

# VB.NET - P18

## 字符串

在VB.NET中，可以使用String关键字声明一个字符串变量，也可以使用字符串作为字符串数组。

String关键字是System.String类的别名(alias)。

提供了多种方式创建字符串对象。

by assigning string literal to String variable

如 Dim str As String = "Hello World"

by using String class constructor

如 Dim letters As Char() = {"H", "e", "l", "l", "o"}

Dim str As String = New String(letters)

→ "Hello"

by using string concatenation operator (+) (字符串连接运算符)

如 Dim str As String = "Hello" + " " + "World" + "!"

→ "Hello World!"

by retrieving property / calling method that return string

如 Dim strs As String() = {"Hello", "World"}

Dim str As String = String.Join(" ", strs)

→ "Hello World"

by calling formatting method to convert value / object to string representation

如 Dim dt As DateTime = New DateTime(2019, 8, 18, 17, 27, 37)

Dim str As String = String.Format("at {0:t} on {0:D}", dt)

→ at 05:27 PM on Sunday, August 18, 2019

String.Chars(index As Integer) As Char

get Char object at specified position in current String object

ReadOnly Property String.Length As Integer

get number of character in current String object

String类中还提供了很多处理字符串对象的常数

Function String.Compare(strA As String, strB As String) As Integer

Function String.Compare(strA As String, strB As String,

ignoreCase As Boolean) As Integer

compare two specified String objects

and return Integer indicate relative position in sort order

ignore case if Boolean parameter ignoreCase = True

# VB.NET - Part 19

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字符串

Public Shared Function String.Concat(str0 As String, str1 As String) As String

concatenate two specified instances of String

其他定义的 Public Shared Function String.Concat() As String 方式：

String.Concat(arg0 As Object, arg1 As Object) As String

concatenate string representation of two specified objects

String.Concat(ParamArray values As String()) As String

String.Concat(ParamArray args As Object()) As String

参数：represent elements / string representations of specified String/Object array

返回值：A String.Concat(values As IEnumerable(Of String)) As String

成员：members of constructed IEnumerable(Of Out T) implementation

方法：methods to return instance members : functions

Public Function String.Contains(value As String) As Boolean

说明：indicate whether specified substring occur within string

参数：value To indicate the value to search for

Public Shared Function String.Copy(str As String) As String

说明：create new String instance with same value as specified String

参数：a (Public Function String.Equals(obj As Object) As Boolean)

说明：determine whether specified object is String object and has same value as this string

Public Shared Function String.Equals(a As String, b As String) As Boolean

参数：a As String, b As String, comparisonType As StringComparison

说明：determine whether two specified String objects have same value

参数：a, b (comparisonType A specify culture, case, sort rules used in comparison)

参数：a (is null or whitespace) & A return more precise about equality

Public Function String.StartsWith(value As String, ignoreCase As Boolean) As Boolean

Public Function String.EndsWith(value As String, ignoreCase As Boolean) As Boolean

说明：determine whether start/end of this string match specified string

参数：a ((String))

Public Shared Function String.IsNotNullOrEmpty(value As String) As Boolean

Public Shared Function String.IsNotNullWhiteSpace(value As String) As Boolean

参数：a (CT indicates whether specified string is not empty or not entire)

说明：return false if string is null / String.Empty string / consist only of whitespace characters

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字符串

Public Shared Function String.Format(format As String, ~~param1, param2, ..., paramn~~) As String

points to argument for ParamArray args As Object() As String

replace format item with string representation of corresponding object

format: composite format string

Public Function String.IndexOf(value As Char) As Integer

Public Function String.IndexOf(value As String) As Integer

report 0-based index of first occurrence of specified Unicode character / string

String.IndexOf(value As Char, startIndex As Integer, count As Integer) As Integer

String.IndexOf(value As String, startIndex As Integer, count As Integer) As Integer

startIndex: search start as specified character position

count: examine specified number of character positions

Public Function String.IndexOfAny(anyOf As Char()) As Integer

String.IndexOfAny(anyOf As Char(), startIndex As Integer,

count As Integer) As Integer

report 0-based index of first occurrence of any character in array of Unicode character

Public Function String.Insert(startIndex As Integer, value As String) As String

return new String where specified string inserted at specified index position in this string

method of A Public Function String.LastIndexOf(value As Char) As Integer

Public Function String.LastIndexOf(value As String) As Integer

String.LastIndexOf(value As Char, startIndex As Integer, count As Integer) As Integer

String.LastIndexOf(value As String, startIndex As Integer, count As Integer) As Integer

method of A Public Function String.LastIndexOfAny(anyOf As Char()) As Integer

String.LastIndexOfAny(anyOf As Char(), startIndex As Integer, count As Integer) As Integer

report 0-based index of last occurrence

Object()) As String

Public Shared Function String.Join(separator As String, ParamArray values As

String.Join(separator As String, startIndex As Integer, count As Integer) As String

