

Homework

Problem Description:-

Design a system which takes input as the last 5 digits of your roll number, let this input be ABCDE and perform the following steps-

1. Transform the input such that it becomes- $X = \text{rounding_fun}((ABCDE)^{3/2})$
2. Generate Y which will be a pseudo-random sequence of 1000 bits
3. Generate \bar{Z} which will be a set of placeholders, so $\bar{Z} = \{Z_1, Z_2, Z_3\}$ where Z_1, Z_2, Z_3 have the range between 0 to 1000 and their values are uniformly random
4. Generate F which will have the pattern X replaced in Y at the placeholders given by \bar{Z} ,
So $F = Y \cup \{X\}^{\bar{Z}}$
5. And the final output will be a series of 0's and 1's, where 1's will be there when you detect the pattern X in the series F

Submission Instructions:-

Please provide your solution along with the following details-

1. State Equation
2. State Diagram (for the detection of the pattern)
3. VHDL Code (Along with the testbench)
4. Report