7. Recursion; Data Types

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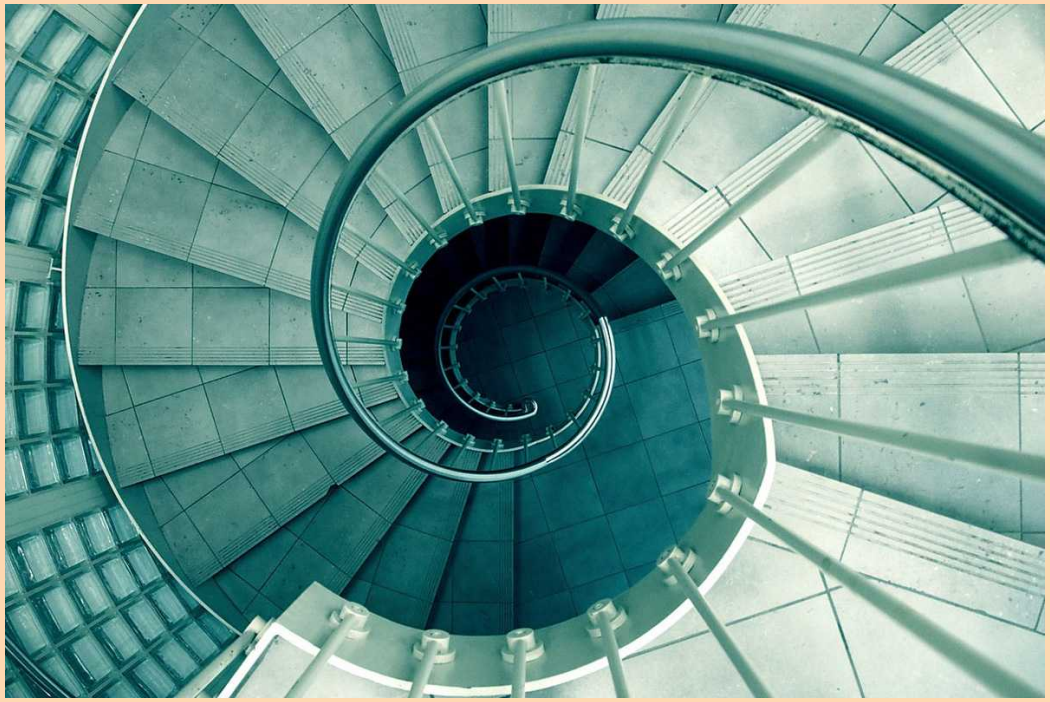
Review

Recursive Functions (Recursion)