String.Join(Of T)(separator As String, values As IEnumerable(Of T)) As String

concatenate members of collection, using specified separator between each member

# VB.NET - P21

String

Properties

字符串  
Public Function String.Remove(startIndex As Integer) As String  
all characters beginning at specified position and continuing through last position deleted

Public Function String.Remove(startIndex As Integer, count As Integer) As String  
specified number of characters beginning at specified position deleted

Public Function String.Replace(oldChar As Char, newChar As Char) As String

Public Function String.Replace(oldValue As String, newValue As String) As String  
all occurrences of specified Unicode character / string in current instance  
replaced with another specified Unicode character / string

<Extension> Enumerable.Reverse() As IEnumerable(Of Char)  
invert order of elements in sequence

Public Function String.Split(ParamArray separator As Char()) As String()  
split string into substrings based on characters in the array

String.Split(separator As Char(), count As Integer, options As StringSplitOptions) As String()

String.Split(separator As String(), count As Integer, options As StringSplitOptions) As String()  
count : maximum number of substrings to return

options : specify whether substrings include empty array elements

Public Function String.ToCharArray() As Char()

Public Function String.ToCharArray(startIndex As Integer, length As Integer) As Char()  
copy characters in current instance / specified substring to Unicode character array

Public Function String.ToLower() As String

Public Function String.ToUpper() As String

return copy of this string converted to lowercase / uppercase

Public Function String.Trim() As String

Public Function String.Trim(ParamArray trimChars As Char()) As String  
remove all leading / trailing occurrence of white-space / specified characters

Public Function String.TrimStart(ParamArray trimChars As Char()) As String

Public Function String.TrimEnd(ParamArray trimChars As Char()) As String

# VB.NET - P22

时间 在VB.NET中，提供了 System.DateTime 用于表示和操作日期与时间。System.DateTime 可以移植到其他.NET语言，如 C#。  
另外还提供了 Microsoft.VisualBasic 命名空间中的 DateAndTime，  
包含 Visual Basic 中所有可用的旧日期函数。

可以通过不同的方式创建 DateTime 对象。

by calling DateTime constructor from any of overloaded DateTime constructor

如 Dim dt As New DateTime(2019, 8, 23, 14, 10, 6)

或 by assigning DateTime object date and time value returned by property / method

如 Dim dt As DateTime = DateTime.Now

或 by parsing string representation of date and time value

如 Dim dt As DateTime = #08/23/2019 02:10:06 PM#

或 by calling DateTime structure's implicit default constructor

DateTime 结构体提供了常用的属性：

ReadOnly Property Date.Year As Integer

ReadOnly Property Date.Month As Integer

ReadOnly Property Date.Date As Date

ReadOnly Property Date.Day As Integer

ReadOnly Property Date.DayOfWeek As DayOfWeek

ReadOnly Property Date.DayOfYear As Integer

ReadOnly Property Date.Hour As Integer

ReadOnly Property Date.Minute As Integer

ReadOnly Property Date.Second As Integer

ReadOnly Property Date.Millisecond As Integer

ReadOnly Property Date.Kind As DateTimeKind

get value whether time represented by this instance

based on local time (in contrast to the

Coordinated Universal Time (UTC)

or neither

ReadOnly Property Date.Ticks As Long

number of ticks (滴答) represent date and time of this instance

ReadOnly Property Date.TimeOfDay As TimeSpan

get time of day for this instance

# VB.NET - P23

时间

ReadOnly Property Date.Now As Date

get Date object set to current date and time expressed as local time

ReadOnly Property Date.UtcNow As Date

(UTC)

get Date object set to current date and time expressed as Coordinated Universal Time

ReadOnly Property Date.Today As Date

get current date

Public Function Date.Add(value As TimeSpan) As Date

return new Date, add specified TimeSpan to this instance

Public Function Date.AddYears(value As Integer) As Date

Public Function Date.AddMonths(value As Integer) As Date

Public Function Date.AddDays(value As Double) As Date

Public Function Date.AddHours(value As Double) As Date

Public Function Date.AddMinutes(value As Double) As Date

Public Function Date.AddSeconds(value As Double) As Date

Public Function Date.AddMilliseconds(value As Double) As Date

Public Function Date.AddTicks(value As Long) As Date

return new Date, add to this instance

specified number of year/month/day/hour/minute/second/millisecond

注意其中 day / hour / minute / second / millisecond 必传入参数类型为 double

即小数部分会折算到更小的单位

to New DateTime(2019, 8, 24, 14, 24, 34).AddDays(0.5)

→ 8/25/2019 02:24:34 AM

Public Shared Function Date.Compare(t1 As Date, t2 As Date) As Integer

return Integer indicate whether first instance earlier than / same as / later than second instance

