

Primer C++ Plus

Loops and Relational Expressions

LOOP

- Loop initialization, loop test, loop update
- Loop test
 - Doesn't limit test-expression to true/ false comparisons
 - You can use any expression -> C++ type cast it to boolean
 - Relational expressions
- Assignment expression
 - C++ also allows those
 - Using
 - Cout displays false and true instead of 0 and 1
 - Side effect
 - When evaluating expression change value of data in memory
 - Inside strings with the for loop
- The increment (++) and decrement (--) operator
 - Prefix
 - ++X
 - First perform operation then increment
 - Postfix
 - --X
 - First increment then perform operation
- Side effects and sequence points
 - Sequence point - point in program execution at which all side effects are guaranteed to be evaluated before next step

- In C++ semicolon is a sequence point
- Increment and decrement operators and pointers
 - You can use operators with pointers too
 - Incrementing pointers follow pointer follows arithmetic rules
 - If pointer points to the first member of an array, ++p will point to array[1]
- Combination assignment operators
 - Each arithmetic operator has a corresponding assignment operator
- Compound statements, or blocks
 - Variables declared in block exists only in that block
 - If you declare variable in a block that has the same name as one outside the block
 - The new variable hides the old one from its point of appearance until the end of the block
- The comma operator
 - Comma allows you to sneak more statements into a place where C++ syntax allows just one statement
 - In the update part of the loop
 - Comma isn't always a comma operator
 - Comma operator tidbits
 - First expression is evaluated before second expression
 - So comma operator is a sequence point
 - Value of a comma expression is the value of the second part of the expression
 - Comma operator has the lowest precedence of any operator
 - Cats is 17 and 240 does nothing, expression is read like this
 - Cats is set to 240 (on the right of the comma), 17 is ignored

RELATIONAL EXPRESSIONS

- Characters are evaluated by ASCII codes, you can use these operators with characters too

- They work with string class object, not C-style strings
 - You can use cin in for too
 - Relational operators have a lower precedence then the arithmetic operators
 - Don't confuse assignment operator with is-equal-to
 - If you change it in the loop, it will still be a valid code -> hard to find an error
 - Comparing C-style strings
 - This test compares addresses of word and "mate"
 - C++ handles C-style strings as addresses
 - strcmp()
 - Function to compare C-style strings
 - Takes 2 string addresses as arguments
 - Pointers, string constants, character array names
 - If 2 pointers are identical -> function returns 0
 - If first string precedes the second one alphabetically -> returns negative value
 - If second precedes the first one alphabetically -> returns positive value
 - Alphabetically
 - according to ASCII, based on code values
 - Uppercase have smaller case than lowercase letters
 - So "Zoo" precedes "aviary"
 - Comparing string class strings
 - String class allows you to use relational operators
- WHILE**
- The while loop
 - Has just test condition, entry condition loop
 - You can rewrite while to for
 - Building a time delay loop

- When you need to wait
 - Result can differ based on the processor
- It is better to use clock()
 - #include <ctime>
- Missing test condition in for loop is constructed as true

DO WHILE

- Exit condition loop
 - First executes body of the loop and only then evaluates the test expression to see whether it should execute looping
 - Loop executes at least once

LOOPS AND TEXT INPUT

- Sentinel character
 - = stop sign
- Program
 - Cin ignores spaces
- cin.get(char)
 - Reads every character - including spaces
- End-of-file condition
 - Redirection
 - Substitute a file for keyboard input
 - Unix and MS-DOS
 - Many OS allow you to simulate EOF condition from the keyboard
 - Unix - Control+D at the beginning of the line
 - DOS - Control+Z and then press enter
 - When cin detects EOF, it sets 2 bits (aofbit and failbit) to 1
 - Use a member function named cin.eof() to test if they were set

- Returns true or false
- You can rewrite test like this
- `cin.get(ch)` vs `cin.get()`

NESTED LOOPS AND TWO-DIMENSIONAL ARRAYS

- Two dimensional array
 - Table
 - 4 rows, 5 columns
 - Initializing 2D array
 - You can use arrays of arrays of char
 - Each string can have max 24 characters
 - Array of pointers for string data