CE412 – PROJECT 5
"Random Number Generation"

In this project, you will write a program which generates random numbers by using the Linear Congruential Method and tests these numbers for uniformity and independence.

In the first step, your program asks the user to input the initial parameters of the Linear Congruential Method (X_0 , a, c, m) and the number of random numbers to be generated (N).

In the second step, your program checks the uniformity of these random numbers by applying the Kolmogorov-Smirnov test. You may use a level of significance $\alpha = 0.05$ and the critical value $D_{0.05} = \frac{1.36}{\sqrt{N}}$ for $N > 35$. Your program should output the value of $D$and whether the numbers are uniform or not.

In the third step, your program checks the independence of these random numbers by applying the Runs Up and Runs Down test. You may use a level of significance $\alpha = 0.05$ and the critical value $Z_{0.025} = 1.96$. Your program should output the value of Z_0 and whether the numbers are independent or not.

Project 5 Submission:
Name your program as *yournamePrj5.X* and submit your program to LEARN on May 4th, 2020. In addition answer the following questions and submit it to LEARN in a separate document.

1) Attach your code.
2) Produce 100 random numbers with these parameters ($X_0 = 123457$, $a = 7^5, c = 0, m = 2^{31} - 1$) round them to 3 decimal places and print them.
3) Print the result of the Kolmogorov-Smirnov test (the value of $D$and whether the numbers are uniform or not)
4) Print the result of the Runs Up and Runs Down test (the value of Z_0 and whether the numbers are independent or not)