Assignment #4

on C, Pascal, Fortran, PHP, Perl, Cobol, C++, and optional Ada and C#

Date Due: April 13, 2026

Total: 100 marks

Use the specific constructions and the characteristics of each programming language to write the following programs: the input is from standard input, and all output is standard output. Use the constructions from the slides/examples, avoiding built-in functions that are not necessary. You can program these functions yourself (mainly for C++/Php/Perl).

1. (10 marks each program, maximum 80) Write a program in C, also in C++, Pascal, Cobol, Fortran, Perl, PHP, Ada , and C# that interactively guesses if a number has function property in relation to a list, stored internaly, in at most k tries.

   The number k is read from standard input. After k is entered, the user must enter a number x and k values i_1, i_2, i_k, $1 \leq i_1, i_2, \ldots, i_k \leq n$.

   A number x has function property with respect to the list $[A_1, \ldots A_n]$ if the indexes satisfy this condition $1 \leq i_1 < i_2 < \ldots < i_k \leq n$ and $x = f(A_{i_1}, \ldots, A_{i_k})$. The function f is your choice. Each of you should have a different function f.

   If the number has function property, the programs ends(user wins), if not, the program displays the number of tries left and the user tries to guess the number again.

   In case the user types a number that is lower than the sum of all numbers in the list this should be displayed. After each try, the number of remaining tries should be displayed.

   If the numbers i_1, i_2, i_k, $1 \leq i_1, i_2, \ldots, i_k \leq n$ entered by the user do not have the property that $1 \leq i_1 < i_2 < \ldots < i_k \leq n$, the program decreses the number of tries by two and the user must guess again.

   The list of numbers should be hardcoded (inside the program).

   For example:

```
(game)
6
You have 6 tries to guess a number with function property.
60
1
2
3
4
5
6
```

```
The max function is lower.
You have 5 tries to guess a number with function property.
20
1
3
5
7
4
You have 3 tries to guess a number with function property.
10
1
4
6
You guessed right.
```

Do not copy any code from the internet. Create your own function f!

2. (10 marks each program maximum 80) Write a program in C, also in C++, Pascal, Cobol, Fortran, Perl, PHP, Ada , and C# that interactively mixes two lists (stored internally) into one list depending on an the value of an integer k that is read from standard input. The first k elements are obtained as follows:

   (a) The first element of the list is the maximum of the first element of the first list and the k-th element of the second list.

   (b) The second element of the list is the minimum of the second element of the first list and the $k-1$-th element of the second list.

   (c) the rest of the elements are obtained by alternatively applying the previous two rules.

   If k is greater than the minimum of the lengths of both lists the user must input the number again.

   The next elements are obtained by mixing the rest of the elements, one from the second list one from the first list, starting with $(k+1)$th elements. If one list is longer then the other one, the missing elements from the shorter list are ignored.

   For example:

```
(game)
Number k:4
Initial Lists: [1,4,5,7,9,10,-3,2,8,9][7,14,1,-7,-9,10,3,-2]
Result [1,1,14,7,9,-9,10,10,-3,3,2,-2,8,9]
```

```
(game)
Number k:12
The number is too big enter a lower number
11
The number is too big enter a lower number
3
Initial Lists: [1,4,5,7,9,10,-3,2,8,9][7,14,1,-7,-9,10,3,-2]
Result [1,4,7,7,-7,9,-9,10,10,-3,3,2,-2,8,9]
```

```
(game)
Number k:12
The number is too big enter a lower number 11
The number is too big enter a lower number 3
Initial Lists: [11,4,5,7,9][7,14,1,-7,-9,10,3,-2]
Result [11,4,7,7,-7,9,-9,10,3,-2]
```

Newlines or other extra whitespaces are optional – they are added just to allow us to read.

Advice to get the maximum marks: Write the code in one language, then "translate it" to the other ones. You may have the same algorithm in every language, but at the same time, you should take advantage of the characteristics/structure/data types/built-in types of that language. If you just have a blind translation without taking into consideration that it is a different language, your mark will be lower. For example:

1. You don't use a function call (like in java) to modify the third element of an array in C, you modify it directly.
2. You cannot have the same code for C and C++. Moreover, you need to have C++ characteristic constructions.
3. for C++ You are not allowed to use the standard input library to store lists of any kind(no multi element data structure from C++ STL). You should use C-like arrays.
4. Some programming languages allow classes and recursion, others don't. Adapt your algorithm accordingly.

Marking scheme: 10 marks (each), including program testing (the `run.txt` file)

Important: Please write your own code, don't share your code, don't use "foreign code".
If you plagiarize, the mark is automatically 0 for the **entire course**, regardless of any other marks.