

Example C Programs

EECS 2031

1

Variables and Arithmetic Expressions (1.2)

```
main()
{
    float fahr, celsius;
    float lower, upper, step;

    lower = 0; /* lower limit of temperature scale */
    upper = 300; /* upper limit */
    step = 20; /* step size */
    fahr = lower;

    while (fahr <= upper) {
        celsius = (5.0/9.0) * (fahr-32.0);
        printf("%3.0f %6.1f\n", fahr, celsius);
        fahr = fahr + step;
    }
}
```

0	-17.8
20	-6.7
40	4.4
...	

2

The `for` Statement (1.3)

Symbolic Constants (1.4)

```
#include <stdio.h>

#define LOWER 0 /* lower limit of table */
#define UPPER 300 /* upper limit */
#define STEP 20 /* step size */

main()
{
    int fahr;
    for (fahr = LOWER; fahr <= UPPER; fahr = fahr + STEP)
        printf("%3d %6.1f\n", fahr, (5.0/9.0)*(fahr-32));
}
```

3

Character Input and Output (1.5)

```
#include <stdio.h>

#define IN 1 /* inside a word */
#define OUT 0 /* outside a word */

main()
{
    int c, nl, nw, nc, state;

    state = OUT;
    nl = nw = nc = 0; /* multiple assignments */

    while ((c = getchar()) != EOF) {
        ++nc;
        if (c == '\n')
            ++nl;
        if (c == ' ' || c == '\n' || c == '\t')
            state = OUT;
        else if (state == OUT) {
            state = IN;
            ++nw;
        }
    }
    printf("%d %d %d\n", nl, nw, nc);
}
```

4

Arrays (1.6)

```
main()
{
    int c, i, nwhite, nother;
    int ndigit[10];    /* an array */

    nwhite = nother = 0;
    for (i = 0; i < 10; ++i)
        ndigit[i] = 0;

    while ((c = getchar()) != EOF)
        if (c >= '0' && c <= '9')
            ++ndigit[c-'0'];    /* convert char to numeric value */
        else if (c == ' ' || c == '\n' || c == '\t')
            ++nwhite;
        else
            ++nother;

    printf("digits =");
    for (i = 0; i < 10; ++i)
        printf(" %d", ndigit[i]);
    printf(", white space = %d, other = %d\n", nwhite, nother);
}
```

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Functions (1.7, 1.8)

```
#include <stdio.h>

int power(int m, int n);    /* function prototype */

main()
{
    int i;

    for (i = 0; i < 10; ++i)
        printf("%d %d %d\n", i, power(2,i), power(-3,i));
    return 0;    /* 0 implies normal termination */
}

/* power: raise base to n-th power; n >= 0 */

int power(int base, int n)
{
    int i, p;

    p = 1;
    for (i = 1; i <= n; ++i)
        p = p * base;
    return p;
}
```

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Character Arrays (Strings) (1.9)

```
#include <stdio.h>

#define MAXLINE 1000 /* maximum input line length */

int inputline(char line[], int maxline); /* function prototype */

main()
{
    char line[MAXLINE]; /* current input line */
    int len = inputline( line, MAXLINE );
    if ( len > 0 )
        printf( "%s", line );
    return 0;
}

/* inputline: read a line into s, return length */
int inputline( char s[],int lim )
{
    int c, i;

    for ( i=0; i < lim-1 && (c=getchar())!=EOF && c!='\n'; ++i )
        s[i] = c;
    if (c == '\n') {
        s[i] = c;
        ++i;
    }
    s[i] = '\0';
    return i;
}
```

7

More Examples ...

- Read Chapter 1, C book.

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