DSA REPORT

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Assignment Set: 1

Problem No: 4

Problem Statement:

Write a program to generate 1,00,000 random integers between 1 and 1,00,000 without repetitions and store them in a file in character mode one number per line. Study and use the functions in C related to random numbers.

Solution Approach:

The system time changes every second, and this is the property that is used in the following solution where srand() and rand() together with a time_t variable is called. Inside a loop the rand()%100000 generates a random number less than or equal to 100000. A binary array is made which stores 1 if that index is already present in the file, 0 otherwise. A check is made if the number is repeated in which case, the loop variable is repeated, written to the file otherwise.
A binary file (also attached below) is used to store the random numbers.

Structured Pseudocode:

FILE *PTR = FOPEN(FILE_NAME, MODE)

TIME_T VAR

ARRAY[10000] = {0}

SRAND (VAR)

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FOR i=1 TO 100000 DO:

INT K=RAND()%100000

IF (K NOT IN FILE)

FPRINTF(PTR,K);

ELSE

i = i-1

ARRAY[i]=1

Results:

Discussions:

The time complexity of this solution is strictly O(n). The auxilary space complexity is O(n).

Source Code:

FILE NAME:

Code – “four.c”

Binary File – “assign4.txt”

(can be found in the following link: https://drive.google.com/drive/folders/1-nNb6aRleNLE1mcE58i85096fDmDUCvd?usp=sharing)