

Ifs

0.1 The If Statement

The *if statement* is the primary selection control structure. The format is

```
if ( condition )
    then_code ;
```

The condition is a boolean condition as before. If the condition is true the `then_code` is executed; if the condition is false the `then_code` is skipped. A *statement* is a single piece of code; a *block* is several statements enclosed in braces. Here is an example:

```
if( gradePointAverage >= 3.0) {
    printf("Scholarship retained");
}
```

0.2 The If-Else Statement

A more general version of the *if* statement is the *if-else* structure for executing a statement when the condition is not true. Here the format is

```
if ( condition )
    then_code
else
    otherwise_code
```

Here is an example:

```
if(denom==0)
    printf("Unable to process fraction");
else
    printf("Fraction in decimal is %4.2f", ((float)numer)/denom);
```

Note the “cast” is the previous line: it tells the compiler to treat the `numer` value as a float.

In other words, the `else` part is optional. A common error is to miss the semi-colon before the `else`, or to have a semi-colon after the condition.

0.3 Sample Program: listMax.c

Here is a standard way of determining the maximum of a collection of values. The idea is to maintain a variable `maxSoFar` with the maximum value seen so far; this variable is updated each time a new value is seen by comparing it with that value. There is a standard problem of how to initialize the value of `maxSoFar`. This program sidesteps this by assuming that all values are nonnegative, and therefore the maximum is at least zero. Another approach is to initialize the value of `maxSoFar` to the first value that is read.

```
/* calculate maximum of user input
 * Assumes values nonnegative
 * wdg 2009
 */
#include <stdio.h>

int main( )
{

    const int LENGTH = 10;
    printf("Enter %d values\n", LENGTH);
    float maxSoFar = 0.0;

    int i;
    float value;

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

    printf( "Max is %4.1f\n", maxSoFar );
    return 0;
}
```