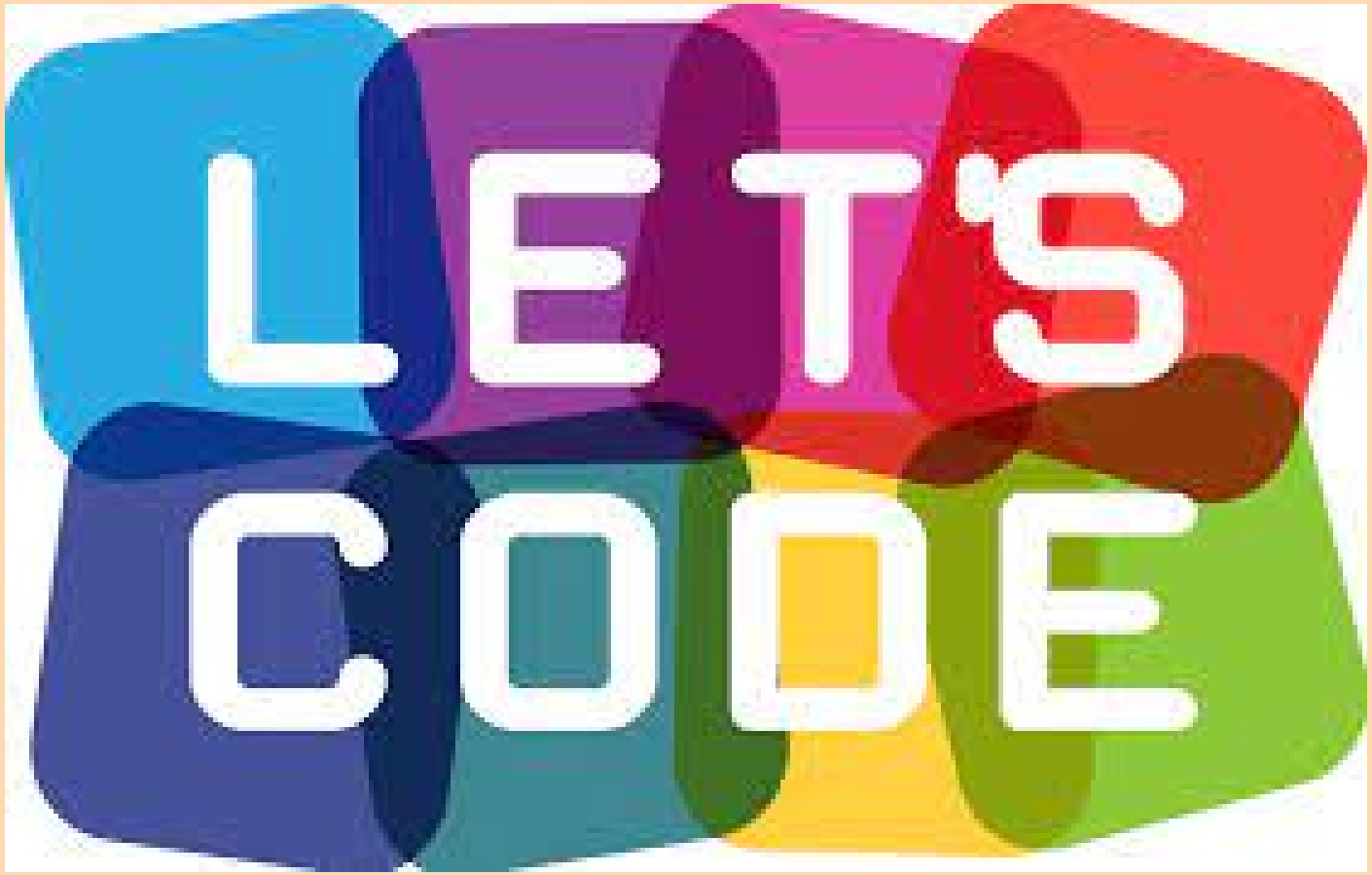


A function that calls itself.

