DateTime in C#

<Training Topic /Lesson Name>

Lesson Objectives

- DateTime in General

- DateTime Format

- TimeSpan in C#

- DateTime Conversion

Section 1

DATETIME IN GENERAL

DateTime in General

- **Greenwich Mean Time (GMT):**
  - is the mean solar time at the Royal Observatory in Greenwich, London, reckoned from midnight

- **Coordinated Universal Time (UTC)**
  - is the primary time standard by which the world regulates clocks and time.

- TimeZone: defines local date and time
  - Vietnam: UTC+7
  - Singapore/Kuala Lumpur: UTC+8

- Unix (Epoch time):
  - defined as the number of seconds from 00:00:00 on 1 January 1970

DateTime in C#

- The DateTime value type represents dates and times with values:

  - ✓ ranging from 00:00:00 (midnight), January 1, 0001 Anno Domini (Common Era)

  - ✓ through 11:59:59 P.M., December 31, 9999 A.D. (C.E.) in the Gregorian calendar.

- Time values are measured in 100-nanosecond units called ticks.

- In practice, you should choose Date and Time or Date only format

Initializing a DateTime object

When we focus on Date only

```
//// Initializing a Date only object
// Save the date of membership
DateTime joinDate = DateTime.Today;
// Date of birth does not contain time
var dateOfBirth = new DateTime(1990, 02, 04);
```

When the time is important

```
//// Initializing a Date and Time object
// Get value of right now
DateTime orderTime = DateTime.Now;
// Declare time to remind me when match start
var matchTime = new DateTime(2020, 11, 23, 14, 45, 00);
```

DateTime in C#

- DayOfWeek: gets the day of the week represented by this instance.

- DayOfYear: gets the day of the year represented by this instance

- TimeOfDay: gets the time of day for this instance.

- DaysInMonth: returns the number of days in the specified month and year.

DateTime in C#

- Use Add<member> methods to Add (or Subtract) from current value

- Example:

```
//// Initializing a Date only object
// Get today as procedure date
DateTime produceDate = DateTime.Today;
// Get expired date is 7 days after
DateTime expiredDate = produceDate.AddDays(7);
// DONOT add value directly
DateTime errorDate = new DateTime(produceDate.Year, produceDate.Month, produceDate.Day + 7);
```

Compare Two DateTime In C#

- Use Compare method to compare two DateTime objects.
  - ✓ If result is 0, both objects are the same.
  - ✓ If the result is less than 0, then the first DateTime is earlier;
  - ✓ otherwise the first DateTime is later.
- Use CompareTo method compare current date with an other.
  - ✓ If result is 0, both objects are the same.
  - ✓ If the result is less than 0, then the first DateTime is earlier;
  - ✓ otherwise the first DateTime is later.

Compare Two DateTime In C#

```csharp
var peterBirthday = new DateTime(2015, 03, 08);
var richyBirthday = new DateTime(2018, 02, 04);
var comparison = peterBirthday.CompareTo(richyBirthday);
if (comparison == 0)
{
    Console.WriteLine("Peter and Richy have same birthday");
}
else if(comparison > 0)
{
    Console.WriteLine("Peter is older than Richy");
}
else
{
    Console.WriteLine("Peter is younger than Richy");
}
```

Section 2

DATETIME FORMAT

DateTime format

- We use date time format to define the text representation of the date and time value

- CultureInfo represents information about a specific culture.

- The information includes the names for the culture, the writing system, the calendar used, the sort order of strings, and formatting for dates and numbers.

DateTime format

- In DateTime, it shows difference format, 26 Feb 2030
  - ✓ en-US: 2/26/2030
  - ✓ en-GB, fr-FR, vi-VN: 26/02/2030
  - ✓ ja-JP: 2030/02/26
- **Important: always check CultureInfo to get date or month**
  - ✓ Example: you got a datetime value as 07/05/1987
  - ✓ Is it: 07-May or 05-Jul?

Standard date and time format strings

Format specifier	Description	Examples
"d"	Short date pattern.	2009-06-15T13:45:30 -> 6/15/2009 (en-US)
"D"	Long date pattern.	2009-06-15T13:45:30 -> Monday, June 15, 2009 (en-US)
"f"	Full date/time pattern (short time).	2009-06-15T13:45:30 -> Monday, June 15, 2009 1:45 PM (en-US)
"F"	Full date/time pattern (long time).	2009-06-15T13:45:30 -> Monday, June 15, 2009 1:45:30 PM (en-US)
"g"	General date/time pattern (short time).	2009-06-15T13:45:30 -> 6/15/2009 1:45 PM (en-US)
"G"	General date/time pattern (long time).	2009-06-15T13:45:30 -> 6/15/2009 1:45:30 PM (en-US)
"M", "m"	Month/day pattern.	2009-06-15T13:45:30 -> June 15 (en-US)
"Y", "y"	Year month pattern.	2009-06-15T13:45:30 -> June 2009 (en-US)

Custom date and time format strings

- Rules:
  - ✓ Use character for value. Example: y for year, d for day,
  - ✓ M for month and m for minute
  - ✓ H for 24-hour and h for 12-hour (following by tt mean AM/PM)
  - ✓ Number of characters is length of value
- Practice to use some custom format:
  - ✓ "d/M/yyyy"
  - ✓ "dd/MM/yyyy"
  - ✓ "dd/MMM/yyyy"
  - ✓ "dd/MMMM/yyyy"
  - ✓ "MMM d, yyyy"

TimeSpan

- TimeSpan represents a period of time and has many helpful methods.

- TimeSpan contains days, hours, minutes, seconds, miliseconds

- TimeSpan is used in DateTime operators

DateTime Operators

- DateTime.Add:
  - ✓ adds the value of the specified System.TimeSpan
- DateTime.Subtraction
  - ✓ Subtracts the specified date and time from this instance.

DateTime Operators

Operator		DateTime	TimeSpan
+	**DateTime**		TimeSpan
	TimeSpan	TimeSpan	
-	**DateTime**	TimeSpan	
	TimeSpan	DateTime	TimeSpan
==, !=, >, >=, < <=	**DateTime**	bool	
	TimeSpan		bool

Convert DateTime to string

- Use DateTime format CultureInfo

- Always check CultureInfo

- Be consider UTC time

Convert string to DateTime

- Always check format before convert
  - ✓ From local machine
  - ✓ From data example
  - ✓ From requirement
- Use Parser methods
  - ✓ DateTime.Parse
  - ✓ DateTime.ParseExact
  - ✓ TryParse
  - ✓ TryParseExact

Practice Time

- Create application to allow display local time at difference cities
  - ✓ User input date and time
  - ✓ User input local code
  - ✓ User input list of countries
  - ✓ Application shows local time at cities

- Technical requirement:
  - ✓ Application accepts at least 3 formats date and time
  - ✓ Application accept list of countries in format:

    \<country name 1\>(\<culture code 1\>), \< country name 2\>(\< culture code 2\>), \< country name 3\>(\< culture code 3\>),
  - ✓ You can use various for application output

Lesson Summary

Thank you