```
1  'MiniParkingA4 - English Version - December 2024 Update - Marc DANIEL
2  #Region Project Attributes
3      #AutoFlushLogs: True
4      #CheckArrayBounds: True
5      #StackBufferSize: 300
6  #End Region
7
8  ' MANAGEMENT OF A PARKING MODEL OF 10 SPACES, 3 of which are FREE at the start of the program
9   ' ARDUINO UNO CARD + Servomotor MG996R + LCD screen (2 lines of 16 characters) and and its incorporated interface
10 ' With an Arduino UNO board, the SDA pin of the I2C interface is connected to analog pin A4 and the SCL pin is connected to analog pin A5.
11
12 Sub Process_Globals
13     Public Serial1 As Serial
14     Private pinGreenLED, pinYellowLED, pinRedLED As Pin 'pins for traffic Light
15     Private pinBlueLED, pinWhiteLED As Pin ' pins for LEDs
16     Private pinButtonEnter As Pin
17     Private pinButtonExit As Pin
18     Public GreenLED = False As Boolean
19     Public Places As UInt
20     Public Lock As Boolean
21     Public Movement As Boolean
22     Private LCD As LiquidCrystal_I2C      'Library "rLiquidCrystal_I2C" to load and use
23     Private Barrier As Servo              'Library "rServo" to load and use
24     End Sub
25
26 Private Sub AppStart
27     Serial1.Initialize(115200)
28     pinButtonEnter.Initialize(pinButtonEnter.A0, pinButtonExit.MODE_INPUT_PULLUP)   'Enter Button
29     pinButtonEnter.AddListener("pinButtonEnter_StateChanged")
30     pinButtonExit.Initialize(pinButtonExit.A1, pinButtonExit.MODE_INPUT_PULLUP)     'Exit Button
31     pinButtonExit.AddListener("pinButtonExit_StateChanged")
32     pinGreenLED.Initialize(7, pinGreenLED.MODE_OUTPUT)                              '     Green Light
33     pinYellowLED.Initialize(13,pinYellowLED.MODE_OUTPUT)                                 ' Yellow light
34     pinRedLED.Initialize(5, pinRedLED.MODE_OUTPUT)
35     pinBlueLED.Initialize(12,pinBlueLED    .MODE_OUTPUT)
36     pinWhiteLED.Initialize(11,pinWhiteLED.MODE_OUTPUT)                              ' Red light
37     Barrier.Attach2(9,0,190) ' Display at address "0x27"
38     'Be careful, the red wire of the servomotor must be connected to the VIN pin of the Arduino card and especially not to a 5 Volt terminal of the card
39     LCD.Initialize(0x27, 16, 2) ' Initialization of the LCD screen with 2 lines of 16 characters
40     Places=3 '3 parking spaces are available
41     ' You can modify line 40 if you wish to change the number of places available at the start of the program
42     Lock=False
43     Departure
44 End Sub
45
46 Private Sub Departure
```

```
47      Log("System Startup")
48      pinGreenLED.DigitalWrite(True)   'lights the green LED at the start of the session or in the event of RESET on the ARDUINO UNO card (3 places remain defined on line 40)
49      LCD.Backlight = True 'Activates the backlight on the LCD screen
50      LCD.Clear
51      LCD.SetCursor(0,0)
52      LCD.Write("CENTRAL  PARKING")
53      LCD.SetCursor(0,1)
54      LCD.Write(NumberFormat(Places,0,0))
55      LCD.Write("  FREE PLACES")
56      Barrier.Read
57      If Barrier.Read <> 0 Then
58          For i = Barrier.Read To 0 Step -1
59              Barrier.Write(i)
60              Delay(20)
61          Next
62          'Closes the gate if it is open at system startup
63      End If
64  End Sub
65
66
67  Private Sub pinButtonEnter_StateChanged(State1 As Boolean)
68      Movement = True
69      If State1 = False Then
70          If Lock=False Then
71              If Places > 0 Then
72                  pinGreenLED.DigitalWrite(True)  'lights up the green LED (there are places left)
73                  ' NB: The green LED will be lit by default at the start because there are 3 free places
74                  pinRedLED.DigitalWrite(False) 'turns off the Red LED (The parking lot is no longer full)
75                  pinBlueLED.DigitalWrite(True) 'Light up the blue LED  = Entry of a vehicle
76                  Lock=True'Momentarily locks the use of the ENTER (or EXIT) button
77                  CallSubPlus("Opening",500,0) 'Opening the barrier
78                  LCD.SetCursor(0,0)
79                  LCD.Write("INCOMING VEHICLE")
80                  CallSubPlus("Break",5150,0) 'Vehicle movement
81                  CallSubPlus("Closing", 10300, 0) ' Closing the barrier
82                  CallSubPlus("EndEntrance",14850,0) ' End of closing the barrier
83                  LCD.SetCursor(0,2)
84                  LCD.Write("                    ")
85                  CallSubPlus("Unlock",15300,0)
86                  Places = Places -1
87                  CallSubPlus("SpaceManagement",0,0)
88
89              End If
90          End If
91      End If
92  End Sub
93
94  Private Sub pinButtonExit_StateChanged(State2 As Boolean)
95      Movement = False
96      If State2 = False Then
97          If Lock=False Then
98              If Places <> 10  Then
```

```
 99                  pinGreenLED.DigitalWrite(True)  'light up the green LED (there are Places
    left)
100                  pinRedLED.DigitalWrite(False) 'turns off the Red LED
101                  pinWhiteLED.DigitalWrite(True) ' light up the white LED = Exiting a
    vehicle
102                  Lock=True ' Momentarily blocks the use of the EXIT (or ENTER) button
103                  CallSubPlus("Opening",500,0)'Opening the barrier
104                  CallSubPlus("Break",5150,0)
105                  'Vehicle movement
106                  CallSubPlus("Closing", 10300, 0) ' Closing the barrier
107                  CallSubPlus("EndOfExit",14850,0) ' End of closing the barrier
108                  CallSubPlus("Unlock",15300,0)
109              End If
110              If Places < 10 Then Places = Places + 1
111              CallSubPlus("SpaceManagement",0,0)
112          End If
113      End If
114  End Sub
115
116  Private Sub Opening(Tag As Byte)
117      For i = 0 To 140
118      Delay(20)
119          Barrier.Write(i) ' opens the barrier for entry or exit of a vehicle
120      Next
121      LCD.SetCursor(0,0)
122      If Movement = True And Places > 0  Then  LCD.Write("INCOMING VEHICLE")
123      If Movement = False Then  LCD.Write("EXITING  VEHICLE")
124  End Sub
125
126  Private Sub Break(Tag As Byte)
127      'Barrier remains open - Movement of vehicle entering or exiting
128  End Sub
129
130  Private Sub Closing(Tag As Byte)
131      For i= 140 To 0 Step -1
132          Delay(20)
133      Barrier.Write(i) 'closing the barrier
134      Next
135  End Sub
136
137  Private Sub EndEntrance '(Tag As Byte)
138      pinBlueLED.DigitalWrite(False)    'Turns off the blue LED - End of vehicle entry
139          LCD.SetCursor(0,1)
140          LCD.Write(NumberFormat(Places,0,0))
141      If Places > 1 Then    LCD.Write("  FREE  PLACES ")
142      If Places < 2 Then LCD.Write("  FREE PLACE  ")
143      LCD.SetCursor(0,0)
144      If Places > 0 Then LCD.Write("CENTRAL  PARKING")
145  End Sub
146
147  Private Sub EndOfExit(Tag As Byte)
148      'End of barrier closure
149      pinWhiteLED.DigitalWrite(False)   'turns off the White LED = End of a vehicle exit
150      LCD.SetCursor(0,0)
151      LCD.Write("CENTRAL  PARKING")
152      LCD.SetCursor(0,1)
153      LCD.Write(NumberFormat(Places,0,0))
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```
154     If Places > 1 Then LCD.Write(" FREE  PLACES ")
155     If Places < 2 Then LCD.Write("  FREE  PLACE  ")
156 End Sub
157 
158 Private Sub SpaceManagement(Tag As Byte)
159     Select Places
160         Case 0
161             pinRedLED.DigitalWrite(True) 'Lights up the red LED (full parking lot 0 free space)
162             pinGreenLED.DigitalWrite(False) 'turns off the Green LED
163             pinYellowLED.DigitalWrite(False)  'turns off the yellow LED
164             LCD.Clear
165             LCD.SetCursor(0,0)
166             LCD.Write(" FULL   PARKING ")
167             LCD.SetCursor(0,1)
168             LCD.Write(NumberFormat(Places,0,0))
169             LCD.Write("  FREE   PLACE ")
170 
171         Case 1
172             pinGreenLED.DigitalWrite(True)  'Green LED on
173             pinYellowLED.DigitalWrite(True)'There is only one place left, the yellow light comes on
174             LCD.Clear
175             LCD.SetCursor(0,0)
176             LCD.SetCursor(0,0)
177             LCD.Write("CENTRAL PARKING")
178             LCD.SetCursor(0,1)
179             LCD.Write(NumberFormat(Places,0,0))
180             LCD.Write("  FREE  PLACE")
181 
182         Case Else ' 2 to 14 free places
183             pinRedLED.DigitalWrite(False) ' turns off the red LED
184             pinYellowLED.DigitalWrite(False) ' turns off the yellow LED
185             pinGreenLED.DigitalWrite(True)  ' lights up the green LED
186             LCD.Clear
187             LCD.SetCursor(0,0)
188             LCD.Write("CENTRAL  PARKING")
189             LCD.SetCursor(0,1)
190             LCD.Write(NumberFormat(Places,0,0))
191             LCD.Write("  FREE  PLACES ")
192     End Select
193 End Sub
194 
195 Private Sub Unlock(Tag As Byte) ' Unlocks the ENTRANCE and EXIT buttons
196     'As long as the blue LED or white LED remains lit, the input and output buttons are disabled
197     Lock=False
198 End Sub
```