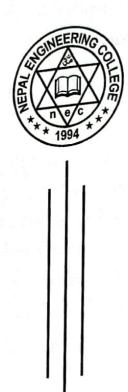
NEPAL ENGINEERING COLLEGE

(Affiliated to Pokhara University) Changunarayan, Bhaktapur



A report on: ...# 4

4. Congruential & Mid Square Method to generate Random number.

Submitted By:

Name: Raj Kuman Khadka

Roll No.: 020 - 348

Submitted To:

Department: Computer Engineer!

Teacher's Signature:

Date: 27th June 2024

Labsheet -4

OBJECTIVE

To generate random numbers using Linear Congruential method and mid square method.

THEORY

Linear Congruential Method is a class of Pseudo Random Number Generator (PANG) algorithms used for generating sequences of random-like numbers in a specific range.

Xn+1 = (axn+c) mad m, n ≥0. Xn is choosen To, m-1], n ≥0

Approach:

. choose to mod m, multiplier a & Increment term c.

· Initialize read amount of random numbers to generate (say, an integer variable notificandom Nums).

. Define size noofflandom Nums.

. Initialize oth index of vector with seed value.

· Now use, random Nums [i] = ((random Nums [i-1] +a) +c) x.m.

Finally, return the random number.

PROGRAM

import java.util *;

static void linear Engruential Method (int Xo, int m, inta, inte, int I random Nums, int not Random Nums)

randomNums [0] = Xo;
for (infi=1; i'< no Of RandomNums; i++)

random Nums [i] = ((random Nums [i-1] *a) rc) km;

public static void main (string [Jargs)

int xo=5; int m=7; int 2=35, c=3; int nolf Random Numc=10. in I [Rerandom Nums = new int [no Of Random Nums]; Linear Goongwent's Method (xo, m, a, c, random Nums, no of Random Num for (snt i=0; iznoofRandom Nums; i++) System. out. print (random Nums [i] + " "); 3

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: tugtul

5 4 1 6 0 3 5 4 1 6

Generate Random Numbers Using Mid Square

Proposed by Van Neumann. In this method, we have seed of seed is squared & its middern is felched as random numbers. Suppose a N number is squared & becomes &N, if it doesnot become aN then we add zeros to make aN. A good algorithm is one which doesnot depend on seed & period should be maximally long that it should almost louch every number in its range before it starts repeating itself as a rule of thumb remember that longer the period more random is the number.

Example:

Number --> Square --> Mid-derm --> 0196 --> 19 LY -> 0361 -> 36 19 --> 1296 --> 29 36 --> 0841 --> 84 29 84 --> 7056 --> 05 05 -> 0025 -> 02 --> 0004 --> 00 00 --> 0000 -->00

Implementation: impost java. util. Random; public class Main of static int range dray [] = T, 10, 100, 1000, 10000, 100000, 1000000, 2 00000000 j; static long middle Square Number (Long num, int digit) long sqn = num * num, nextNum = 0; int drim = (digit/2); sqn = sqn/range Array [trim]; fer (inti=0; i < digit; i++) a nextNum+= (sqnx (range Array [trim])) + (range Array [i]); 4 sqn = sqn /10; return nextNum; public static void main (String args []) of int number Of Digit = 3; into Start = range Array [number Of Digit - 1], end Drange Array Cnumber Of Digit J; Random rand = new Random (); Goo 325] long next Number = rand next Int (end - stort) + start; System. out. print ("The random numbers for the Geeks are: \n" + next Number + ", "). for (int 1=0', 129', 1++) of next Number = middle Square Number (next Number, nomber OfDigit); System.out. print (nentNumber + ", "); : tugtuo The random numbers for the Geeles are: 328, 562, 584, 105, 102, 40,160, 560, 360, 960

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CONCLUSION

Hence, we successfully generated random numbers using linear congruential method & mid square method.