Public Function Date.CompareTo(value As Object) As Integer

Compare this instance to specified object contain specified Date value

return Integer indicate whether this instance earlier than / same as / later than object

Public Function Date.Equals(value As Date) As Boolean

determine whether this instance equal to specified Date instance

Public Shared Function Date.Equals(t1 As Date, t2 As Date) As Boolean

determine whether two Date instances have same date and time value

# VB.NET - P24

时间

在VB.NET中，时间的字面值用哈希符号(hash sign) (# #) 表示

```
如 Dim dt As DateTime = #08/25/2019#
```

注意其中年月日的格式依赖于运行程序的语言环境

如对于 #09/01/2019# 在美国语境下表示 2019 年 9 月 1 日  
在 #MM/dd/yyyy# 的语言环境中编译为 2019 年 9 月 1 日  
在 #dd/MM/yyyy# 的语言环境中编译为 2019 年 1 月 9 日  
在 #yyyy/MM/dd# 的语言环境中会抛出编译器错误

Public Function Date.ToString(format As String, provider As IFormatProvider) As String

convert current Date Object to equivalent string representation

using specified format and culture-specific format information

format: standard / custom date and time format string

provider: object supply culture-specific formatting information

to 9.2 (ex: 2019)

to 9.2 (ex: 2019)

predefined Date/Time format

esldboipv + b

G / General Date : MM/dd/yyyy HH:mm:ss AM/PM

短日期格式 g : MM/dd/yyyy HH:mm AM/PM

d / Short Date : MM/dd/yyyy

D / Long Date / Medium Date : EEEE, MMM dd, yyyy

t / Short Time : HH:mm AM/PM

T / Long Time / Medium Time : HH:mm:ss AM/PM

f : long date and short time according to current culture's format

长日期格式 - EEEE, MMM dd, yyyy HH:mm AM/PM

F : long date and long time according to current culture's format

长日期格式 - EEEE, MMM dd, yyyy HH:mm:ss AM/PM

M / m : MMM dd

R/r : according to RFC1123 Pattern property

EEE, dd MMM yyyy HH:mm:ss Z

S : format date and time as sortable index

如 "2019-08-23T14:10:06Z"

U : format date and time as GMT sortable index

如 "2019-08-23 14:10:06Z"

(受当前时区影响) U : EEEE, MMM dd, yyyy HH:mm:ss AM/PM

y/Y : MMM yyyy

# VB.NET - P25

DateAndTime    ReadOnly Property DateAndTime.Now As Date  
    return Date value containing current date and time according to system

    Property DateAndTime.Today As Date  
        return / set Date value containing current date according to system

    Property DateAndTime.TimeOfDay As Date  
        return / set Date value containing current time of day according to system

    Read Only Property DateAndTime.Timer As Double  
        return Double value representing number of seconds elapsed since midnight

    Property DateAndTime.DateString As String  
        return / set String value representing current date according to system

    Property DateAndTimeTimeString As String  
        return / set String value representing current time of day according to system

Public Shared Function DateAndTime.Year(DateValue As Date) As Integer  
    return integer value [1, 9999] representing year

Public Shared Function DateAndTime.Month(DateValue As Date) As Integer  
    return integer value [1, 12] representing month

Public Shared Function DateAndTime.Day(DateValue As Date) As Integer  
    return integer value [1, 31] representing day of month

Public Shared Function DateAndTime.Hour(DateValue As Date) As Integer  
    return integer value [0, 23] representing hour of day

Public Shared Function DateAndTime.Minute(DateValue As Date) As Integer  
    return integer value [0, 59] representing minute of hour

Public Shared Function DateAndTime.Second(DateValue As Date) As Integer  
    return integer value [0, 59] representing second of minute

Public Shared Function DateAndTime.WeekDay(DateValue As Date, [DayOfWeek As FirstDayOfWeek = FirstDayOfWeek.Sunday]) As Integer  
    return integer value containing number representing day of week

Public Shared Function DateAndTime.WeekDayName([Abbreviate As Boolean = False], Weekday As Integer, [FirstDayOfWeekValue As FirstDayOfWeek = FirstDayOfWeek.Sunday]) As String  
    return String value containing name of specified weekday/month

# VB.NET - P26

DateAndTime Public Shared Function DateAndTime.DateValue(String Date As String) As Date  
return Date value containing date information represented by string  
with time information set to 00:00:00

Public Shared Function DateAndTime.TimeValue(String Time As String) As Date  
return Date value containing time information represented by string  
with date information set to January 1st of year 1

Public Shared Function DateAndTime.DateSerial(

Year As Integer, Month As Integer, Day As Integer) As Date  
return Date value representing specified year, month, day

Public Shared Function DateAndTime.TimeSerial(

Hour As Integer, Minute As Integer, Second As Integer) As Date  
return Date value representing specified hour, minute, second

