

CSCI 1301 — Datatypes in C#

1 Value Types

1.1 Numeric

1.1.1 Signed Integer

Type	Range	Size
sbyte	-128 to 127	Signed 8-bit integer
short	-32,768 to 32,767	Signed 16-bit integer
int	-2,147,483,648 to 2,147,483,647	Signed 32-bit integer
long	-9,223,372,036,854,775,808 to 9,223,372,036,854,775,807	Signed 64-bit integer

1.1.2 Unsigned Integer

Type	Range	Size
byte	0 to 255	Unsigned 8-bit integer
ushort	0 to 65,535	Unsigned 16-bit integer
uint	0 to 4,294,967,295	Unsigned 32-bit integer
ulong	0 to 18,446,744,073,709,551,615	Unsigned 64-bit integer

1.1.3 Floating-point Numbers

Type	Approximate Range	Precision
float	$\pm 1.5\text{e}-45$ to $\pm 3.4\text{e}38$	7 digits
double	$\pm 5.0\text{e}-324$ to $\pm 1.7\text{e}308$	15–16 digits
decimal	$(-7.9 \times 10^{28}$ to $7.9 \times 10^{28}) / (100 \text{ to } 10^{28})$	28–29 significant digits

1.2 Logical

Type	Possible Values	Size
bool	true, false	8-bit

1.3 Character

Type	Range	Size
char	U+0000 to U+ffff	Unicode 16-bit character

2 Literals

Name	Corresponding datatype	Examples
Integer Literal	int	40, -39, 291838, 0, ...
Float Litteral	float	3.5F, -43.5f, 309430.70006F, ...
Double Literal	double	28.98, 239.0, -391.089, 0.0, ...
Decimal Literal	decimal	8.95m, 3283.9M, -30m, ...
Boolean Literal	bool	true, false
Character Literal	char	'Y', 'a', '0', '\n', '\x0058', '\u0058', ...

3 Compatibility

	Integer Litteral	Float Litteral	Double Litteral	Decimal Litteral
int	✓			
float	✓	✓		
double	✓	✓	✓	
decimal	✓			✓

4 Result Type of Operations

	int	float	double	decimal
int	int	float	double	decimal
float	float	float	double	illegal
double	double	double	double	illegal
decimal	decimal	illegal	illegal	decimal

References

- <https://docs.microsoft.com/en-us/dotnet/csharp/tour-of-csharp/types-and-variables>
- <https://docs.microsoft.com/en-us/dotnet/csharp/language-reference/keywords/integral-types-table>
- <https://docs.microsoft.com/en-us/dotnet/csharp/language-reference/keywords/floating-point-types-table>
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- <https://docs.microsoft.com/en-us/dotnet/csharp/language-reference/keywords/implicit-numeric-conversions-table>
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