CMPE 1666- Intermediate Programming

Lecture 10B

C# Multi-Threading Example

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Lecture10B- Exercise 1

- You have been provided with a starter program that contains a form, a list box and a button.
- The program defines:
  - a struct called CityInfo, providing the name and code for a city and a pair of coordinates(to be used on a GDI Drawer window).
  - A struct called FlightPairs, containing a pair of cities for a flight
- It then creates a list of CityInfo a list of FlightPairs.
- It also defines a method called InitializeCities that creates a number of CityInfo objects. This method is called in the Form constructor.
- Run the program as given, then implement the tasks specified in the next 3 slides.

Lecture10B- Exercise 1-contd

- Your Tasks:
  1. Implement the method **DrawCities()** (called within the constructor). This method must draw each city, on the GDIDrawer window, as a blue square of size 5pixels, centered at the city's coordinates. It also adds the city code as text of size 10 and color yellow for each city. The text should start at x-25 and y-10 where x,y is the coordinate of the city. Also the width and height of the text area must be 50.
  2. Implement the method **ReceiveFlightInfo()**. It has as parameter a list of points and for each point in the list, it draws a square of size 2 pixels centered at the point. The color is the second parameter.

Lecture10B- Exercise 1-contd

3. Implement the method **FlyThePlane()**. It has as parameters 2 cities.
   - It generates a random color (use RandColor.GetColor()).
   - It also generates a random delay between 5 and 50 ms.
   - It creates an empty list of points called FlightPath.
   - It sets a temporary point **current** to the coordinates of the 1st (from) city.
   - Depending on the positions of the 2nd city from the first, it creates a new point by moving 1 pixel in the x direction and 1 pixel in the y direction towards the 2nd city.
   - It sleeps for the time of the delay generated above, then adds this point to the FlightPath list and assigns the new point to current.
   - This continues until current has the coordinates of the second city.
   - It finally invokes **ReceiveFlightInfo()** through a delegate and passes FlightPath and the random color as parameter.

Lecture10B- Exercise 1-contd

4. Implement the event handler btnCommission_Click.
   - It executes a loop that executes 20 times.
   - Each time it generates a random integer in the range of the size of the list of cities.
   - It picks the city at that position in the list as the starting city.
   - It then generates another random integer in the same range and obtain the destination city. It should ensure that the 2 cities are not the same.
   - It adds the 2 cities as a pair into the list of Flight pairs.
   - It creates a thread that calls FlyThePlane(), passing the starting and destination cities as the parameters. It sets the thread as background thread and runs it.
   - It then adds the list of flight pairs to the listbox.