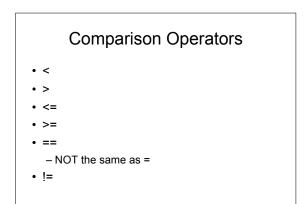


### Conditions

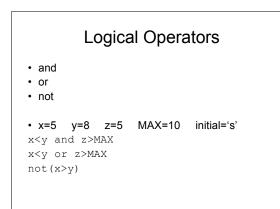
#### score > 90

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



# Examples

• x=5 y=8 z=5 MAX=10 initial='s' x<y y>MAX x<=z z>=MAX initial==`r' x!=z



### Precedence

- function calls
- unary operators and binary power (-, \*\*)
- \*/%
- + -
- < <= >= > == !=
- not
- and
- or

### Short-Circuit Evaluation

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

```
x>2 or y > 13
x<2 and y>13
```

### Logical Assignment and Negation

in\_range = (x>0 and x<=10) # 1 if x between 1-10, 0 otherwise in\_range = 0<x<=10 #Java does not allow this!!!

same\_initials = (first\_initial==`S' and last\_initial==`R')

 $\label{eq:not_same_initials} = \mbox{not(first_initial==`S' and last_initial==`R')} \\ \mbox{not_same_initials} = (\mbox{first_initial!=`S' or last_initial!=`R')} \\ \label{eq:not_same_initials}$ 

## DeMorgan's Theorem

- not(a and b) => (not(a) or not(b))
- not(a or b) => (not(a) and not(b))

### Exercises

- 1. Determine the results of the following statements given a=6 b=9 c=12 d=-7 e=0 f=12:
  - 1. print a > d  $\,$
  - 2. print c <= f
    3. print d > e
  - 4. print c = f
  - 5. print c == f
  - 6. print c > b and e > f
  - 7. print c > b or e > f
  - print a or e
     print e and a

# if Statement

#### • Statements MUST be indented

if condition: statements

if age >= 16:

print "You can get a driver's license."

if age > 21: print "You can purchase alcohol." print "You can gamble."

if age >= 16 and age < 21: print "You can drive but you cannot gamble."

# if/else Statement

if condition: statements else:

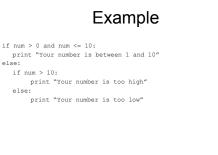
statements

if grade > 60: print "You passed the class." print "Next up, CS112."

else:

print "Sorry, you did not pass." print "Try again next semester."

<pre>if condition: if condition: statement else: statement else: print "You passed the class." if grade &gt; 90:</pre>		Nested if Statements
else: statement if grade > 60: print "You passed the class." if grade > 90: print "You passed with an A!" else:	if condi sta	tion:
print "You passed the class." if grade > 90: print "You passed with an A!" else:	sta else:	
else:	pr	int "You passed the class."
	else:	print "You passed with an A!"



# **Chained Conditionals**

if num > 0 and num <= 10: print "Your number is between 1 and 10" else: if num > 10: print "Your number is too high" else:

- print "Your number is too low"
- if num > 0 and num <= 10: print "Your number is between 1 and 10" elif num > 10: print "Your number is too high" else: print "Your number is too low"

## Example

- if grade > 60: print "You passed the class." if grade > 90: print "You passed with an A!"
- else: print "Sorry, you did not pass."

#Does this work ???

- print "You passed with an A!" else:
  - print "Sorry, you did not pass."

# **Using Functions**

def getGrade(score): if score > 90: return "A" elif score > 80: return "B" elif score > 70: return "C" elif score > 60: return "D" else: return "F"

### **Exercises**

- 1. Write an if statement that compares two integer variables x and y and prints the largest. For example, your program would print "X is larger than Y" or "Y is larger than X".
- 2. Modify your program above so that it compares three integers x, y, and z and prints the largest.
- Write a function that takes as input a year and returns true if the year is a leap year and false otherwise. A year is a leap year if it is divisible by four, except that any year divisible by 100 is a leap year only if it is divisible by 400 as well. -Problem Solving and Program Design in C Hanly and Koffman