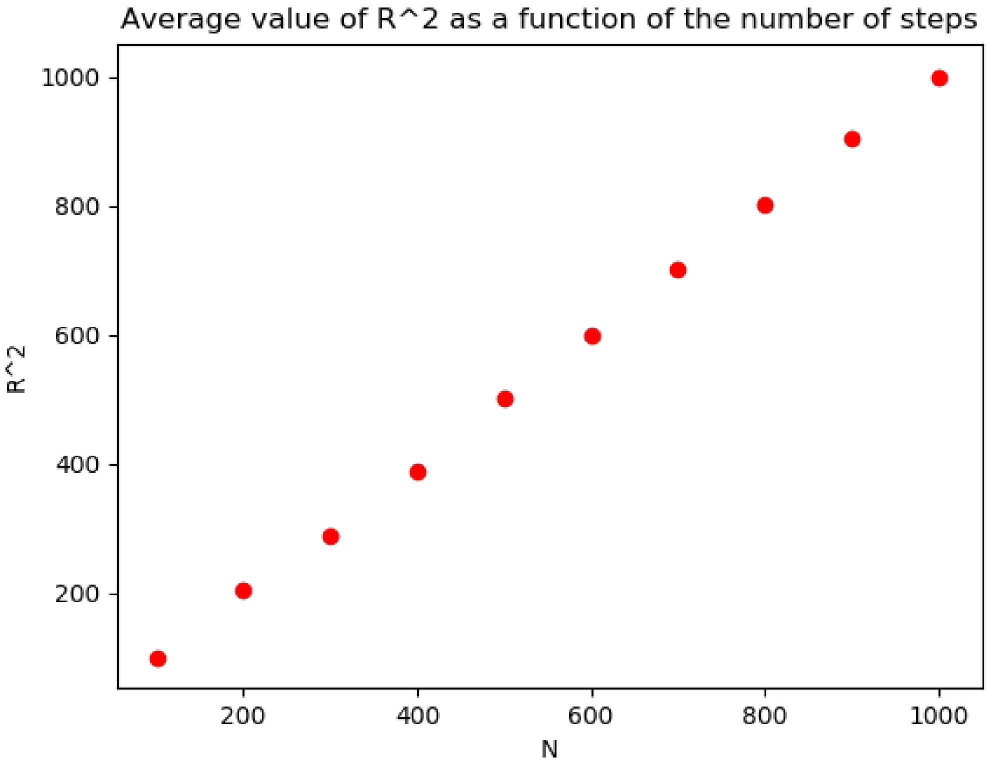
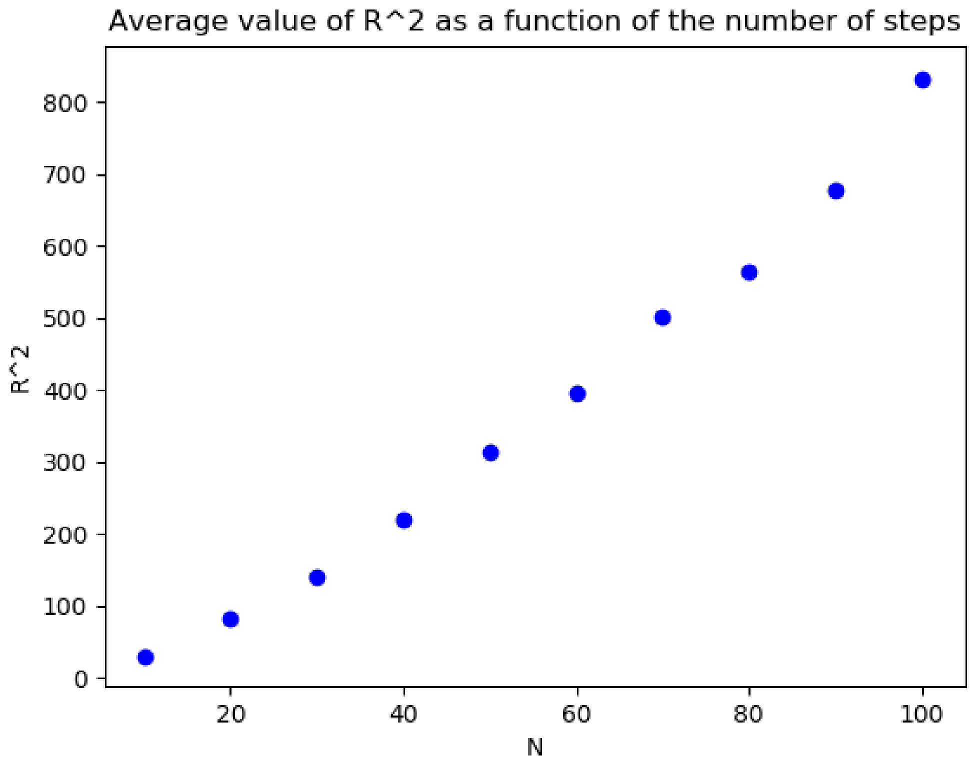
Not self avoiding random walk:



The graph above clearly shows that the dependence of R^2 from the number of step N is linear. It is to say that we expect (on average) a generic random walk to have a distance R, between the first and the last point, that is of the order of $N^{(1/2)}$. Each red point in the graph was obtained as the average value of R^2 for 3000 random walks of N steps (with each step being of length one).

Self avoiding random walk:



In this case the random walk was created using 2-spheres (of diameter one in my simulation) in a 2d plane. Each sphere has to touch the previous one. Altough the step's length, in this situation, is the same as in the non avoiding case, it is easy to see that R^2 increases more steadily then in the previous case. This makes sense, since the "solid spheres constraint" implies a lower likelyhood for the walk to come back on its previous steps. The question now is the following: "Is R^2(N) linear in N again?". To answer we first have to ponder on the reliability of the data shown in the graph. Each blue dot was obtained by averaging 1000 values of R^2. Thus this time only 1000 (and not 3000) random walks were created to obtain each point, a choice that was made because of runtime, which is higher in this solid spheres case. As a consequence of this "not so smooth" average the graph leaves some doubts. In order to give a solid answer many such graphs should be created and test different aproximating curves; however my opinion is that the behaviour is again linear.