

Selection (`if` Statements)

Logical Operators

Lecture Contents

- Logical Operators
- Operator Precedence

Operator Types

✓ <i>Arithmetic</i>		+	-	*	/	%
✓ <i>Assignment</i>	=	+=	-=	*=	/=	%=
✓ <i>Increment</i>		++	--			
✓ <i>Comparison</i>	!=	==	>	>=	<	<=
➡ <i>Logical</i>	!			&&		
<i>Bitwise</i>	~			&		^
	~=	=		&=		^=

Logical operators take two boolean as parameters and return a boolean.

(Remember: a boolean can only be either true or false).

Logical Operators

Symbol	Name
!	Logical NOT
&&	Logical AND
	Logical OR

Operator Precedence

Level	Description	Operators	Associativity
16	parentheses	()	Left-to-right
15	post inc/dec	++, --	Left-to-right
14	logical NOT	!	Right-to-Left
13	cast	()	Right-to-Left
12	multiplicative	*, /, %	Left-to-right
11	additive	+, -	Left-to-right
9	relational	>, >=, <, <=	Left-to-right
8	equality	==, !=	Left-to-right
4	logical AND	&&	Left-to-right
3	logical OR	 	Left-to-right
1	assignment	=, +=, -= *=, /=, %=	Right-to-Left

Truth Tables

Input	!
false	true
true	false

Inputs		&&
false	false	false
false	true	false
true	false	false
true	true	true

Inputs		
false	false	false
false	true	true
true	false	true
true	true	true

Truth Tables

Input	!
0	1
1	0

Inputs		&&
0	0	0
0	1	0
1	0	0
1	1	1

Inputs		
0	0	0
0	1	1
1	0	1
1	1	1

Testing Logical Operators

```
public static void main(String args[]) {  
    System.out.println("Starting Program...");  
    if(true && false) {  
        System.out.println("Hello World!");  
    } else {  
        System.out.println("Goodbye cruel world...");  
    }  
    System.out.println("Finished Program!");  
}
```

Testing Logical Operators

```
public static void main(String args[]) {  
    System.out.println("Starting Program...");  
    if(true && false) {  
        System.out.println("Hello World!");  
    } else {  
        System.out.println("Goodbye cruel world...");  
    }  
    System.out.println("Finished Program!");  
}
```

```
Starting Program...  
Goodbye cruel world...  
Finished Program!
```

Testing Logical Operators

```
public static void main(String args[]) {  
    System.out.println("Starting Program...");  
    if (true && 5) {  
        System.out.println("Hello World!");  
    } else {  
        System.out.println("Goodbye cruel world...");  
    }  
    System.out.println("Finished Program!");  
}
```

Testing Logical Operators

```
public static void main(String args[]) {  
    System.out.println("Starting Program...");  
    if (true && 5) {  
        System.out.println("Hello World!");  
    } else {  
        System.out.println("Goodbye cruel world...");  
    }  
    System.out.println("Finished Program!");  
}
```

ERROR:

The operator && is undefined for the argument type(s) boolean, int

Operator Precedence

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13	cast	()	Right-to-Left
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