# National Institute of Technology Calicut
# Department of Computer Science and Engineering
# Fourth Semester B. Tech.(CSE)-Winter 2021-22
# CS2094D Data Structures Laboratory
# Assignment #2- Modification Question

**Instructions:** For the question given below, write the design in the shared doc. Upload your design as a .pdf file in the eduserver strictly by 2.30 pm in the link provided for *submitting the design of the Modification question.* After submitting the design, implement your design using *C Language* and show the output of your program to the evaluator for the test cases given for the Modification question in eduserver. In any case, you should submit your C Program in the eduserver strictly by 3.15 pm in the link provided for *submitting the C Program for the Modification question.* In case of clarifications, your evaluator will help you.

Marks (Design + Implementation + Viva): 3 + 3 + 2

The marks for implementation will be based on the results for the test cases. The evaluator will be conducting a viva for a maximum of 5 minutes.

## QUESTION

1. Consider a mapping H: X→H[X]. Write a C program to check whether the mapping is one-one (every element in the range of H corresponds to exactly one element in the domain of H) or not.

   X→ First name of a student in NITC
   H[X]→ ((pos(first_letter) * $3^0$) + (pos(second_letter) * $3^1$) + (pos(third_letter) * $3^2$) +……..+ (pos(last_letter) * $3^k$)) % n

   Where,
   k → Length of first name - 1
   n → Hash table size
   pos(A) is the alphabetical position of the alphabet A. Also, pos(A)=pos(a)
   Eg:- pos(G) = 7, pos(y) = 25

   For example,
   n = 10, X = Rupa, then
   pos(R) = 18, pos(u) = 21, pos(p) = 16, pos(a) = 1
   H[X] = (18 * $3^0$ + 21 * $3^1$ + 16 * $3^2$ + 1 * $3^3$) % 10 = 252 % 10 = 2

   **Note:-** Collision resolution is handled by ***chaining***.

   **Input format:**

   - First line is size of the hash table $\mathcal{H}$, n.
   - Character 'i' is followed by a string 'S'. In this operation a new name 'S' is inserted into $\mathcal{H}$.
   - Character 'd' is followed by a string 'S'. In this operation, the name 'S' is deleted from $\mathcal{H}$ if it is present, otherwise do nothing.
   - Character 'p' is to check whether the function is one-one or not.
   - Character 't' is to terminate the program.

   **Output format:**

   - Print 1, if the mapping is one-one.
   - Print -1, if the mapping is not one-one

**Sample Input 1:**
10
i Rupa
i Nandu
i Nita
i Keshav
p
d Rupa
p
t

**Sample Output 1:**
-1
1

**Sample Input 2:**
30
i Rupa
i Nandu
i Nita
i Keshav
p
d Nita
p
t

**Sample Output 2:**
1
1