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Br I

الجامعة اللبنانية
كلية الاعلام
الفرع الاول

الامتحانات النهائية الدورة الثانية - للفصل الاول
من العام الجامعي 2023-2022

المرحلة: الاجازة فصل الاول
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Question 1 Array

a) Write a C program that declares an array of reals T[8] and fills it with notes between 0 and 100 using loops. Each pair of grades in T represents a student's final exam grade and lab grade.

Ex: Let T =

50	70	80	85	40	45	25	60

NB: the above example is given for information only. In this example, the final grade of the first student is 50 and his TP is 70, the final grades and TP of the 2nd student are 80 and 85, and so on.

b) Write a C program that displays the grade of the final exam and the TP of the students who passed the course i.e. having the average of the final exam of the TP higher than 50 by using a loop. In the given example, the average of the 1st student is = (50 + 70)/2 = 60 > 50 so the program will display 50 and 70, and so on.

c) Write a C program that finds the maximum final exam Grade in T and the minimum lab mark in T using one or more loops. In the example above, the maximum final score is 80 and the minimum lab score is 45.

d) Write a C program that searches for the second highest final score of T. In the given example, this score is 50.

Question 2 Matrix

a) 3.1) Write a C++ program that declares an integer matrix M[5][5] and fills it with values entered on the keyboard by the user.
b) 3.2) Write a C++ program that calculates the frequency of even elements in the matrix M.
c) 3.3) Write a C++ program that displays the upper triangular part of the matrix M ie. the elements in the upper part of M.
d) 3.4) Write a C++ program that searches for the number of the line that contains the greatest number of 1s in the matrix M.

Example : soit M = $\begin{pmatrix} 4 & 1 & 1 & 4 & 7 \\ 8 & 2 & 3 & 5 & 9 \\ 1 & 1 & 1 & 6 & 0 \\ 5 & 1 & 0 & 3 & 8 \\ 9 & 1 & 1 & 2 & 7 \end{pmatrix}$

In the matrix, the frequency of even numbers in M is = 36%
The upper part of M is:
1 1 4 7
3 5 9
6 0
8
Line 2 contains 3 ones, it is the most 1 in the lines of M.

Question 3 functions

4.1) Define a function int occNb(int T[], int n, int val) which returns the number of times val is found in the array T passed as a parameter of the function.

4.2) Write a C program that declares and initializes an array of integers A= [1, 2, 5, 1, 2, 2, 7, 9], then calls the occNb() function several times using a loop in order to display the unique elements of A. In the given array A, the unique elements are 5, 7 and 9.

4.3) Give the result of the execution of the following program:

```
int enigma(int n){
 int  p = 1;
 int  A = 2;
 int  k = n;
  while (k>0) {
    if (k % 2 == 1)
        p = p*A;
   A = A*A;
   k = k /2;
   } // fin while
   return p;
}
int main() {
 cout <<enigma(3)<<endl;
 cout <<enigma(4);
  return 0;
}
```

Deduce what gives the function enignma(n) as a function of n?