Overview

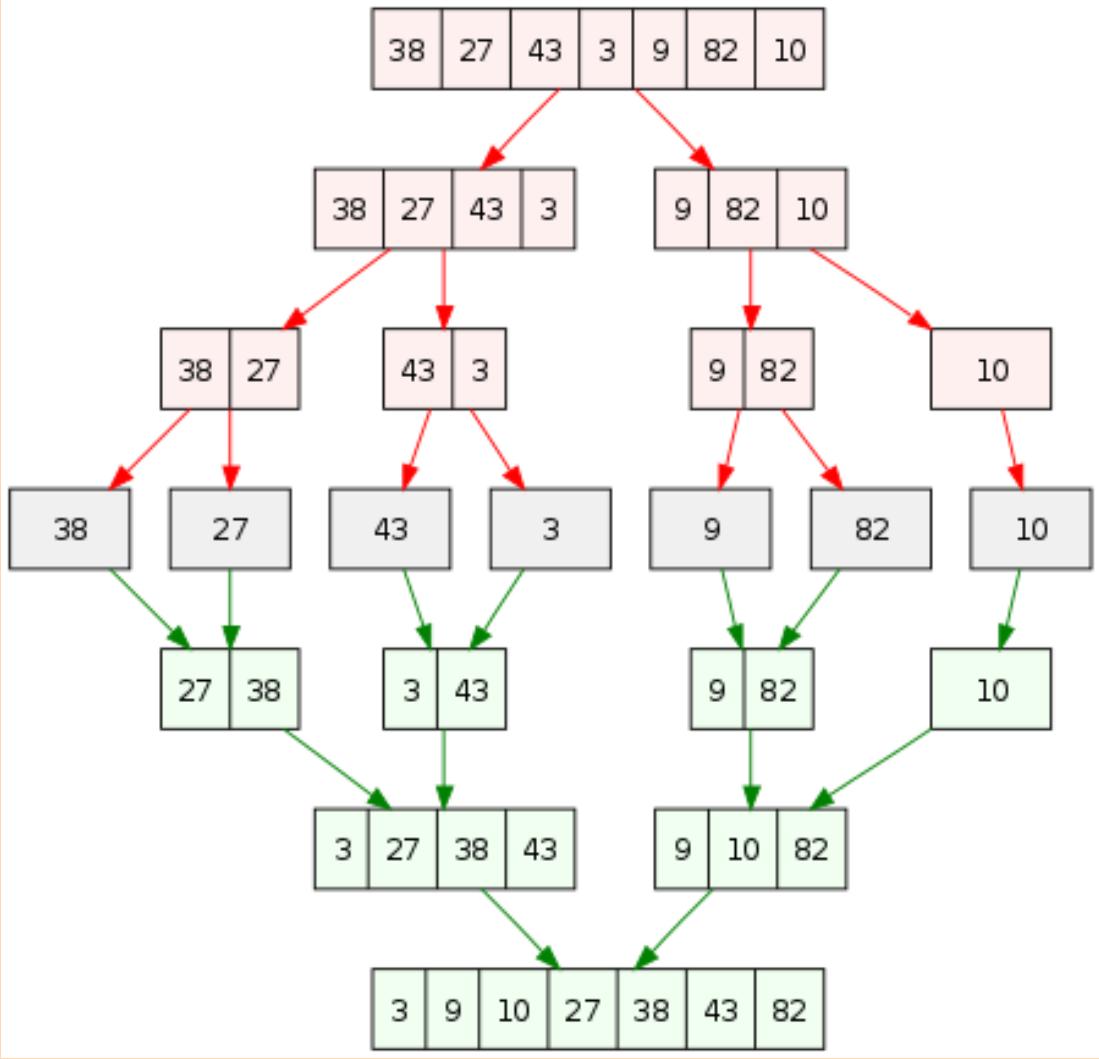
Recursion (mergesort.c)

