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# Primitive Types

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## What is Type?

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- › 'Type' specifies what type of value to be stored in memory.
- › "Type" is a.k.a. "data type".
- › Ex: int, string etc.

## Classification of Types

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- › **Primitive Types**
  - › (sbyte, byte, short, ushort, int, uint, long, ulong, float, double, decimal, char, bool)
  - › Strictly stores single value.
  - › Primitive Types are basic building blocks of non-primitive types.
- › **Non-Primitive Types**
  - › (string, Classes, Interfaces, Structures, Enumerations)
  - › Stores one or more values.
  - › Usually contains multiple members.

## 1. sbyte

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- › 8-bit signed integer
- › Size: 1 byte

- › Range: -128 to 127
- › Default value: 0
- › MinValue Command: `sbyte.MinValue`
- › MaxValue Command: `sbyte.MaxValue`

## 2. byte

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- 8-bit un-signed integer
- Size: 1 byte
- Range: 0 to 255
- Default value: 0
- MinValue Command: `byte.MinValue`
- MaxValue Command: `byte.MaxValue`

## 3. short

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- 16-bit signed integer
- Size: 2 bytes
- Range: -32,768 to 32,767
- Default value: 0
- MinValue Command: `short.MinValue`
- MaxValue Command: `short.MaxValue`

## 4. ushort

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- 16-bit un-signed integer
- Size: 2 bytes
- Range: 0 to 65,535
- Default value: 0
- MinValue Command: `ushort.MinValue`

- MaxValue Command: `ushort.MaxValue`

## 5. int

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- 32-bit signed integer
- Size: 4 bytes
- Range: -2,147,483,648 to 2,147,483,647
- Default value: 0
- MinValue Command: `int.MinValue`
- MaxValue Command: `int.MaxValue`
- By default, integer literals between

-2,147,483,648 to 2,147,483,647 are treated as "int" data type.

## 6. uint

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- 32-bit un-signed integer
- Size: 4 bytes
- Range: 0 to 4,294,967,295
- Default value: 0
- MinValue Command: `uint.MinValue`
- MaxValue Command: `uint.MaxValue`
- By default, integer literals between 2,147,483,648 to 4,294,967,295 are treated as "uint" data type.

## 7. long

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- 64-bit signed integer
- Size: 8 bytes
- Range: -9,223,372,036,854,775,808 to 9,223,372,036,854,775,807
- Range:  $-2^{63}$  to  $2^{63}-1$
- Default value: 0

- MinValue Command: `long.MinValue`
- MaxValue Command: `long.MaxValue`
- By default, integer literals between 4,294,967,296 and 9,223,372,036,854,775,807 are treated as "long" data type.

## 8. ulong

- 64-bit un-signed integer
- Size: 8 bytes
- Range: 0 to 18,446,744,073,709,551,615
- Default value: 0
- MinValue Command: `ulong.MinValue`
- MaxValue Command: `ulong.MaxValue`
- By default, integer literals between 9,223,372,036,854,775,808 and 18,446,744,073,709,551,615 are treated as "ulong" data type.

## 9. float

- 32-bit signed floating-point number
- Size: 4 bytes
- Range: -34028230000000000000000000000000 to 34028230000000000000000000000000
- Range: -3.402823E+38 to 3.402823E+38
- Range: MINUS three hundred forty two hundred eighty-two three hundred nonillion

to three hundred fourty two hundred eighty-two three hundred NONILLION

- Precision: 7 digits
- Default value: 0F
- MinValue Command: float.MinValue
- MaxValue Command: float.MaxValue



to

seventy-nine octillion two hundred twenty-eight septillion one hundred sixty-two sextillion five hundred fourteen quintillion two hundred sixty-four quadrillion three hundred thirty-seven trillion five hundred ninety-three billion five hundred forty-three million nine hundred fifty thousand three hundred thirty-five

- Precision: 28 digits
- Default value: 0M
- Min and Max: `double.MinValue`, `double.MaxValue`

## 12. char

- 16-bit Single Unicode character
- Character literal should be written in single quotes only. Ex: 'A'
- Size: 2 bytes
- Range: 0 to 137,994 (Unicode codes that represent characters)
- Unicode is superset of ASCII.
- ASCII = 0 to 255 (English language characters only)
- Unicode = ASCII + Other natural language characters
- Default value: `\0`

### Important ASCII / Unicode numbers for characters

<b>65 to 90</b>	<b>:</b>	<b>A-Z</b>
<b>97 to 122</b>	<b>:</b>	<b>a-z</b>
<b>48 to 57</b>	<b>:</b>	<b>0-9</b>
<b>32</b>	<b>:</b>	<b>Space</b>
<b>8</b>	<b>:</b>	<b>Backspace</b>
<b>13</b>	<b>:</b>	<b>Enter</b>

### 13. string

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- Collection of Unicode characters
- String literal should be written in double quotes only. Ex: "Abc123"
- Size: Length \* 2 bytes
- Range: 0 to 2 billion characters
- Default value: null

### 14. bool

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- Stores logical value (true / false)
- Possible values: true, false
- Size: 1 bit
- Default value: false

### Default Literals

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- › You can get the default value of respective type using the following syntax.
- › Syntax: default(type)
- › Example: default(int) = 0