Programmierpraktikum

Exercise Sheet #13

WS, 2012/2013

Applets

Modify the code given in the class:
http://itp.uni-frankfurt.de/~gros/Vorlesungen/ProgPrak/Java-applets.html#%285%29
such that the animation of the fall should be maximally smooth and the fall should accurately follow Newton's law. That is, since the minimal possible change is one pixel, every time the ball moves a distance equivalent to one pixel, it should be redrawn (therefore maximally smooth animation). However, following Newton's law implies that, besides redrawing every pixel change, this redrawing must be faster the faster the ball moves during its fall. The dynamics of the fall should therefore be realistic.

To load the applet into your browser, use an `html` file like that found in the slides:
http://itp.uni-frankfurt.de/~gros/Vorlesungen/ProgPrak/Java-applets.html#%283%29
You must also probably install and/or activate the Java plugin in your web browser.

Mouse Interaction

Modify the code given in the class
http://itp.uni-frankfurt.de/~gros/Vorlesungen/ProgPrak/Java-applets.html#%285%29
by adding mouse interaction:

- The ball color should change when the mouse is over the ball.

You can copy some mouse code from:
http://itp.uni-frankfurt.de/~gros/Vorlesungen/ProgPrak/Java-applets.html#%284%29
to help with the task.

`[Optional]` Montecarlo

Calculate the numerical value of the integral

$$\int_{x=0}^{1} \frac{e^x - 1}{e - 1} \mathrm{d}x \ ,$$

using the Montecarlo method.

Hint: You can solve this problem like the calculation of π in the class. The ratio of randomly chosen points falling under the function's curve relative to the total amount of randomly chosen points is the same as the area under the curve divided by the square area delimited by the maximum/minimum values of x and the maximum/minimum values of the function within that interval. The randomly chosen points must have the same probability to fall within any point in such square area.