VPS 5 | **Parallel and Distributed Software Systems** | **ST 16, Exercise 4**

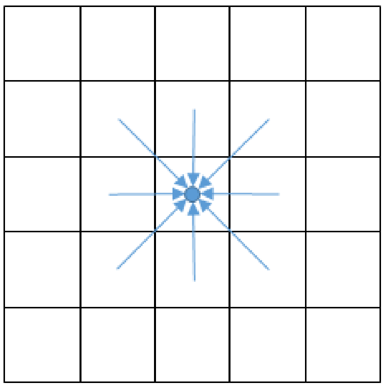
Deadline: 15th of May, 2016 23:55

Name____

Points ________ **Effort in hours** ________

1. Psychedelic Diffusions (4 + 4 + 4 Points)

On Moodle you find a template for implementing a diffusion simulation. Simple diffusion simulations work by computing the value of a point by averaging over its neighboring points:



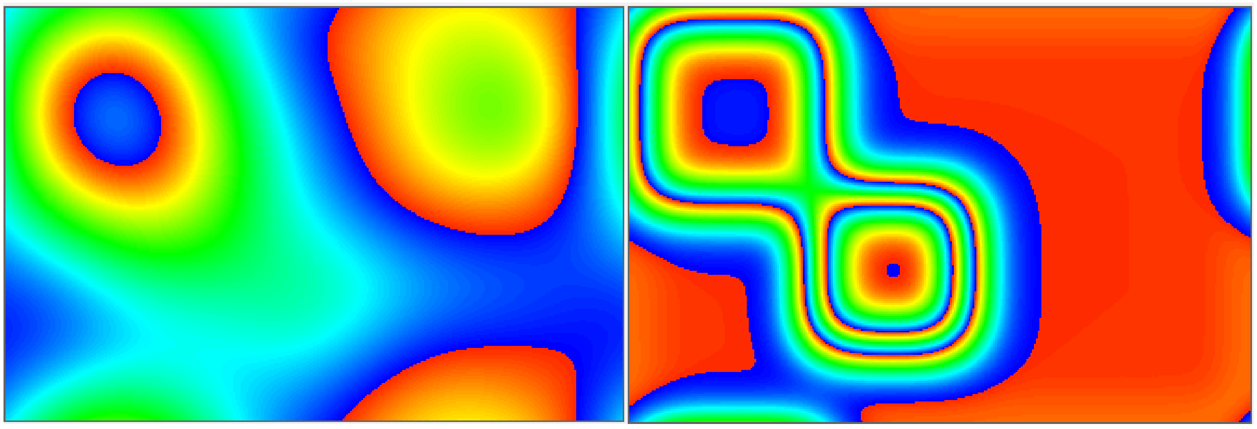
$$f(p) = \frac{1}{8} * \sum neighbor(p)$$

a) Implement a sequential version of the simulation in C# using the provided template. Also implement the mouse event for "reheating" at a point as well as starting and stopping the simulation.

b) Use any of the learned techniques to compute the simulation in the background to provide a responsive UI. Take care of proper cancelation and locking!

c) Implement a parallel version of the simulation with the parallelization technique of your choice. Discuss your design considerations and calculate the speedup.

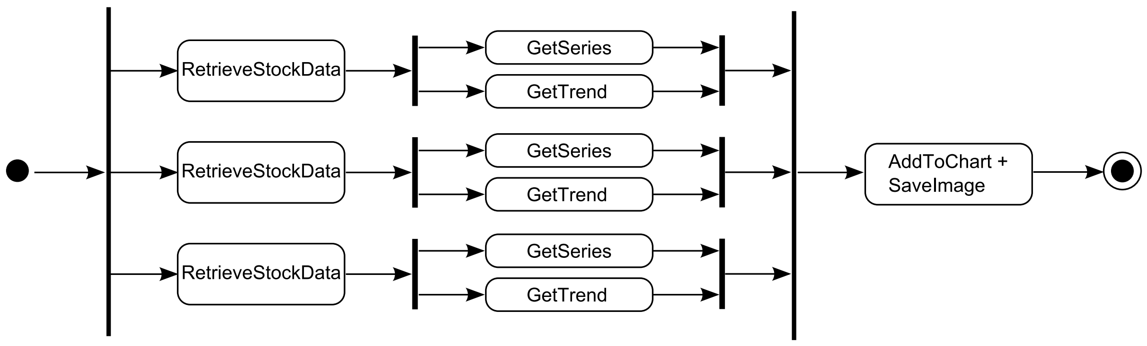
Document each step and also show a screenshot of the application in action.



2. Stock Data Visualization (6 + 6 Points)

Web requests can often be executed asynchronously to improve the responsiveness of an application and to reduce the total response time of multiple requests. On Moodle we provide a sequential implementation of a stock data visualization program that downloads price histories of three stocks from *quandl.com* and shows them in a line chart.

a) Implement an asynchronous version of the stock data visualization program using the .NET Task Parallel Library. Your version should execute tasks as shown in the following activity diagram. Use continuations to create chains of several tasks.



b) Implement a second version of the stock data visualization program which uses the keywords *async* and *await*. Make sure the tasks are again modeled as shown in the activity diagram.