More Ifs

1 Selection from More Choices

The otherwise code for an else statement might itself be an if-else construct. This is commonly thought of as if . . . else if . . . else. Here is an example:

```c
if( waterTemp>100.0 )
    printf("Gas");
else if (waterTemp>0.0 )
    printf("Liquid");
else
    printf("Solid");
```

2 Boolean Variables

A flag is a variable that has only two possible values (think true/false or on/off). In C a flag is often simulated by an int variable. Note that

*C interprets 0 as false and any other value as true.*

An example usage could be where we have a loop that can end for many reasons (bad input, problem solved, time elapsed). In this case, we do a loop which repeatedly checks the flag; in the body of the loop there are several places where the flag can be set (to set a flag is to make it true; to clear a flag is to make it false).

3 Logical Operators

For more complex boolean conditions, one can combine conditions with one of the logical operators. The three most common of these are

`&& || !`

`&&` means *and*: the overall condition is true if both parts are true. The `||` means *or*: the overall condition is true if either or both parts are true (sometimes called the inclusive or). The operator `!` means *not*: it converts false to true and vice versa.

It is useful to know that the logical operators have lower precedence than the other operators such as arithmetic and relational. So to test if a given char is an upper-case letter, it is sufficient to write as follows (without more brackets):

```c
if ( myChar >='A' && myChar<='Z' )
```
4 Sample Program: sequence.c

Here is a program that reads in a sequence from the user and then prints a message as to whether the sequence is strictly increasing, strictly decreasing, or neither.

// reads 10 numbers from user and says whether increasing or decreasing
#include <stdio.h>

int main( )
{
    const int LENGTH = 10;
    int isIncreasing = 1, isDecreasing = 1;
    float prev, current;
    int i;

    for(i=0; i<LENGTH; i++) {
        printf("Enter value ");
        scanf("%f", &current);

        if( i>0 && current<=prev)
            isIncreasing = 0;
        if( i>0 && current>=prev)
            isDecreasing = 0;
        prev = current;
    }

    if( isIncreasing )
        printf("Is strictly increasing\n");
    else if( isDecreasing )
        printf("Is strictly decreasing\n");
    else
        printf("Not strictly monotonic\n");

    return 0;
}