

Datatypes in C#

<https://csci-1301.github.io/about#authors>

February 21, 2022 (09:41:02 PM)

Contents

1 Value Types	1
1.1 Numeric	1
1.1.1 Signed Integer	1
1.1.2 Unsigned Integer	1
1.1.3 Floating-point Numbers	2
1.2 Logical	2
1.3 Character	2
2 Literals	2
3 Compatibility	2
4 Result Type of Operations	2
References	3

1 Value Types

1.1 Numeric

1.1.1 Signed Integer

Type	Range	Size
<code>sbyte</code>	-128 to 127	Signed 8-bit integer
<code>short</code>	-32,768 to 32,767	Signed 16-bit integer
<code>int</code>	-2,147,483,648 to 2,147,483,647	Signed 32-bit integer
<code>long</code>	-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
<code>byte</code>	0 to 255	Unsigned 8-bit integer
<code>ushort</code>	0 to 65,535	Unsigned 16-bit integer
<code>uint</code>	0 to 4,294,967,295	Unsigned 32-bit integer

Type	Range	Size
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	$\pm 1.5e-45$ to $\pm 3.4e38$	7 digits
double	$\pm 5.0e-324$ to $\pm 1.7e308$	15–16 digits
decimal	$(-7.9 \times 10^{28}$ to $7.9 \times 10^{28})/(100$ 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 Literal	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 Literal	Float Literal	Double Literal	Decimal Literal
int	✓	✗	✗	✗
float	✓	✓	✗	✗
double	✓	✓	✓	✗
decimal	✓	✗	✗	✓

4 Result Type of Operations

	<code>int</code>	<code>float</code>	<code>double</code>	<code>decimal</code>
<code>int</code>	<code>int</code>	<code>float</code>	<code>double</code>	<code>decimal</code>
<code>float</code>	<code>float</code>	<code>float</code>	<code>double</code>	illegal
<code>double</code>	<code>double</code>	<code>double</code>	<code>double</code>	illegal
<code>decimal</code>	<code>decimal</code>	illegal	illegal	<code>decimal</code>

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>
- <https://docs.microsoft.com/en-us/dotnet/csharp/language-reference/keywords/value-types-table>
- <https://docs.microsoft.com/en-us/dotnet/csharp/language-reference/keywords/implicit-numeric-conversions-table>
- <https://docs.microsoft.com/en-us/dotnet/csharp/language-reference/keywords/explicit-numeric-conversions-table>