Public Shared Function DateAndTime.DateAdd(

Interval As String, Number As Double, DateValue As Object) As Date

Public Shared Function DateAndTime.DateAdd(

Interval As DateInterval, Number As Double, DateValue As Object) As Date

Interval : required DateInterval enumeration value / String expression

representing time interval to add

return Date value containing date and time value added specified time interval

Public Shared Function DateAndTime.DateDiff(Interval As String / DateInterval,

Date1 As Object, Date2 As Object,

[DayOfWeek As FirstDayOfWeek = FirstDayOfWeek.Sunday],

[WeekOfYear As FirstWeekOfYear = FirstWeekOfYear.Jan1]) As Long

Interval : required time interval used as unit of difference between Date1 and Date2

return Long value specifying number of time intervals between two Date values

Public Shared Function DateAndTime.DatePart(Interval As String / DateInterval,

[FirstDayOfWeekValue As FirstDayOfWeek = FirstDayOfWeek.Sunday],

[FirstWeekOfYearValue As FirstWeekOfYear = FirstWeekOfYear.Jan1]) As Integer

Interval : required time interval representing part of date/time value to return

return Integer value containing specified component of given Date value

# VB.NET - P27

## 数组

在VB.NET中，数组为存储相同类型元素的固定大小的顺序集合。

定义数组的基本语法为：

```
(Dim <arrayname> [<subscripts>] As <datatype>)
```

这个语法结构类似于C/C++的风格。

arrayname：定义的数组名。

datatype：数组中存储的元素数据类型。

subscripts：指定数组的索引上限，即最后一个元素的偏移量。

特别注意与其他编程语言指定数组大小不同。

```
(如 Dim intarray(10) As Int32)
```

```
Console.WriteLine(intarray.Length) → 11
```

数组可以通过字面值进行初始化。

```
如 Dim intarray() As Int32 = {1, 2, 3, 4, 5}
```

但是注意如果使用字面值初始化，则不允许显式地指定数组大小。

explicit initialization not permitted for array declared with explicit bound

在VB.NET中数组的索引是0-based的。

通过索引查找数组元素的基本语法为 <arrayname>(<index>)

注意与 C/C++、Python 等不同的是，索引用的是圆括号( )。

```
如 intarray(2) → 3
```

在VB.NET中可以使用 ReDim 关键字重新定义数组的大小。

基本语法为 ReDim [<Preserve>] <arrayname> (<subscripts>)

subscripts：在 ReDim 中是必需的，在 Dim 中是可选的。

如果不提供则抛出编译器错误。

ReDim statement require parenthesized list of new bound of each dimension

Preserve：指定在重新定义数组时保留原有元素。

(注意默认情况下相当于定义了一个相同类型的新开数组)

如 Redim intarray(6)

intarray := {0, 0, 0, 0, 0, 0, 0}

Redim Preserve intarray(6)

intarray := {1, 2, 3, 4, 5, 0, 0}

Redim Preserve intarray(2)

intarray := {1, 2, 3}

**数组**

在VB.NET中支持定义多维数组，又名矩阵数组

如 Dim intarray(2, 3, 4) As Int32

即定义一个  $3 \times 4 \times 5$  的矩阵数组 / 矩阵

也可以不显式地定义数组每个维度的大小

如 Dim intarray(,,) As Int32

但是注意，不能混合地使用显式定义与不显式定义

如 Dim intarray(2, , 4) As Int32

会抛出编译器错误 expression expected

在VB.NET中也支持定义类别的数组 / 不规则数组

与多维数组不同，不规则数组不要求数组的子数组在同一层维度的大小一致

如 Dim intarray(,) As Int32

= New Int32(,) { New Int32() { 1 },

New Int32() { 2, 3 },

New Int32() { 4, 5, 6 } }

**集合**

在VB.NET中，集合类为用于数据存储和检索的专用类，如列表，队列，堆栈，散列表

集合类创建 Object 类的对象集合，并实现相同的接口

并用于动态地为元素分配内存 / 基于索引访问 元素列表 / ...

定义于 System.Collections 命名空间

**ArrayList** 在VB.NET中，ArrayList 表示可以单独索引的对象的有序集合，基本是数组的替代

与数组不同，ArrayList 允许使用索引在指定位置从列表添加 / 删除 元素

允许动态内存分配 / 添加 / 搜索 / 排序列表中的元素

Property ArrayList.Capacity As Integer

get / set number of elements that ArrayList can contain

ReadOnly Property ArrayList.Count As Integer

get number of elements actually contained in ArrayList

ReadOnly Property ArrayListFixedSize As Boolean

get value indicating whether ArrayList has fixed size

ReadOnly Property ArrayList.IsReadOnly As Boolean

get value indicating whether ArrayList read-only