ISTANBUL TECHNICAL UNIVERSITY
FACULTY OF COMPUTER AND INFORMATICS ENGINEERING
COMPUTER ENGINEERING DEPARTMENT

BLG102E - INTRODUCTION TO SCIENTIFIC AND ENGINEERING COMPUTATION
2020 -2021 Spring
FINAL EXAM

Date:	24 June 2021
Duration:	**40 minutes**
Instructors:	Assoc. Prof. Dr. Ali Çakmak, H. Turgut Uyar

1 (35 pts). Download the test file "q2.yaml" and the starter source code "q2.c", add your implementation into this source code, and **submit the modified source file "q2.c" to Ninova.**

Make sure to test your solution against the test file using Calico (the command is given below). Your solutions will be automatically graded with different test cases.

```
python -m calico.cli q2.yaml
```

The given starter code is for a C program that takes a non-empty phrase (without any spaces in it) from the user and encodes it so that blocks of repeated characters are represented as pairs of character and repeat counts. For example the substring **"bbbb"** will be represented as the pair `('b', 4)`. The whole string will be represented as an array of such encoded substring pairs. For example, the string **"abbbbccdd"** will be encoded as `[('a', 1), ('b', 4), ('c', 2), ('d', 2)]`. The structure for representing blocks and the `main` function are already provided in the starter code; you are asked to implement the "`encode`" function as described in the starter code.

A sample run is given below (the yellow highlighted parts are user inputs):

```
Phrase: abbbbccdd
a:1 b:4 c:2 d:2

Phrase: attempt
a:1 t:2 e:1 m:1 p:1 t:1
```

You are not allowed to include any other header files, nor to change anything in the starter code except for adding the body of the "`encode`" function.