Data Types



mergesort.c

Merge Sort (mergesort.c)



DO YOU WANNA DANCE TONIGHT?

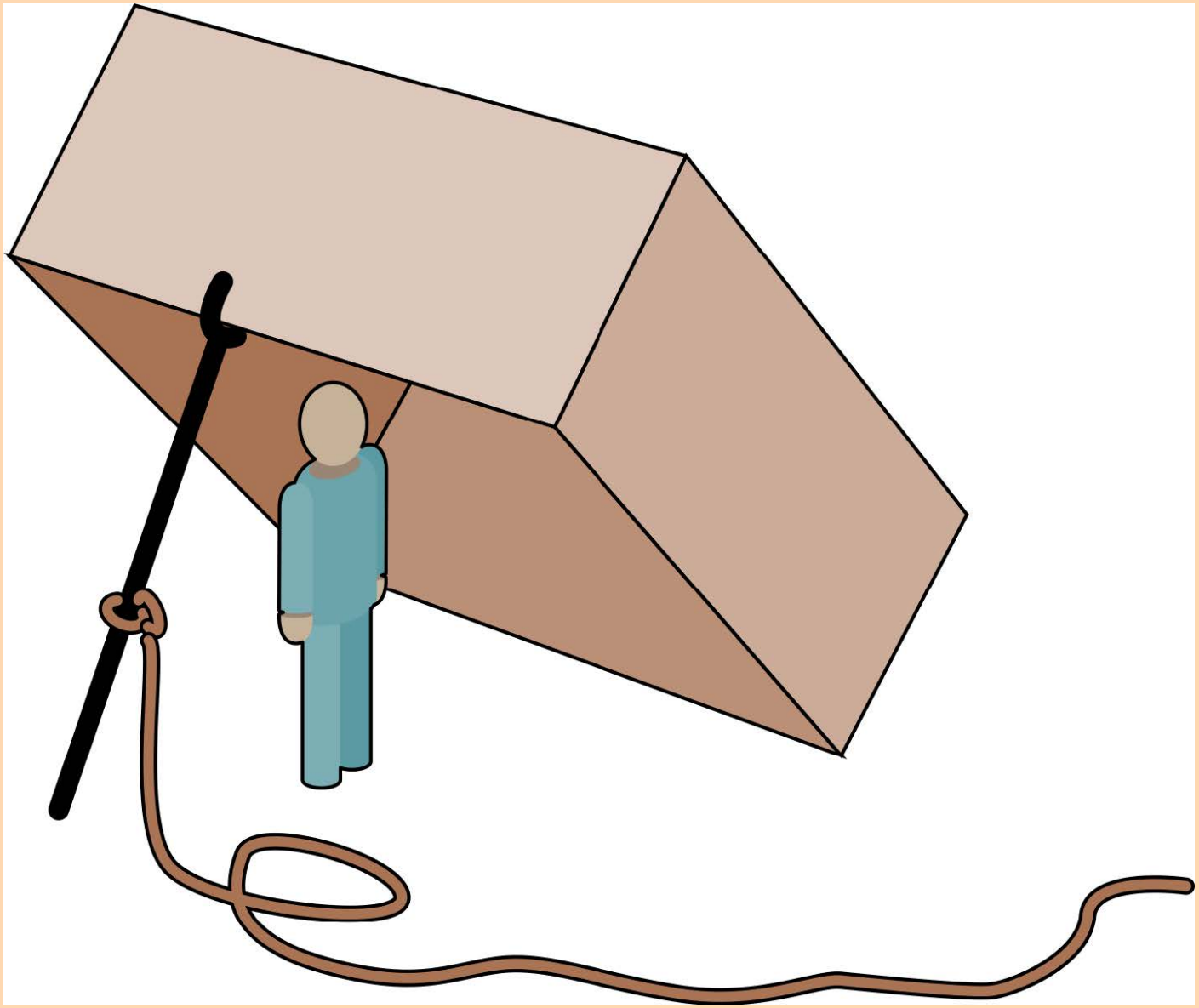
Data Types

The **type** of a variable determines

- the set of **values** it may take on and
- what **operations** can be performed on them.

int **double** **char** **bool**

[ ]



Integral Types (int-limits.c)

- short (int)
- int
- long (int)
- long long (int)

signed *vs.* unsigned

Overflow (int-overflow.c)

- 有符号整数运算中发生溢出，程序的行为是**未定义的**。
- 无符号整数运算中发生溢出，则发生**回绕**现象。

Signed and Unsigned (unsigned.c)

Be careful when mixing signed and unsigned types.

