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#include <stdio.h>
#include <string.h>
#include <stdlib.h>

typedef int Position;
#define NotFound -1

void BuildMatch( char *pattern, int *match )
{
    Position i, j;
    int m = strlen(pattern);
    match[0] = -1;

    for ( j=1; j<m; j++ ) {
        i = match[j-1];
        while ( (i>=0) && (pattern[i+1]!=pattern[j]) )
            i = match[i];
        if ( pattern[i+1]==pattern[j] )
            match[j] = i+1;
        else match[j] = -1;
    }
}

Position KMP( char *string, char *pattern )
{
    int n = strlen(string);
    int m = strlen(pattern);
    Position s, p, *match;

    if ( n < m ) return NotFound;
    match = (Position *)malloc(sizeof(Position) * m);
    BuildMatch(pattern, match);
    s = p = 0;
    while ( s<n && p<m ) {
        if ( string[s]==pattern[p] ) {
            s++; p++;
        }
        else if ( p>0 ) p = match[p-1]+1;
        else s++;
    }
    return ( p==m )? (s-m) : NotFound;
}

int main()
{
    char string[] = "This is a simple example.";
    char pattern[] = "simple";
    Position p = KMP(string, pattern);
    if (p==NotFound) printf("Not Found.\n");
    else printf("%s\n", string+p);
    return 0;
}

```