C Programming Language Course
Lesson 3: Data Types in C

Topics

Data Types in C

Integer Numbers

Non-Floating point numbers: **8**, **16**, **32** or **64 bits**.

Real Numbers

Floating point numbers **32**, **64**, **80**, **96** or **128 bits**.

Characters

Smallest addressable unit of the machine that can contain basic character set. Represent basic keyboard symbols (**letters**, **numbers**, **punctuation**, **special characters**, etc.). The characters on the **ASCII** table are supported. each character uses **8 bits**.

Characters

Table: Representation of character in C

Type	Range	Size (Bits)	Format
char	$[-127; +127]$	8	%c ou %hhi
signed char	$[-127; +127]$	8	%c ou %hhi
unsigned char	$[0; +127]$	8	%c ou %hhi

Integer Numbers

Table: Different sizes for integer numbers

Type	Range	Bits	Format
short (int)	$[-32767; 32767]$	16	%hi; %hd
signed short (int)	$[-32767; 32767]$	16	%hi; %hd
unsigned short	$[0; 65535]$	16	%hu
int	$[-(2^{32})/2; (2^{32})/2]$	16/32	%i; %d
signed (int)	$[-(2^{32})/2; (2^{32})/2]$	16/32	%i; %d
unsigned (int)	$[0; 2^{32} - 1]$	16/32	%u

Note: $(2^{16} - 1)$ and $(2^{32} - 1)$ are the exact amount of numbers for 16 e 32 bits, respectively.

Integer Numbers

Table: Sizes for big integer numbers

Type	Range	Bits	Format
long (int)	$[-(2^{32})/2; (2^{32})/2]$	32	%li;%ld
signed long (int)	$[-(2^{32})/2; (2^{32})/2]$	32	%li;%ld
unsigned long (int)	$[0; (2^{32})]$	32	%lu
long long (int)	$[-(2^{64})/2; (2^{64})/2]$	64	%lli;%lld
signed long long (int)	$[-(2^{64})/2; (2^{64})/2]$	64	%lli;%lld
unsigned long long	$[0; 2^{64} - 1]$	64	%llu

Nota: $(2^{32} - 1)$ and $(2^{64} - 1)$ are the exact amount of numbers for 32 and 64 bits, respectively.

Real Numbers

Table: Different sizes for real numbers

Type	Bits	Format
float	32	%f ; %g ; %e ; %a
double	64	%lf ; %lg ; %le ; %la
long double	80 or 96 or 128	%Lf ; %Lg ; %Le ; %La

Nota: the formats **f**, **g**, **e** and **a** can also be written in capital letters.

Thanks a lot! Follow us.