Signed and Unsigned (unsigned.c)

Do NOT use unsigned types unless you know exactly what you are doing.

typedef

typedef unsigned long long int size_t

typedef long clock_t

char (char.c)

Use `char` only for representing characters.

Do **NOT** assume `signed char` or `unsigned char`.

Implicit Conversion

(implicit-conversion.c)

- 算术表达式、逻辑表达式 (类型提升; Section 7.4.1)
- 定义初始化、赋值 (类型转换)
- 函数调用时 (类型转换)
- 函数返回时 (类型转换)

Be careful about narrowing conversion!!!

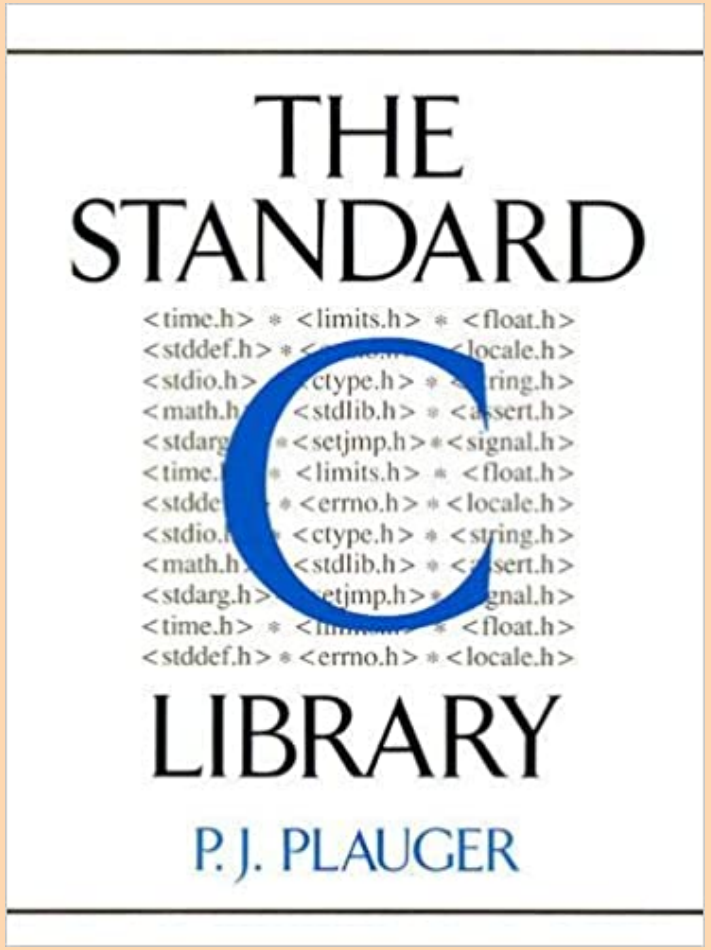
Explicit Conversion

(explicit-conversion.c)

