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' Time Zone: Extreme Coding Challenge
' entry of Harmon V. -- GUI version
' released as public domain
' LB\timezone2.bas
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' The 27 megacities with populations of 10 million or more.
' daylight savings/summer start and stop times from www.dateandtime.co
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Rem

#	City, Country	Pop.	ST	DT start & End
Data 1,	"Tokyo, Japan",	"33,600,000",	"UTC+9",	"NONE"
'	35*41'N x 139*46'E			
Data 2,	"Seoul, South Korea",	"23,400,000",	"UTC+9",	"NONE"
Data 3,	"Mexico City, Mexico",	"22,400,000",	"UTC-6",	
	"Sun 06-APR-08 02:00",	"Sun 26-OCT-08 02:00"		
Data 4,	"New York City, USA",	"21,962,000",	"UTC-5",	
	"Sun 09-MAR-08 02:00",	"Sun 02-NOV-08 02:00"		
Data 5,	"Mumbai, India",	"21,600,000",	"UTC+5.5",	"NONE"
Data 6,	"Delhi, India",	"21,500,000",	"UTC+5.5",	"NONE"
Data 7,	"São Paulo, Brazil",	"20,600,000",	"UTC-3",	
	"Sun 19-OCT-08 00:00",	"Sun 17-FEB-09 00:00"		
Data 8,	"Los Angeles, USA",	"18,000,000",	"UTC-8",	
	"Sun 09-MAR-08 02:00",	"Sun 02-NOV-08 02:00"		
Data 9,	"Shanghai, China",	"17,500,000",	"UTC+8",	"NONE"
Data 10,	"Osaka, Japan",	"16,700,000",	"UTC+9",	"NONE"
Data 11,	"Cairo, Egypt",	"16,100,100",	"UTC+2",	
	"Fri 25-APR-08 00:00",	"Fri 29-AUG-08 00:00"		
Data 12,	"Buenos Aires, Argentina",	"16,000,000",	"UTC-3",	
	"Sun 19-OCT-08 00:00",	"Sun 16-MAR-09 00:00"		
Data 13,	"Kolkata, India",	"15,700,000",	"UTC+5.5",	"NONE"
Data 14,	"Manila, Philippines",	"15,600,000",	"UTC+8",	"NONE"
Data 15,	"Jakarta, Indonesia",	"15,100,000",	"UTC+7",	"NONE"
Data 16,	"Karachi, Pakistan",	"15,100,000",	"UTC+5",	
	"Sun 01-Jun-08 00:00",	"Sat 01-NOV-08 00:00"		
Data 17,	"Tehran, Iran",	"13,500,000",	"UTC+3.5",	
	"Fri 21-MAR-08 00:00",	"Sun 21-SEP-08 00:00"		
Data 18,	"Beijing, China",	"12,800,000",	"UTC+8",	"NONE"
Data 19,	"Dhaka, Bangladesh",	"12,750,000",	"UTC+6",	"NONE"
Data 20,	"Lahore, Pakistan",	"12,700,000",	"UTC+5",	
	"Sun 01-JUN-08 00:00",	"Sat 01-NOV-08 00:00"		
Data 21,	"London, England",	"12,500,000",	"UTC+0",	
	"Sun 30-MAR-08 01:00",	"Sun 26-OCT-08 02:00"		
Data 22,	"Paris, France",	"12,000,000",	"UTC+1",	
	"Sun 30-MAR-08 02:00",	"Sun 26-OCT-08 03:00"		
Data 23,	"Istanbul, Turkey",	"11,800,000",	"UTC+2",	

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"Sun 30-MAR-08 03:00", "Sun 26-OCT-08 04:00"
Data 24, "Rio de Janeiro, Brazil", "11,500,000", "UTC-3",
"Sun 19-OCT-08 00:00", "Sun 17-FEB-09 00:00"
Data 25, "Lagos, Nigeria", "10,200,000", "UTC+1", "NONE"
Data 26, "Moscow, Russia", "10,100,000", "UTC+3",
"Sun 30-MAR-08 02:00", "Sun 26-OCT-08 03:00"
Data 27, "Bangkok, Thailand", "10,100,000", "UTC+7", "NONE"
```

```
Struct timeZoneData, _
  Bias As Long, _
  StandardName As Char[64], _
  StandardDateYear As Short, _
  StandardDateMonth As Short, _
  StandardDateDayOfWeek As Short, _
  StandardDateDay As Short, _
  StandardDateHour As Short, _
  StandardDateMinute As Short, _
  StandardDateSecond As Short, _
  StandardDateMilliseconds As Short, _
  StandardBias As Long, _
  DaylightName As Char[64], _
  DaylightDateYear As Short, _
  DaylightDateMonth As Short, _
  DaylightDateDayOfWeek As Short, _
  DaylightDateDay As Short, _
  DaylightDateHour As Short, _
  DaylightDateMinute As Short, _
  DaylightDateSecond As Short, _
  DaylightDateMilliseconds As Short, _
  DaylightBias As Long
```

```
  CallDll #kernel32, "GetTimeZoneInformation"
, timeZoneData As Struct, ret As Long
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```
Global myUTCOffset
myUTCOffset = timeZoneData.Bias.struct + timeZoneData.
DaylightBias.struct
```

