Algorithm Code Book

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```
#include<bits/stdc++.h>
using namespace std;
char TXT[10000000],ptr[10000000];
vector<int> compute_prefix(const char *p)
{
    int m=strlen(p+1);
    vector<int> prefix(m+1);
    prefix[1]=0;
    int k=0;
    for(int i=2; i<=m; i++)
    {
        while(k>0 and p[k+1]!=p[i])k=prefix[k];
        if(p[k+1]==p[i])k=k+1;
        prefix[i]=k;
    }
    return prefix;
}
vector<int> KMP_match(const char *txt,const char *ptrn)
{
    int n=strlen(txt+1);
    int m=strlen(ptrn+1);
    vector<int> Prefix=compute_prefix(ptrn);
    vector<int>Match_position;
    int q=0;
    for(int i=1; i<=n; i++)
    {
        while(q>0 and ptrn[q+1]!=txt[i])q=Prefix[q];
        if(ptrn[q+1]==txt[i])q=q+1;
        if(q==m)
        {
            Match_position.push_back(i-m);
            q=Prefix[q];
        }
    }
    return Match_position;
}
int main()
{
    scanf("%s %s",TXT+1,ptr+1);
    vector<int> Match_position=KMP_match(TXT,ptr);
    for(int i=0; i<Match_position.size(); i++)
    {
        if(!i)printf("%d",Match_position[i]);
        else printf(" %d",Match_position[i]);
    }
    return 0;
}
```