Floating-point Numbers

(float-limits.c)

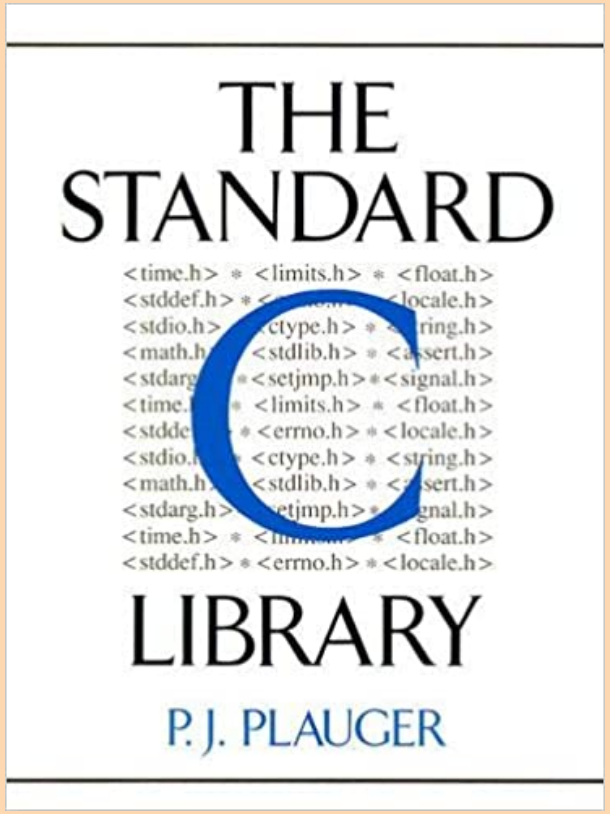
- float (F)
- double
- long double (L)



"Floating-point Arithmetic is Hard."

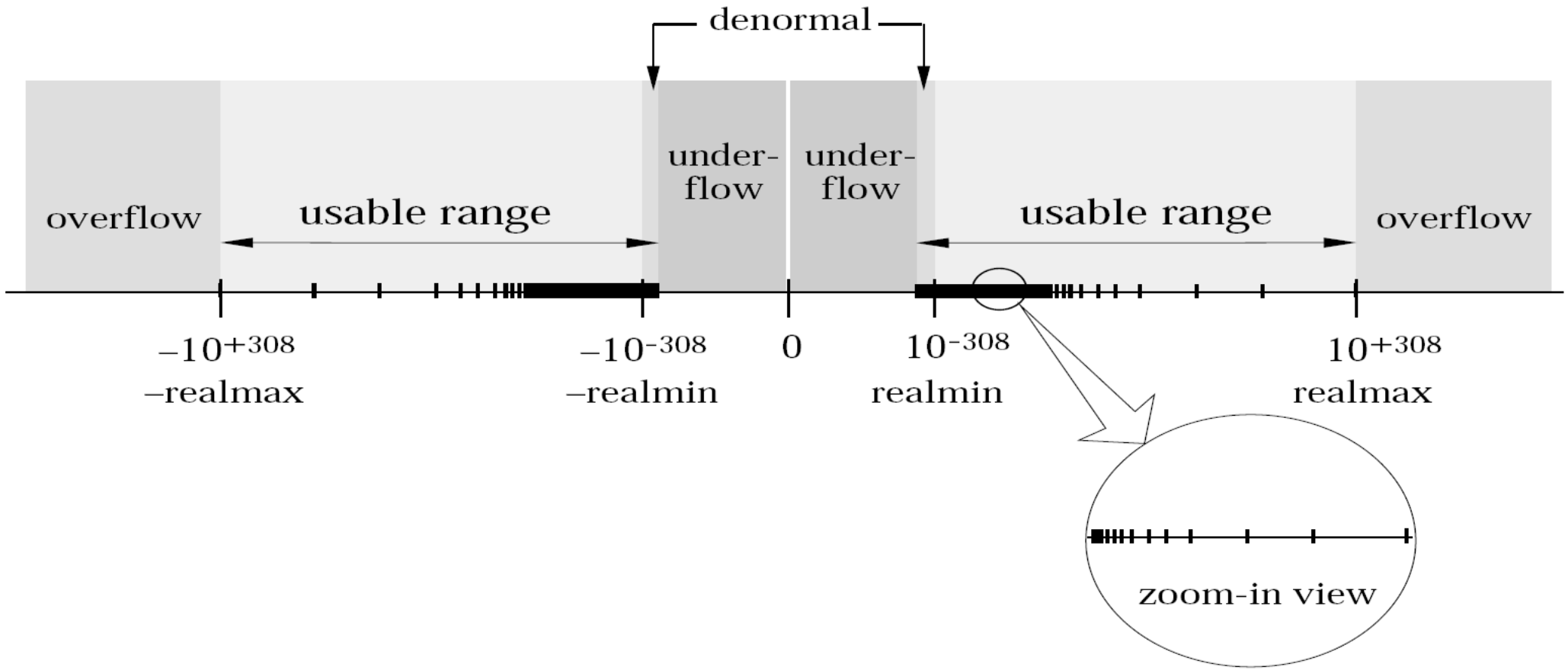
(Section 23.1 `float.h`)

