Programming & Data Structures Laboratory: Section 1: Test 2 –

May 25, 2022

Time: 90 minutes | Full marks = 100

Instructions

1. **Give meaningful comments to explain the functionality of the method used in your program**.
2. Name the file containing the main function and the other function(s) as instructed. This file should have a header (as comment) **containing your name and rollno.**
3. Put "printf" statement corresponding to each "scanf" statement so that the input data appears in the output.

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(1) Given a sequence A of $n \geq 1$ integers and another sequence B of m integers, $1 \leq m < n$ integers, we wish to determine the number of occurances of B in A. Your program must read the values of n and m and the two sequences A and B. Then it must determine the number of occurances of B in A. The program must print the number of occurances and positions in A where the occurances of B begin.

If $A =< 1, 2, 5, 8, 2, 5, 8 >$ and $B =< 2, 5, 8 >$, then the indices of the matches are at positions 2 and 5.

If $A =< 1, 2, 1, 2, 1, 2, 1 >$ and $B =< 1, 2, 1 >$ then indices of the matches are at positions 1, 3 and 5.

The main program must
(a) read the integers n and m and print them,
(b) it must then call a function
void readlists(int A [], int B[], n, m)
to read the two arrays A and B of integers of lengths n and m, respectively,
(c) the main program must now call another function
void printlist(int A[], int B[], n,m)
to print the two lists,
(d) the main program must call a function
int search(int A[], int B[], int C[],n,m)
that returns the number of matches of B in A, and additionally, stores the indices of the matching positions in the array C. The program must print

the number of matches and the array C,
(e) and finally, the main program must call the same "search" function repeatedly and suitably, to find all occurances of each subsequence of B in A. For each such call as in part (d), it must print the number of matches of that subsequence of B and the array C of indices of the matches.

If $A =< 1, 2, 1, 2, 1, 2, 1 >$ and $B =< 1, 2, 1 >$ then for the subsequence $< 2, 1 >$ of B, the indices of the matches are 2, 4 and 6, and for the subsequence $< 1 >$ of B matches at positions 1, 3, 5 and 7.

If $A =< 1, 2, 5, 7, 2, 5, 6 >$ and $B =< 2, 5, 8 >$, then the indices of the matches for the subsequence $< 2, 5 >$ of B are 2 and 5.

The subsequences for $B =< 2, 5, 8 >$ are $< 2 >, < 2, 5 >, < 2, 5, 8 >, < 5 >, < 5, 8 >, < 8 >$.