Front compression

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Introduction:

We use front compression for name list (The name is compatible from the previous string)

Algorithms:

```cpp
#include <bits/stdc++.h>

using namespace std;

int main()

{

    freopen("input.txt","r",stdin);

    freopen("output.txt","w",stdout);

    string s,s1;

    int a=0;

    vector<string> v,v1;//compression

    getline(cin,s);

    while(s[0] !='0'){

        if(!a){        //push the first string

            v.push_back(s);

            a=1;
```

```cpp
            s1=s;
        }
        else{
            int x=0,cnt=0,y;
            y=min(s1.size(),s.size());
            while(y--){   //count the similar character in both strings
                if(s1[x]==s[x]) cnt++;
                else break;
                x++;
            }
            s1=s;
            if(cnt){
            s="";
            for(int i=cnt;i>0;i/=10){    //convert the counter to string
            s+=(i%10)+'0';}
            reverse(s.begin(),s.end());
            s+=s1.substr(cnt,s1.size());
        }
        v.push_back(s);
    }
    getline(cin,s);
    }
    cout<<"The compressed file " <<endl;
    cout<<endl;
    for(int i=0;i<v.size();i++){
```

```cpp
        cout<<v[i]<<endl;
    }
//decompression
v1.push_back(v[0]);
for(int i=1;i<v.size();i++){
    string ss=v[i],st="",ss1;
    for(int j=0;j<ss.size();j++){
    if(ss[j]>'0' && ss[j]<='9'){
        st+=ss[j];
    }
    else break;
    }
    int n=st.size()-1,z=0;
    for(int j=1;j<=st.size();j*=10){
        z+=(st[n]-'0')*j;
        n--;
    }
    ss1=v1[i-1];
    ss1=ss1.substr(0,z);
    ss=ss.substr(st.size(),ss.size());
    ss1+=ss;
    v1.push_back(ss1);
}
cout<<endl;
cout<<"***********************************************"<<endl;
```

```
    cout<<"The decompressed file " <<endl;

  cout<<endl;

  for(int i=0;i<v1.size();i++){

      cout<<v1[i]<<endl;

  }

  return 0;

}
```
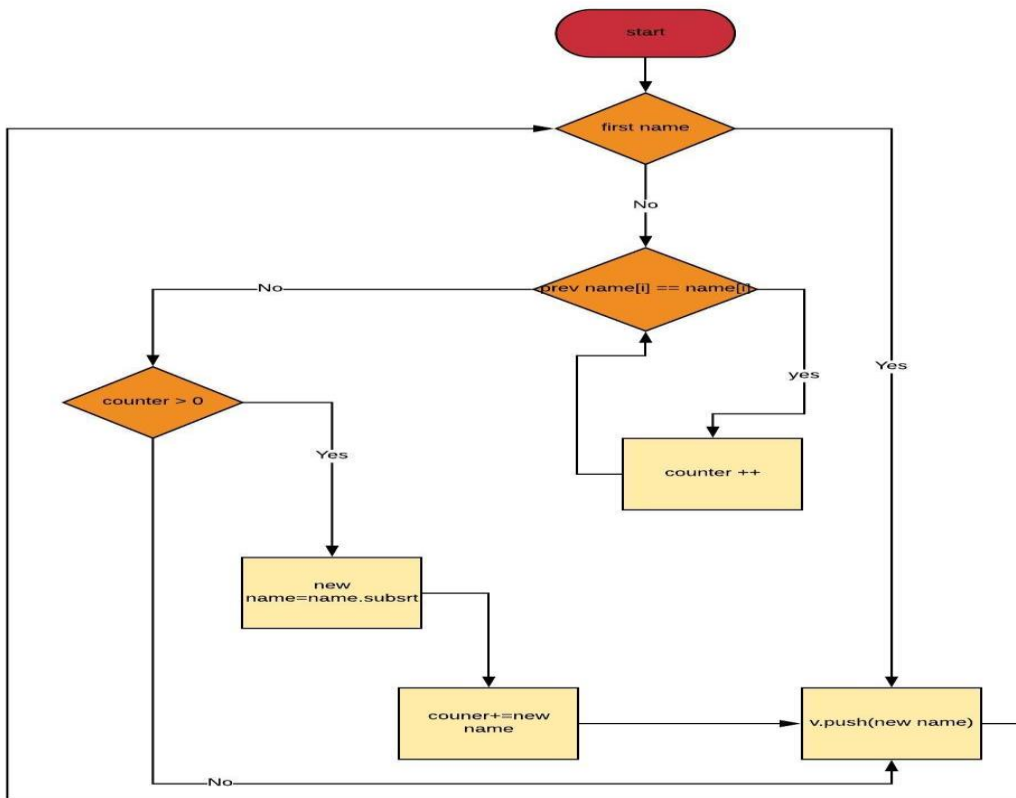
flowchart :

