The 'if' statement

```
// some code here
```

```
// some code here
```

```
// some code here
```

The “if” statement

```
// some code here
```

```
// some code here
```

```
// some code here
```

The “if” statement

// some code here



question

// some code here



// some code here

The “if” statement

```
// some code here
if ( question )
{
    // some code here
}
// some code here
```


The “if” statement

```
// some code here
if ( /* a test goes here */ )
{
    // some code here
}
// some code here
```


The “if” statement

```
// some code here
if ( /* a test goes here */ )
{
    // some code here
}
// some code here
```

The "if" statement



```
// some code here
if ( /* a test goes here */ )
{
    // some code here
}
// some code here
```


The “if” statement

```
// some code here  
→ if ( /* a test goes here */ )  
  {  
    // some code here  
  }  
// some code here
```

The "if" statement

```
// some code here  
→ if ( /* a test goes here */ ) ✓  
  {  
    // some code here  
  }  
// some code here
```

The "if" statement

```
// some code here
if ( /* a test goes here */ ) ✓
{
     // some code here
}
// some code here
```

The "if" statement

```
// some code here
```

```
if ( /* a test goes here */ ) ✓
```

```
{
```

```
    // some code here
```

```
}
```

```
➡ // some code here
```

The “if” statement

```
➡ // some code here
  if ( /* a test goes here */ )
  {
      // some code here
  }
  // some code here
```

The "if" statement

```
// some code here  
→ if ( /* a test goes here */ )  
  {  
    // some code here  
  }  
// some code here
```


The “if” statement

```
// some code here  
→ if ( /* a test goes here */ ) ✗  
  {  
    // some code here  
  }  
// some code here
```

The “if” statement

```
// some code here
```

```
if ( /* a test goes here */ ) ×
```

```
{
```

```
    // some code here
```

```
}
```



```
// some code here
```

The 'if' statement: an example

```
temperature = sc.nextDouble();  
System.out.println("Below freezing");  
System.out.print("Enter another temperature");
```



Activity

“Modify this code so the **Below freezing** message is displayed only when the temperature is **less than zero**”

The 'if' statement: an example

```
temperature = sc.nextDouble();  
System.out.println("Below freezing");  
System.out.print("Enter another temperature");
```

The **'if'** statement: an example

```
temperature = sc.nextDouble();
```

```
System.out.println("Below freezing");
```

```
System.out.print("Enter another temperature");
```

The **'if'** statement: an example

```
temperature = sc.nextDouble();  
if ( temperature < 0 )  
{  
    System.out.println("Below freezing");  
}  
System.out.print("Enter another temperature");
```

The “**if**” statement: an example

```
temperature = sc.nextDouble();  
if ( temperature < 0 )  
{  
    System.out.println(“Below freezing”);  
}  
System.out.print(“Enter another temperature”);
```

RUN

The **"if"** statement: an example

```
temperature = sc.nextDouble();  
if ( temperature < 0 )  
{  
    System.out.println("Below freezing");  
}  
System.out.print("Enter another temperature");
```

The “**if**” statement: an example

```
➡ temperature = sc.nextDouble();  
if ( temperature < 0 )  
{  
    System.out.println(“Below freezing”);  
}  
System.out.print(“Enter another temperature”);
```

The **"if"** statement: an example

```
→ temperature = sc.nextDouble();  
if ( temperature < 0 )  
{  
    System.out.println("Below freezing");  
}  
System.out.print("Enter another temperature");
```

-5

The “**if**” statement: an example

```
temperature = sc.nextDouble();  
→ if ( temperature < 0 )  
  {  
    System.out.println(“Below freezing”);  
  }  
System.out.print(“Enter another temperature”);
```

-5

The **"if"** statement: an example

```
temperature = sc.nextDouble();
```

```
if ( temperature < 0 )
```

```
{
```



```
    System.out.println("Below freezing");
```

```
}
```

```
System.out.print("Enter another temperature");
```

-5

The **"if"** statement: an example

```
temperature = sc.nextDouble();
```

```
if ( temperature < 0 )
```

```
{
```



```
    System.out.println("Below freezing");
```

```
}
```

```
System.out.print("Enter another temperature");
```

-5

Below freezing

The **"if"** statement: an example

```
temperature = sc.nextDouble();  
if ( temperature < 0 )  
{  
    System.out.println("Below freezing");  
}  
→ System.out.print("Enter another temperature");
```

-5
Below freezing

The “if” statement: an example

```
temperature = sc.nextDouble();  
if ( temperature < 0 )  
{  
    System.out.println(“Below freezing”);  
}  
➡ System.out.print(“Enter another temperature”);
```

```
-5  
Below freezing  
Enter another temperature
```


The “**if**” statement: an example

```
➡ temperature = sc.nextDouble();  
if ( temperature < 0 )  
{  
    System.out.println(“Below freezing”);  
}  
System.out.print(“Enter another temperature”);
```

The **"if"** statement: an example

```
➔ temperature = sc.nextDouble();  
if ( temperature < 0 )  
{  
    System.out.println("Below freezing");  
}  
System.out.print("Enter another temperature");
```

12

The **"if"** statement: an example

```
temperature = sc.nextDouble();  
→ if ( temperature < 0 )  
  {  
    System.out.println("Below freezing");  
  }  
System.out.print("Enter another temperature");
```

12

The **"if"** statement: an example

```
temperature = sc.nextDouble();
```

```
if ( temperature < 0 )
```

```
{
```

```
    System.out.println("Below freezing");
```

```
}
```

```
➔ System.out.print("Enter another temperature");
```

12

The **'if'** statement: an example

```
temperature = sc.nextDouble();
```

```
if ( temperature < 0 )
```

```
{
```

```
    System.out.println("Below freezing");
```

```
}
```

```
➔ System.out.print("Enter another temperature");
```

12

Enter another temperature

**Remember: you
can have **multiple**
instructions
inside an **if**
statement!**



```
import java.util.*;

public class ShoppingApp
{
    public static void main(String[] args )
    {
        double initialPrice, tax, total;
        Scanner sc = new Scanner(System.in);
        System.out.println("*** Product Price Check ***");
        System.out.print("Enter initial price: ");
        initialPrice = sc.nextDouble();
        System.out.print("Enter tax rate: ");
        tax = sc.nextDouble();
        total = initialPrice * (1 + tax/100);
        System.out.println("Cost after tax = " + total);
    }
}
```



Activity

“Use an *if* statement to display an informative message and reduce the tax when appropriate.”


```
import java.util.*;
public class ShoppingApp
{
    public static void main(String[] args )
    {
        double initialPrice, tax, total;
        Scanner sc = new Scanner(System.in);
        System.out.println("*** Product Price Check ***");
        System.out.print("Enter initial price: ");
        initialPrice = sc.nextDouble();
        System.out.print("Enter tax rate: ");
        tax = sc.nextDouble();
        total = initialPrice * (1 + tax/100);
        System.out.println("Cost after tax = " + total);
    }
}
```

```
import java.util.*;
public class ShoppingApp
{
    public static void main(String[] args )
    {
        double initialPrice, tax, total;
        Scanner sc = new Scanner(System.in);
        System.out.println("*** Product Price Check ***");
        System.out.print("Enter initial price: ");
        initialPrice = sc.nextDouble();
        System.out.print("Enter tax rate: ");
        tax = sc.nextDouble();

        // code to reduce tax here if price 100 or more


        total = initialPrice * (1 + tax/100);
        System.out.println("Cost after tax = " + total);
    }
}
```

```
import java.util.*;
public class ShoppingApp
{
    public static void main(String[] args )
    {
        double initialPrice, tax, total;
        Scanner sc = new Scanner(System.in);
        System.out.println("*** Product Price Check ***");
        System.out.print("Enter initial price: ");
        initialPrice = sc.nextDouble();
        System.out.print("Enter tax rate: ");
        tax = sc.nextDouble();
        if(
        )
        {
            System.out.println ("Promotion: Half Tax!");
            tax = tax * 0.5;
        }
        total = initialPrice * (1 + tax/100);
        System.out.println("Cost after tax = " + total);
    }
}
```


```
import java.util.*;
public class ShoppingApp
{
    public static void main(String[] args )
    {
        double initialPrice, tax, total;
        Scanner sc = new Scanner(System.in);
        System.out.println("*** Product Price Check ***");
        System.out.print("Enter initial price: ");
        initialPrice = sc.nextDouble();
        System.out.print("Enter tax rate: ");
        tax = sc.nextDouble();
        if(
        )
        {
            System.out.println ("Promotion: Half Tax!");
            tax = tax * 0.5;
        }
        total = initialPrice * (1 + tax/100);
        System.out.println("Cost after tax = " + total);
    }
}
```

```
import java.util.*;
public class ShoppingApp
{
    public static void main(String[] args )
    {
        double initialPrice, tax, total;
        Scanner sc = new Scanner(System.in);
        System.out.println("*** Product Price Check ***");
        System.out.print("Enter initial price: ");
        initialPrice = sc.nextDouble();
        System.out.print("Enter tax rate: ");
        tax = sc.nextDouble();
        if( initialPrice > 100 )
        {
            System.out.println ("Promotion: Half Tax!");
            tax = tax * 0.5;
        }
        total = initialPrice * (1 + tax/100);
        System.out.println("Cost after tax = " + total);
    }
}
```

```
import java.util.*;
public class ShoppingApp
{
    public static void main(String[] args )
    {
        double initialPrice, tax, total;
        Scanner sc = new Scanner(System.in);
        System.out.println("*** Product Price Check ***");
        System.out.print("Enter initial price: ");
        initialPrice = sc.nextDouble();
        System.out.print("Enter tax rate: ");
        tax = sc.nextDouble();
        if( initialPrice > 100 )
        {
            System.out.println ("Promotion: Half Tax!");
            tax = tax * 0.5;
        }
        total = initialPrice * (1 + tax/100);
        System.out.println("Cost after tax = " + total);
    }
}
```



```
*** Product Price Check ***  
Enter initial price: 1000  
Enter tax rate: 10  
Promotion: Half Tax!  
Cost after tax = 1050.0
```



```
*** Product Price Check ***  
Enter initial price: 50  
Enter tax rate: 10  
Cost after tax = 55.0
```


The comparison operators of Java

Operator	Meaning
==	equal to
!=	not equal to
<	less than
>	greater than
>=	greater than or equal to
<=	less than or equal to

```
if ( temperature >= 18 )  
{  
    System.out.println("Today is a hot day!");  
}
```

The comparison operators of Java

Operator	Meaning
==	equal to
!=	not equal to
<	less than
>	greater than
>=	greater than or equal to
<=	less than or equal to

```
if (angle == 90)  
{  
    System.out.println("This is a right angle!");  
}
```

The comparison operators of Java


Operator	Meaning
==	equal to
!=	not equal to
<	less than
>	greater than
>=	greater than or equal to
<=	less than or equal to

```
if (angle != 90)  
{  
    System.out.println("This is NOT a right angle!");  
}
```



Activity

“What is the output of the following program if the user enters **10 when prompted?”**




```
import java.util.*;
public class Selection
{
    public static void main(String[ ] args)
    {
        int x;
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter a number: ");
        x = sc.nextInt();
        if (x > 10)
        {
            System.out.println("Green");
            System.out.println("Blue");
        }
        System.out.println("Red");
    }
}
```



Activity

“What is the output of the following program if the user enters **10 when prompted?”**



```
import java.util.*;
public class Selection
{
    public static void main(String[ ] args)
    {
        int x;
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter a number: ");
        x = sc.nextInt();
        if (x > 10)


            System.out.println("Green");
            System.out.println("Blue");

        System.out.println("Red");
    }
}
```



Activity

“What is the output of the following program if the user enters **20 when prompted?”**



```
import java.util.*;
public class Selection
{
    public static void main(String[ ] args)
    {
        int x;
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter a number: ");
        x = sc.nextInt();
        if (x > 10)
        {
            System.out.println("Green");
            System.out.println("Blue");
        }
        System.out.println("Red");
    }
}
```