Computational Physics Homework Assignment #4

April 29, 2019; Due May 27, 2019

Reading Assignment

1. Read lecture notes and references; Study sample programs and prepare your own programs with any languages you prefer.
2. *"Numerical Recipes"* provides several random number generators.

Laboratory Assignments (Total Points: 100), on May 06, 2019

1. (50 points) Write a program to test random number generator and select 10 sets of (*m, a, c*) from the table given for testing, and make comparisons on them. You should use more than 3 testing methods.

m	a	c
214326	1807	45289
244944	1597	51749
233280	1861	49297
175000	2661	26979
121500	4081	25673
145800	3661	30809
139968	3877	29573
214326	3613	45289
714025	1366	150889
134456	8121	28411
243000	4561	51349
259200	7141	54773
233280	9301	49297
714025	4096	150889
1771815	2416	374441
510300	17221	107839
312500	36261	66037
217728	84589	45989
2147483647	16807	0
4294967296	1664525	1013904223
4294967296	69069	0

2. (50 points: 15, 15, 20) **Random walks in two dimensions**: Enumerate all the random walks on a square lattice for N = 6 and obtain exact results for $< x(N) >$, $< y(N) >$ and $< \Delta R^2(N) > = < x^2(N) > + < y^2(N) > - < x(N) >^2 + < y(N) >^2$, for
    (a) simple random walk.
    (b) non-reversal random walk.
    (c) self-avoiding random walk. (Total number of walks is 780).