Faculty of Computers, Informatics and Microelectronics

Technical University of Moldova

WINDOWS PROGRAMMING

Laboratory work #4

Windows Timer. Animation.

Authors:
Bega Valeria

Supervisor:
Irina Cojanu

Laboratory work #4

1 Purpose of the laboratory

Gain knowledge about basics of event-driven programming, Windows Timer. Animation.

2 Laboratory Work Requirements

– **Basic Level (grade 5 - 6) you should be able to:**

a) Create an animation based on Windows timer which involves at least 5 different drawn objects

– **Normal Level (grade 7 - 8) you should be able to:**

a) Realize the tasks from *Basic Level*.

b) Increase and decrease animation speed using mouse wheel/from keyboard

c) Solve flicking problem describe in your readme/report the way you had implemented this

– **Advanced Level (grade 9 - 10) you should be able to:**

a) Realize the tasks from *Normal Level*.

b) Add 2 animated objects which will interact with each other. Balls that have different velocity and moving angles. They should behave based on following rules:
-At the begining you should have 3 bals of different colours of the same size
-On interaction with each other, if they are of the same class (circle, square), they shuld change their color and be multiplied.
-On interaction with the right and left wall (the margins of the window), they should be transformed into squares.
-On interaction with the top and bottom of the window - the figures should increase their velocity.
-Please, take into consideration that the user can increase and decrease animation speed using mouse wheel/from keyboard

c) For the task above, add balls with mouse.

3 Laboratory work implementation

3.1 Tasks and Points

-Create an animation based on Windows timer which involves at least 5 different drawn objects
My animation consists of moving figures, balls or rectangles, generated by the user, and when they meet they change their form/color.

-Increase and decrease animation speed using mouse wheel/from keebord
The velocity or speed could be increased with the mouse wheel and with keyboard : when you press UP button the speed increase and when you press DOWN the ball's speed decrease.

-Solve flicking problem describe in your readme/report the way you had implemented this
The primary cause of flickering is erasing the background, then immediately drawing over it. And because we draw the whole client area of our window in WMPAINT, I add a handler that returns the true value to indicate that the background has been erased.

-Add 2 animated objects which will interact with each other. Balls that have different velocity and moving angles.
Each of two animated objects behave such as:they can move with different velocity, when is collision with another object , the color is changed.When objects interacts with margins of the window, they are changed into sqares.

-Bonus point
Hooked some keyboard inputs. For example it was given that we have to change the speed of the moving objects by scrolling, but it is also possible to change the speed by pressing UP and DOWN on the keyboard.

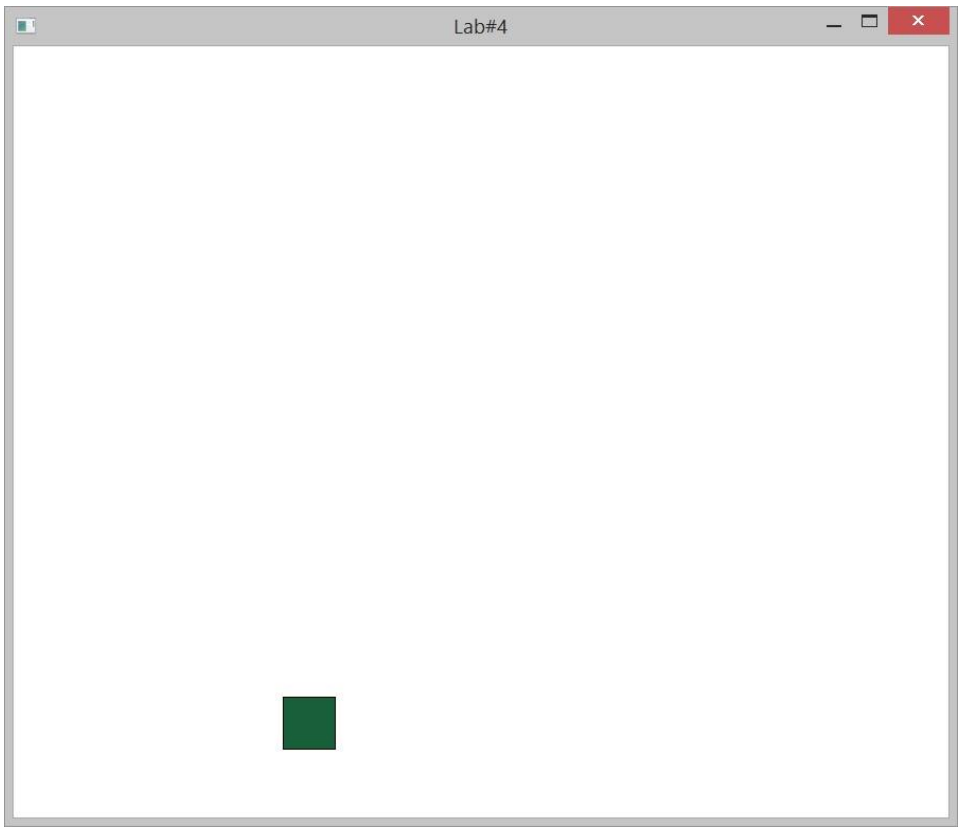
3.2 Laboratory work analysis

Add link to your repository. Create a README.md file for each laboratory work you submit.
`https://github.com/ValeriaBega/PW`

