

Conditions and if/else

Conditions

score > 90

- Evaluates to true (1) or false (0)
- Generally ...

variable operator variable

variable operator constant

Comparison Operators

- $<$
- $>$
- $<=$
- $>=$
- $==$
 - NOT the same as $=$
- $!=$

Object Comparison

- `==` compares references
- Use `.equals` to compare objects
 - `o1.equals(o2)`

Examples

- $x=5$ $y=8$ $z=5$ $MAX=10$ $initial='s'$

$x < y$

$y > MAX$

$x \leq z$

$z \geq MAX$

$initial == 'r'$

$x \neq z$

Logical Operators

- &&

- ||

- !

- x=5 y=8 z=5 MAX=10 initial='s'

x<y && z>MAX

x<y || z>MAX

!(x>y)

Precedence

- `()`, `[]`, `.`
- `++` `--`
- `*` `/` `%`
- `+` `-`
- `<` `<=` `>=` `>`
- `==` `!=`
- `&&`
- `||`
- `=`

Short-Circuit Evaluation

- Stop evaluation when true/false value is determined
- `x=6    y=9`

`x>2   ||   y > 13`

`x<2   &&   y>13`

`var != null   &&   var.getData() == 10`

Logical Assignment and Negation

```
in_range = (x>0 && x<=10); // 1 if x between 1-10, 0 otherwise
```

```
same_initials = (first_initial=='S' && last_initial=='R');
```

```
not_same_initials = !(first_initial=='S' && last_initial=='R');
```

```
not_same_initials = (first_initial!='S' || last_initial!='R');
```

DeMorgan's Theorem

- $\neg(a \ \&\& \ b) \Rightarrow (\neg(a) \ || \ \neg(b))$
- $\neg(a \ || \ b) \Rightarrow (\neg(a) \ \&\& \ \neg(b))$

if Statement

- Condition must be surrounded by ()
- Statements must be surrounded by {}
- Each statement must end with ;

```
if (condition) {  
    statements  
}  
if (age >= 16) {  
    System.out.println("You can get a driver's license.");  
}  
if (age > 21) {  
    System.out.println("You can purchase alcohol.");  
    System.out.println("You can gamble.");  
}  
  
if(age >= 16 && age < 21) {  
    System.out.println("You can drive but you cannot gamble.");  
}
```

if/else Statement

```
if(condition) {  
    statements  
} else {  
    statements  
}  
  
if(grade > 60) {  
    System.out.println("You passed the class.");  
    System.out.println("Next up, CS112.");  
} else {  
    System.out.println("Sorry, you did not pass.");  
    System.out.println("Try again next semester.");  
}
```

Nested if Statements

```
if (condition) {  
    if(condition) {  
        statement  
    } else {  
        statement  
    }  
} else {  
    statement  
}
```

```
if(grade > 60) {  
    System.out.println("You passed the class.");  
    if(grade > 90) {  
        System.out.println("You passed with an A!");  
    }  
} else {  
    System.out.println("Sorry, you did not pass.");  
}
```

Chained Conditionals

```
if(num > 0 && num <= 10) {  
    System.out.println("Your number is between 1 and 10");  
} else if(num > 10) {  
    System.out.println("Your number is too high");  
} else {  
    System.out.println("Your number is too low");  
}
```

Using Functions

```
String getGrade(double score) {  
    if(score > 90) {  
        return "A";  
    } else if(score > 80) {  
        return "B";  
    } else if(score > 70) {  
        return "C";  
    } else if(score > 60) {  
        return "D";  
    } else {  
        return "F";  
    }  
}
```

switch Statement

```
switch(value) {  
    case 1:  
        //do something  
        break;  
    case 2:  
        //do something  
        break;  
    default:  
        //do something  
}
```