**Practical – 5**

**Practical Statement** : Encode a given string “BILL GATES” using Arithmetic Encoding / Decoding scheme.

**Code :**

#include <bits/stdc++.h>

using namespace std;

int main()

{

cout<<"190420116071 : Meet Vaghasiya"<<endl;

cout<<"Practical 5 : Encode a given string “BILL GATES” using Arithmetic Encoding/Decoding"

"scheme"<<endl;

string s;

string s1;

cout<<"Enter String : ";

getline(cin,s);

map<char, int> order;

map<char, int> map;

for(int i=0;i<s.length();i++){

map[s.at(i)]++;

}

double prob[map.size()+1];

int i=1;

for(auto m:map)

{

prob[i] = (m.second/(double)s.length());

i++;

}

i=1;

for(auto m:map)

{

order[m.first] = i;

i++;

}

double F[map.size()+1];

F[0] = 0;

for(int j=1;j<=map.size();j++){

F[j] = prob[j]+F[j-1];

}

double l=0;

double u = 1;

cout<<endl;

for(int j=0;j<s.size();j++){

double l1= l + ((u-l)\*F[order[s.at(j)]-1]);

u = l + (u-l)\*F[order[s.at(j)]];

l=l1;

}

double tag = (l+u)/2;

cout<<"Tag is : "<<tag<<endl;

string decode = "";

l=0;

u=1;

double l1 = 0;

double u1 = 1;

for(int j=0;j<s.size();j++){

for(auto m : order){

l1 = l + (u-l)\*F[m.second-1];

u1 = l + (u-l)\*F[m.second];

if(tag>=l1 && tag<u1){

decode.push\_back(m.first);

l=l1;

u=u1;

break;

}

}

}

cout<< "Decode string is : "<<decode<<endl;

return 0;

}

Output:

