Software Tools

C, Unix (Linux), and tools

Our First Program

```
/* Everybody's first program */

main()
{
  printf("Hello World");
}
```

Our First Program (fixed)

```
/* Everybody's first program */
#include <stdio.h>

int main()
{
  printf("Hello World\n");
}
```

OK, we did it, now what?

- Notice that `main` looks like a function definition
- We can do some tricks to make it accept arguments
- We do this by letting main accept two arguments
  - First is an integer `argc` (argument count)
  - Second is an array of strings `argv` (argument vector)

Our First Program (fixed)

```
/* Everybody's first program */
#include <stdio.h>

int main(int argc, char *argv[ ])
{             /* argc is argument count */
              /* argv is an array of strings */
  if (argc==1)
    printf("Hello World\n");
  else if (argc==2)
    printf("Hello %s\n",argv[1]);
  else
    printf("Too many arguments\n");
}
```

Variables, Assignments and Loops

- All variables have to be defined and or declared
- For the time being we only define them
- Definition should include the type of variable
- We deal with the simpler kind of loop: the `while` loop

The Fahrenheit Program

```
#include <stdio.h>

int main()
{
  int fahr, celcius;
  int lower, upper, step;

  lower = 0;
  upper = 300;
  step  = 20;

  fahr = lower;
  while (fahr <= upper)
    {
      celcius = 5*(fahr-32)/9;
      printf("F:%4d\tC:%4d\n", fahr, celcius);
      fahr += step;
    }
}
```

The Fahrenheit Program

- You can have several variables defined on the same definition or multiple definitions
- The definitions can appear almost anywhere
  - Unless really needed for clarity, they should be at the begining
- You cannot change
  - celcius = 5*(fahr-32)/9;
    - As
  - celcius = 5/9*(fahr-32);

Floating point numbers

- What mathematicians call real numbers
- As in other languges, they are an approximation
- In C (and other languages) they are called `float`.
- They are usually 32 bit long (4 bytes)
- If we need higher accuracy we use `double` (64 bits or 8 bytes)
- C converts between integers and floats (or doubles) in a rather sensible manner.

The Fahrenheit Program (floats)

```
#include <stdio.h>

int main()
{
  float fahr, celcius;
  int lower, upper, step;

  lower = 0;
  upper = 300;
  step  = 20;

  fahr = lower;
  while (fahr <= upper)
    {
      celcius = 5*(fahr-32)/9;
      printf("F:%5.2f\tC:%5.2f\n", fahr, celcius);
      fahr += step;
    }
}
```