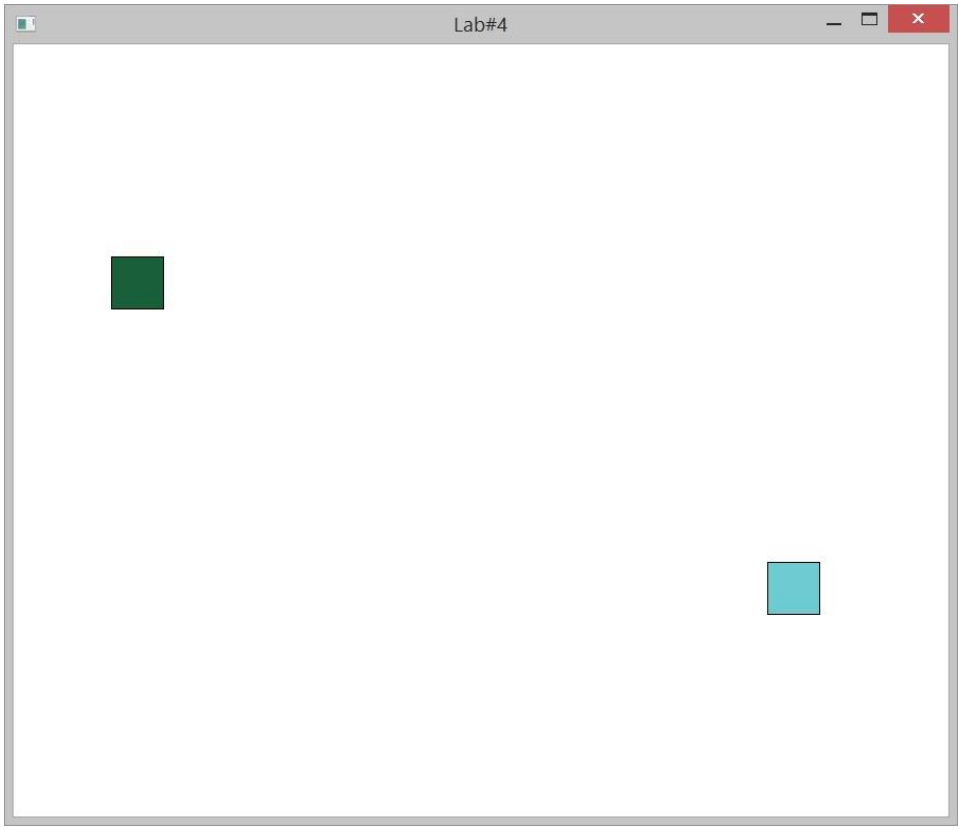
I already explained what my laboratory works contains in the paragraph above.We had to work with some new features than in the previous laboratory works.This application was some kind of animation where you have to add objects by hand and change some of their properties.

3.3 Prove your work with screens

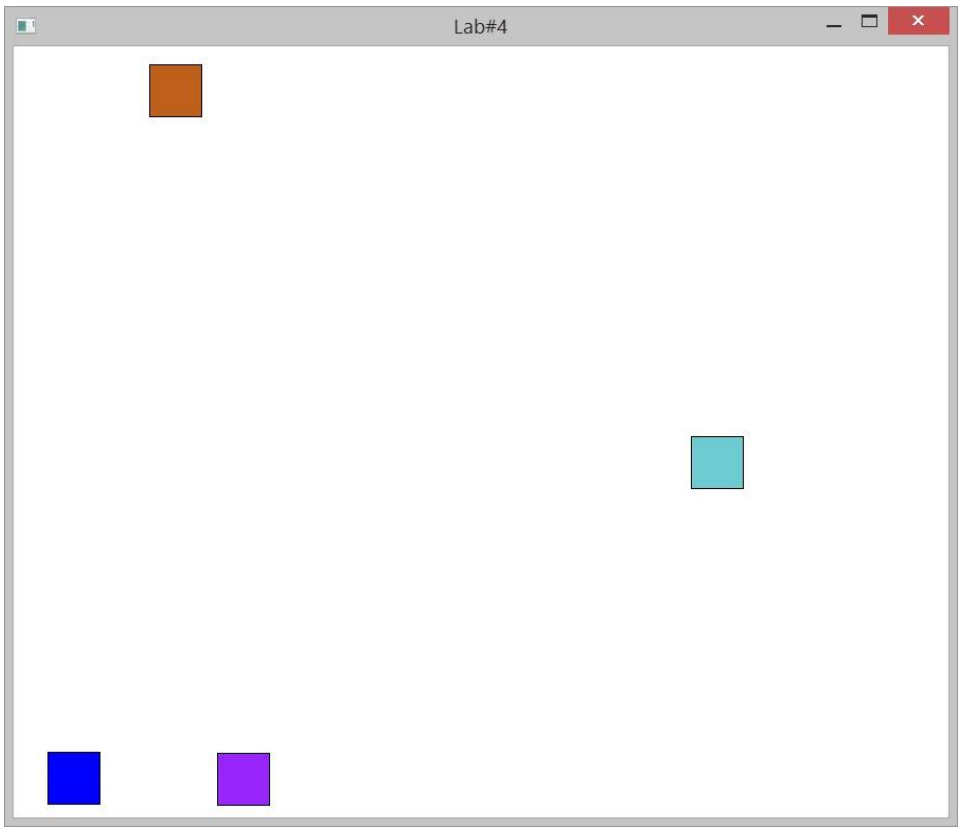
The basic window as we have it:



