

The C Programming Language: Chapter 1

Eric Bailey

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Write an abstract

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Hello, world!

Covers Exercises 1-1 and 1-2.

1a `<hello.c 1a>`≡
`<Include the standard I/O functions. 3c>`

```
int main()
{
    printf("Hello, world!\n");
}
```

Uses `printf 3c`.

Root chunk (not used in this document).

Fahrenheit-Celsius table

Covers Exercises 1-3, 1-4, and 1-5.

1b `<fahrrels.c 1b>`≡
`<Include the standard I/O functions. 3c>`
`<Include the standard string functions. 3d>`

This definition is continued in chunks **2** and **3**.

Root chunk (not used in this document).

Declare some useful constants.

2a *(fahrrels.c 1b)*+≡
`#define LOWER 0`
`#define UPPER 300`
`#define STEP 20`

Defines:

LOWER, used in chunk 2c.

STEP, used in chunk 2c.

UPPER, used in chunk 2c.

Exercise 1-3

2b *(fahrrels.c 1b)*+≡
`void print_header(char lhs[], char rhs[])`
`{`
 `printf("| %s | %s |\n", lhs, rhs);`
 `putchar('|');`
 `for (int i = -2; i < (int)strlen(lhs); ++i)`
 `putchar('-');`
 `putchar('+');`
 `for (int i = -2; i < (int)strlen(rhs); ++i)`
 `putchar('-');`
 `puts("|");`
`}`

Defines:

print_header, used in chunks 2c and 3a.

Uses printf 3c, putchar 3c, puts 3c, and strlen 3d.

Exercise 1-5

2c *(fahrrels.c 1b)*+≡
`void fahrrels()`
`{`
 `print_header("Fahrenheit", "Celsius");`
 `for (int fahr = UPPER; fahr >= LOWER; fahr -= STEP)`
 `printf("| %10d | %7.1f |\n", fahr, (5.0/9.0) * (fahr-32.0));`
`}`

Defines:

fahrrels, used in chunk 3b.

Uses LOWER 2a, STEP 2a, UPPER 2a, printf 3c, and print_header 2b.

Exercise 1-4

3a `<fahrrels.c 1b>+≡`

```
void celsfahr()
{
    print_header("Celsius", "Fahrenheit");
    for (int celsius = 0; celsius <= 300; celsius += 20)
        printf("| %7d | %10.0f |\n", celsius, 32.0 + (9.0/5.0) * celsius);
}
```

Defines:

`celsfahr`, used in chunk **3b**.

Uses `printf` **3c** and `print_header` **2b**.

The main function

3b `<fahrrels.c 1b>+≡`

```
int main()
{
    fahrrels();
    puts("\n");
    celsfahr();

    return 0;
}
```

Uses `celsfahr` **3a**, `fahrrels` **2c**, and `puts` **3c**.

Common Headers

3c `<Include the standard I/O functions. 3c>≡`

```
#include <stdio.h>
```

Defines:

`printf`, used in chunks **1-3**.

`putchar`, used in chunk **2b**.

`puts`, used in chunks **2b** and **3b**.

This code is used in chunk **1**.

3d `<Include the standard string functions. 3d>≡`

```
#include <string.h>
```

Defines:

`strlen`, used in chunk **2b**.

This code is used in chunk **1b**.

Chunks

⟨Include the standard I/O functions. 3c⟩ 1a, 1b, 3c

⟨Include the standard string functions. 3d⟩ 1b, 3d

⟨fahrrels.c 1b⟩ 1b, 2a, 2b, 2c, 3a, 3b

⟨hello.c 1a⟩ 1a

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LOWER: 2a, 2c

STEP: 2a, 2c

UPPER: 2a, 2c

celsfahr: 3a, 3b

fahrrels: 2c, 3b

printf: 1a, 2b, 2c, 3a, 3c

print_header: 2b, 2c, 3a

putchar: 2b, 3c

puts: 2b, 3b, 3c

strlen: 2b, 3d