compression

decompression

Flowchart:

- start
- v.push(first name)
- Decision: s[j]>'0' && ss[j]<='9'
  - No → new name = prev name.substr + name . substr → v.push(new name)
  - Yes → counter++
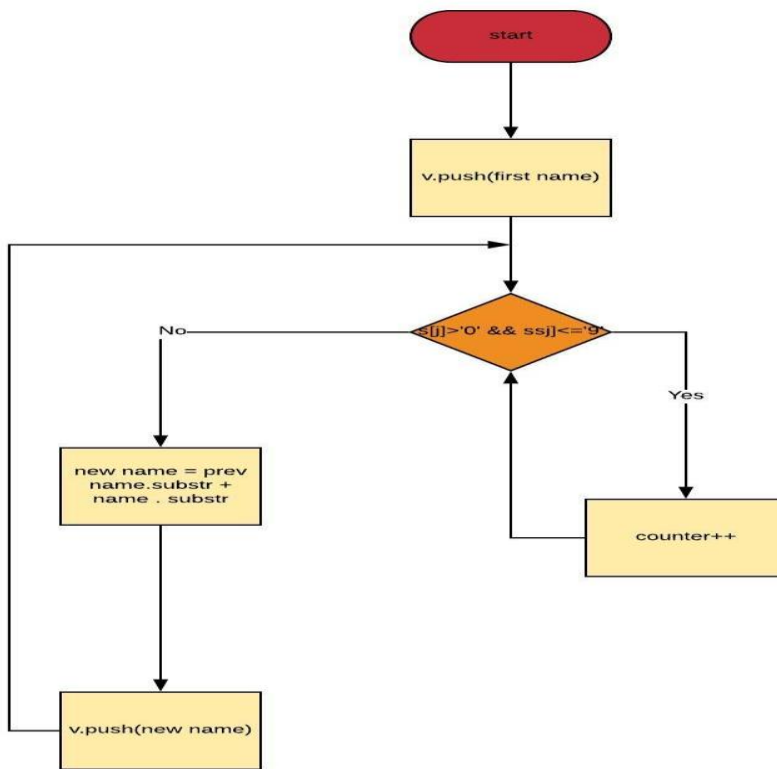
Output sample:

The compressed file

Ahmed Osama Saad Abdel Fattah Abdelmaksoud
6Ehab Taha Abu Mandour
6Gamal Fathy Mahmoud
6Shawky Kamel Othman

****
The decompressed file

Ahmed Osama Saad Abdel Fattah Abdelmaksoud
Ahmed Ehab Taha Abu Mandour
Ahmed Gamal Fathy Mahmoud
Ahmed Shawky Kamel Othman

conclusion:

The original string is stored in 119 bytes , but the compressed string will be stored in 104 bytes.

Compression ratio= 104/119 = 87.39%

Then compression factor = 12.6%

So this type of compression is suitable for this data.