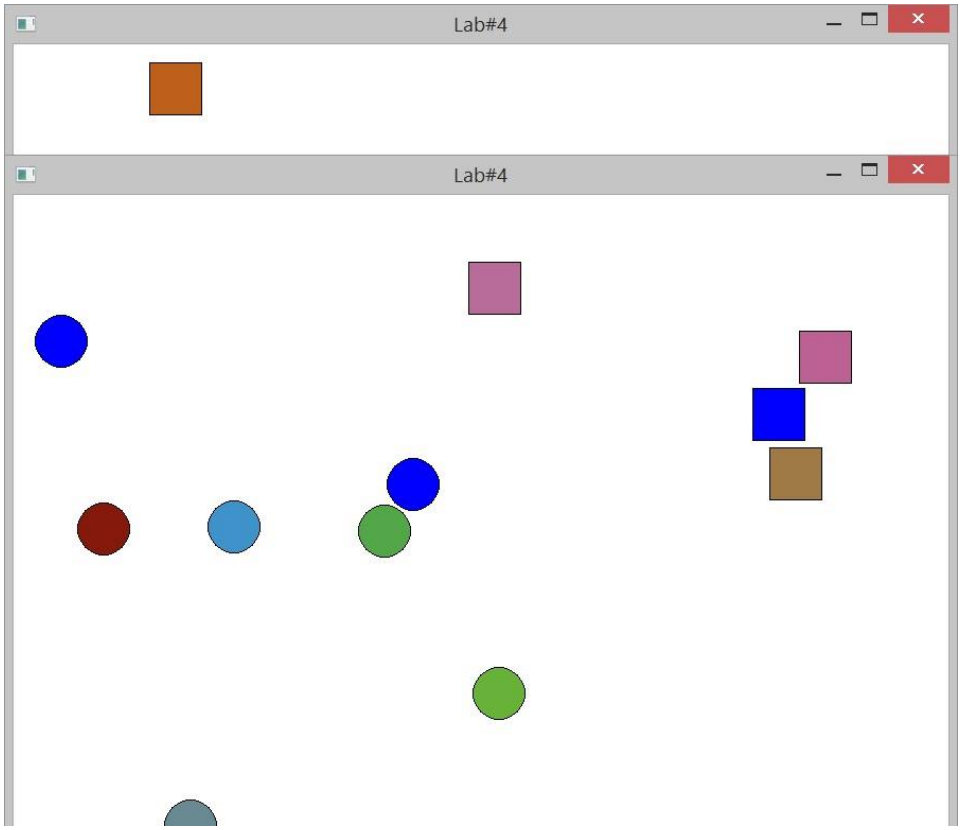
More objects appear on screen :



And even more, of different colors and shape:



And even more, of different colors and shape:



Conclusions

This laboratory work was hard but with a lot of fun. I discovered that a lot of the previous laboratory works had the flickering problem and here we actually learned what this means and how to solve it(by adding a handle variable, which sends the message that the background has been cleared.

Also, in this laboratory we used the Timer for the first time in practice and created these awesome animated objects which can change. So this was a lesson that Timer can help make interesting animated stuff.

It was challenging to complete the tasks, I really enjoyed performing them. For me it's a new experience and it improve my skills as programmer. I think there are a little bit space for improvements, and I'll make them as soon as possible. This laboratory work broadened and deepened my understanding of Event-Driven Programming, animation, and Win32 API in particular.

References

1 Microsoft Windows, *official page*, https://msdn.microsoft.com/en-us/library/bb384843.aspx

2 C++ website, http://www.cprogramming.com/tutorial/opengl_first_windows_app.html

3 LateX basics, https://www.sharelatex.com