CS F111 - Computer Programming - Lab 8

Date: June 8, 2021 - 5pm to 7pm.

- The lab is **EVALUATIVE**.
- Follow the instructions given below in the exact order.
- Any deviation from the instructions or incomplete steps will be dealt with according to the policy announced on quanta.
- Without the video recording link, the lab marks will be withheld.
- You may refer **ONLY** to the teaching materials shared by the course instructors.

LAB INSTRUCTIONS

(Please ensure that you follow the instructions in this order.)

1. Close all applications and browser-tabs except the ones needed during the lab, and join the Google meet assigned to your group..
2. Start recording your screen and webcam feed in the format mentioned in the "Software Prerequisites" document. Ensure that the date/time are visible.
3. Solve the questions given in the question paper.
4. When you are ready to submit your solution, upload your C program via the form given below:
   https://forms.gle/3tqfkwkkU3oVctmb8
   Please ensure that you use BITS email ID while filling the form.
5. Stop screen and webcam recording.
   Please click the "Stop recording" button only once. If you click it multiple times, you may lose the entire recording.
6. Upload the recording on your BITS Google Drive.
7. Edit the options on the uploaded recording to allow the "All can view" option and copy the link to be shared. If you're unsure about this, use the following link : https://tinyurl.com/GDriveuploadhelp
8. Submit the link of the recording via the form below by 5pm, 9th June:
   https://forms.gle/BcNEYizNoYZWAqzj6
   Please ensure that you use BITS email ID while filling the form.

Question 1 - (6 Marks):

Write a program `P1.c` that has the following features:

- Define a type alias `FType` for functions that have the parameters and return type similar to the functions `linSearch` and `binSearch`. **(1 Mark)**

- The program should have the following functions:

- `int linSearch(int A[],int x, int y, int k):`
  - The function searches for `k` in array `A[]`, between the positions `x` and `y`.
  - The function returns `1`, if k is found, else returns `0`. **(1 Mark)**

- `int binSearch(int A[],int x, int y, int k):`
  - The function implements *binary search* to search for `k` in the array `A[]`, between the positions `x` and `y`.
  - The function returns `1`, if k is found, else returns `0`.
  - You may copy-paste this from the slides. **(1 Mark)**

- `int isSort(int A[],int n):`
  - The function checks if the first n positions of array `A[]` are sorted.
  - The function returns 1, if `A[]` is sorted, else returns 0. **(1 Mark)**

- `int search(Ftype f,int A[],int n, int k):`
  - The function returns the position of `k` in `A[]`, if `k` is found in the first `n` positions of `A[]` using the function `f`, else return `-1`. **(1 Mark)**

- In the main function, do the following:
  - Read integers `n` and `k` from the user. Assume `n<100`.
  - Read `n` integers from the user into an array `A[]`.
  - Using `isSort` , check if `A[]` is sorted.
  - Using `search` find `k` in `A[]`and print the position of `k` in `A[]`.
  - Pass `binSearch` or `linSearch` to `search` depending on whether `A[]` is sorted. Use slides if you don't understand this point. **(1 Mark)**

`NOTE: The template of P1.c is available in Quanta.`

Question 2 - (4 Marks):

Write a program `P2.c` that has the following features:

- Define a type alias `Arr1D` as an integer array of size 2.

- Define a type alias `Arr2D` as an array of size 3, where each location of the array stores an object of type `Arr1D`.

- Write a function `set` that takes the address of integer as an input and stores integer `1` at the address. The function does not return anything.
- Write a function `reset` that takes the address of integer as an input and stores integer `-1` at the address. The function does not return anything.

- In the main function, do the following:
  - Declare a variable `A` of type `Arr2D.`
  - Initialize every position of `A` with `-1,` using the function `reset`.
  - Read two positive integers `i,j` from user. Assume that `i<3` and `j<2.`
  - Initialize the integer at the `i`th row and `j`th column in `A` with `1,` using the function `set`.
  - Print `A` as a 2D Array, with each row on a separate line.