```
ncities = 27
Dim city$(ncities) ' City, Country
Dim pop$(ncities) ' population of megacity (aka: metropolitan area)
Dim st$(ncities) ' standard time (in terms of UTC) ie:UTC-3
' Next two arrays deal with daylight savings time (DST)
' format of these two strings is "Aaa dd-MMM-yy HH:MM"
Dim dtstart$(ncities)
' When DST starts or NONE if area does not observe DST
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Dim dtstop$(ncities) ' When DST stops

' load arrays
For a = 1 To ncities
  Read n, a$, b$, c$, d$
  If d$<>"NONE" Then Read e$ Else e$ = ""
  city$(a) = a$
  pop$(a) = b$
  st$(a) = c$
  dtstart$(a) = d$
  dtstop$(a) = e$
  Print n;" "; a$; Tab(28);" "; b$;" "; c$;" "; d$;" "; e$
Next a

' GUI code begins here
WindowWidth = 500
WindowHeight = 400
Statictext #win.banner1,
"Time Zone -- Extreme Coding Challenge", 80, 25, 350, 25
Statictext #win.now1, "Local Date and Time :", 10, 75, 400, 25
Statictext #win.now2, "", 120, 100, 150, 25
Statictext #win.now3, "", 280, 100, 100, 25

Statictext #win.UTC, "UTC/GMT Date and Time :", 10, 125, 400, 25
Statictext #win.UTC2, "", 120, 150, 400, 25

Statictext #win.txt, "<< Select megacities >>", 120, 190, 300, 25
Combobox #win.cb1, city$(), citypick, 10, 220, 220, 100
Statictext #win.citya, "", 20, 250, 200, 50
' print city date & time

Combobox #win.cb2, city$(), citypick, 250, 220, 220, 100
Statictext #win.cityb, "", 260, 250, 200, 50
' print city date & time

Open "UTC/GMT Time Zone Utility" For window_nf As #win
#win, "trapclose [xitprog]"
winOpen = 1
#win, "font Verdana 12"

[again]
Timer 0
' * Program must first show the current date and time based upon
' Liberty BASIC's native Date$() and Time$() functions.
dateNow$ = Date$()
timeNow$ = Time$()
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```
#win.now2, dateNow$
#win.now3, timeNow$

' * Program must calculate GMT
' convert local time to UTC/GMT time
  dateTimeUTC = Date$("days") + Time$("seconds")/86400 +
myUTCOffset/1440

' * Program must then allow user to select at least 2 other time zones
.
  #win.cb1, "selectionindex? a"
  If a>0 Then Call citypick "#win.cb1"
  #win.cb2, "selectionindex? a"
  If a>0 Then Call citypick "#win.cb2"

' * Program must display the GMT as well as the selected date(s) and t
ime(s).
  #win.UTC2, days2DT$(dateTimeUTC)

  Timer 1000, [again]
Wait

[xitprog]
  Print "Done."
  Timer 0
  If winOpen=1 Then Close #win
End

Sub citypick handle$
  Timer 0
  #handle$, "selectionindex? a"
  dateTimeUTC = Date$("days") + Time$("seconds")/86400 +
myUTCOffset/1440
  UTCOffset = Val(Mid$(st$(a),4))/24 ' convert hours to decimal days
  cityDateTime = dateTimeUTC + UTCOffset

  t1$ = dtstart$(a)
  t2$ = dtstop$(a)
  If onDST(cityDateTime, t1$, t2$) Then cityDateTime =
cityDateTime + 1/24

  If handle$="#win.cb1" Then
    #win.citya, days2DT$(cityDateTime) ' print city date & time
  Else
    #win.cityb, days2DT$(cityDateTime) ' print city date & time
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End If
Timer 1000, [again]
End Sub ' citypick

' returns 1 if we're on daylight savings/summer time, else returns 0
' t1$ & t2$ format = "Fri 21-MAR-08 00:00"
Function onDST(nday, t1$, t2$)
  If t1$="NONE" Then
    onDST = 0
  Else
    starttime$ = Right$(t1$, 5)
    sec1 = 3600*Val(Left$(starttime$,2)) + 60*Val(Right$(starttime$,2))
    dt1 = Date$(Mid$(t1$, 5, 9)) + sec1/86400

    stoptime$ = Right$(t2$, 5)
    sec2 = 3600*Val(Left$(stoptime$,2)) + 60*Val(Right$(stoptime$,2))
    dt2 = Date$(Mid$(t2$, 5, 9)) + sec2/86400

    ' is our local time "nday" between our start & stop dates?
    If dt1<nday And nday<dt2 Then onDST = 1 Else onDST = 0
  End If
End Function ' onDST

' Convert decimal days format to standard "MM/DD/YYYY HH:MM:SS" format
Function days2DT$(DyTm)
  xdate$ = Date$(Int(DyTm))
  xtime = (DyTm Mod 1)*86400 ' in seconds since midnight
  xtime$ = sec2hms$(xtime)
  days2DT$ = xdate$; " "; xtime$
End Function ' days2DT$

' Convert n seconds into standard HH:MM:SS time string
Function sec2hms$(n)
  hh = Int(n/3600)
  mm = Int((n Mod 3600) / 60)
  ss = Int((n Mod 60) + 0.5)
  sec2hms$ = Right$(Str$(hh+100),2);":"; _
             Right$(Str$(mm+100),2);":"; _
             Right$(Str$(ss+100),2)
End Function ' sec2hms$
```