"Many applications **don't** need floating-point arithmetic at all."

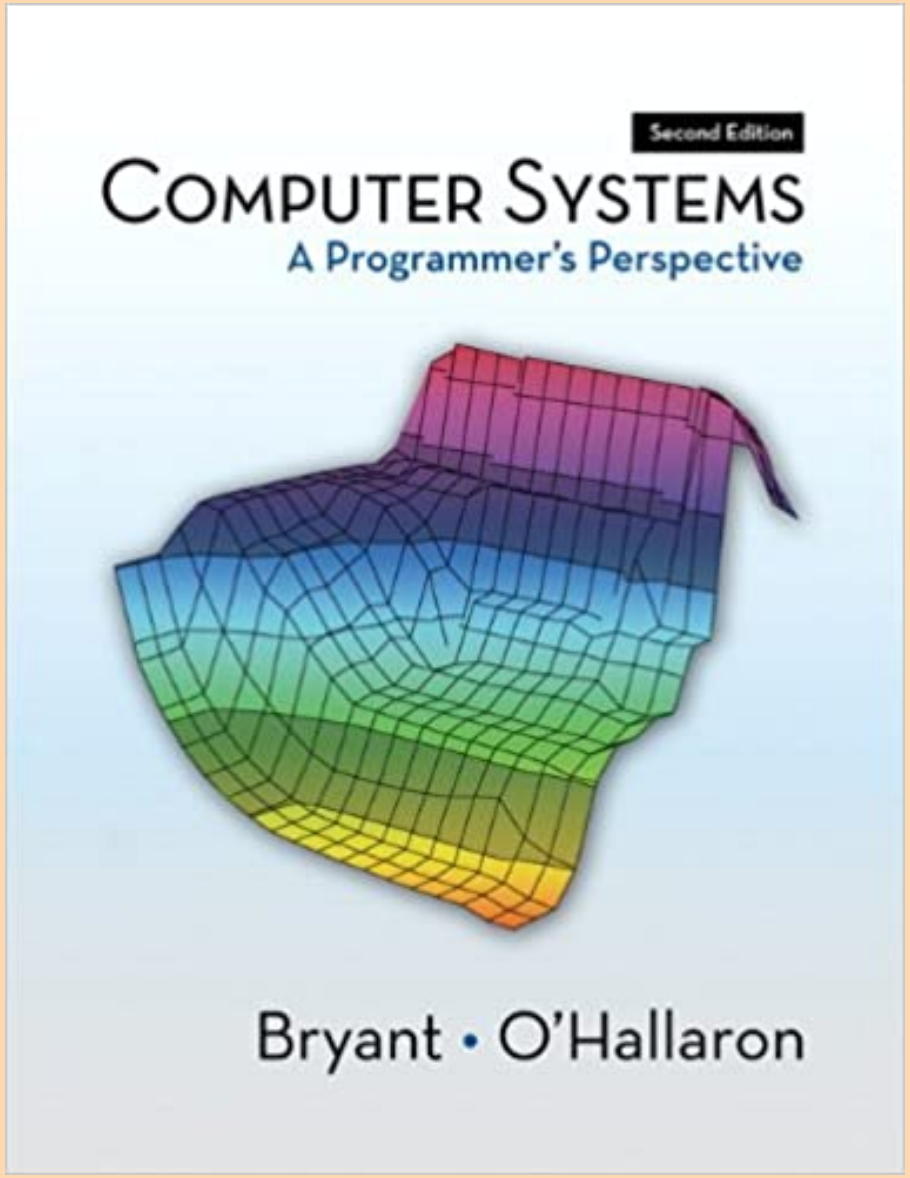


Use `math.h` (Section 23.3) whenever possible.

Floating Point Number Line



sum-product.c loop.c compare.c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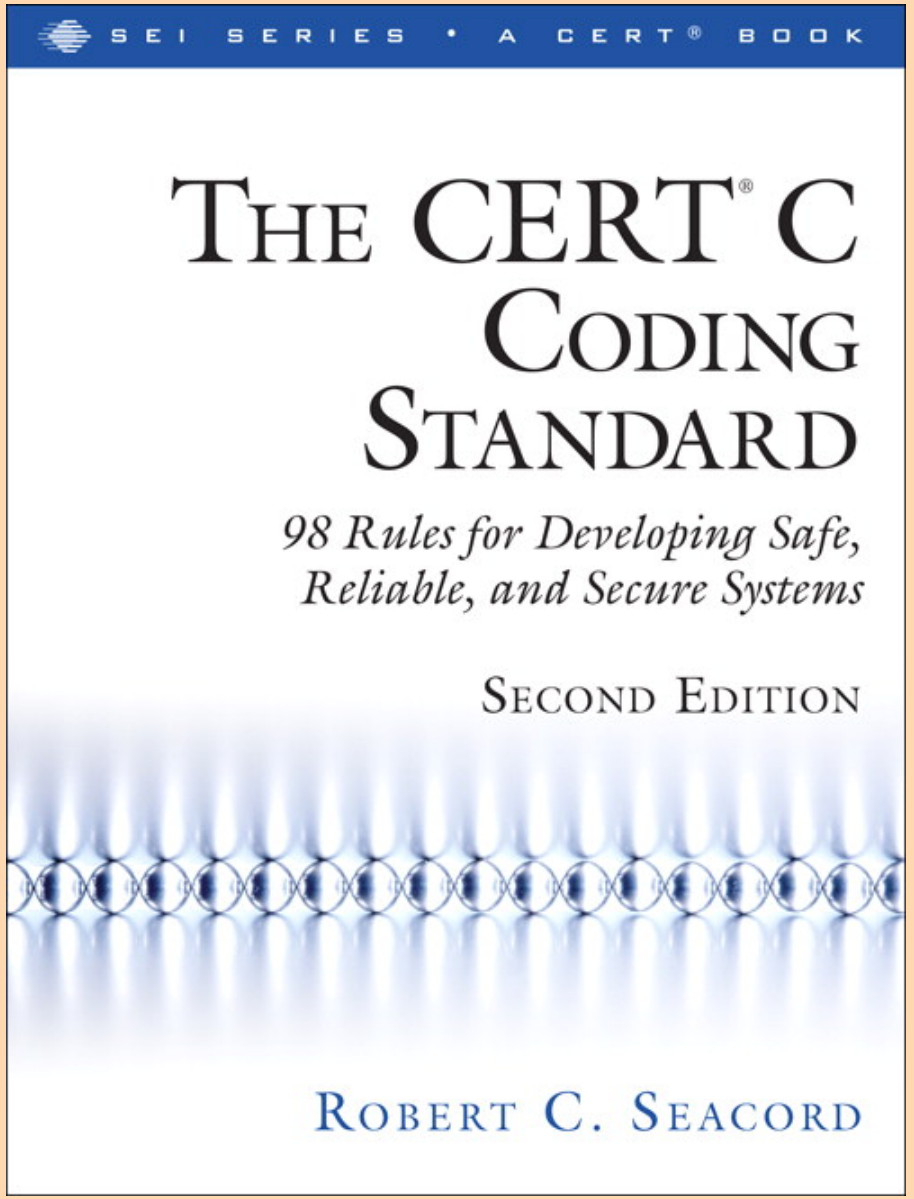
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