# Problem 1:

Design a class to hold information about a person and his DNA sample. Develop a solution to help the scientists track the evolution of this DNA string after applying multiple mutations (operations from the list below) on different people at the same time.

**Classes:**

*Person class:*

Name: should be unique

DNA string: A string of length 25 characters having characters A,T,G or C (Eg. GGCTCTGACTTCCGTTCGCGCAACA)

Age: Any valid number between 18 to 100

*Person Evolution class:*

Instance of Person class detailed above with evolved DNA string

From – character that has to be replaced Ex: A

To – character to be replaced with Ex: G

*Example Operations:*

1. Convert all a’s to g’s and vice-versa for Person 1
2. Convert all c’s to t’s and vice-versa for Person 3
3. Convert all a’s to t’s and vice-versa for Person 4

On start of the application, it should be capable of storing details of 10 people in memory. And prompt the user/scientist to apply different operations by keying in the person name and the evolution from and to character details. Store each of these evolutions for every person in memory.

Further, on querying details about a particular person the solution should display the evolution of the DNA string.

**Sample Output:**

App: Enter the number of people under test:

User: 3

App: Enter details of person 1 in the format - Name,Age,DNA string:

User: Person1,20,GGCTCTGACTTCCGTTCGCGCAACA

App: Enter details of person 2 in the format - Name,Age,DNA string:

User: Person2,22,TTCGCGCAACAGGCTCTGACTTCCG

App: Enter details of person 3 in the format - Name,Age,DNA string:

User: Person3,40,GGCTCTTTCGCGCAACAGACTTCCG

App: Enter the below options:

1. Perform Operation
2. Display Information
3. Quit

User: 1

App: Enter the Person name:

User: Person1

App: Enter the character to be replaced:

User: A

App: Enter the character to replace A with:

User: G

App: Operation Performed.

App: Enter the below options:

1. Perform Operation
2. Display Information
3. Quit

User: 1

App: Enter the Person name:

User: Person3

App: Enter the character to be replaced:

User: C

App: Enter the character to replace A with:

User: T

App: Operation Performed.

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…(Multiple such operations are performed on different people)

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App: Enter the below options:

1. Perform Operation
2. Display Information
3. Quit

User: 2

App: Enter the name of Person whose details has to be displayed:

User: Person 1

App: The DNA evolution of Person 1 is as below,

1. DNA: GGCTCTGACTTCCGTTCGCGCAACA – Original
2. DNA: GGCTCTGGCTTCCGTTCGCGCGGCG – A to G
3. DNA: GGTTTTGATTTCCGTTTGTGTAATA – C to T

# Problem 2:

Develop a solution to perform a binary search of set of values. The values can be of any data type. The data and its type on which binary search will be performed will have to be taken as input from user.

This shall be using generic linked list.