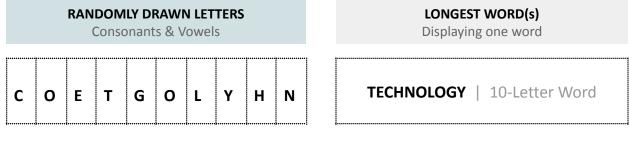# Project - Longest Word

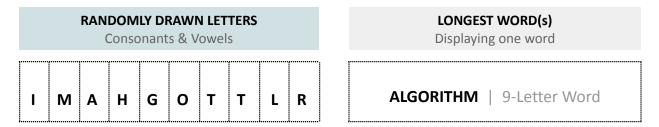In this game, two players compete to find the longest word using randomly drawn letters (consonants and vowels).

Game principle

- The two players take turns to choose the number of vowels they wish to have in the letter draw.
- 10 letters are then drawn randomly.
- The goal is then to find the longest word possible using the drawn letters.

Example 1

RANDOMLY DRAWN LETTERS Consonants & Vowels	LONGEST WORD(s) Displaying one word
C O E T G O L Y H N	**TECHNOLOGY**	10-Letter Word

 Example 2

RANDOMLY DRAWN LETTERS Consonants & Vowels	LONGEST WORD(s) Displaying one word
I M A H G O T T L R	**ALGORITHM**	9-Letter Word

Assigned work - Part 1

Starting from a randomly drawn string of 10 letters (called `drawn_letters`), we seek to find all possible combinations (strings) of 10, then of 9, 8, 7, 6, 5, 4, 3, and finally 2 letters that can be obtained using the letters in the string `drawn_letters`.

For example, with a string of 3 letters "ABC", we will obtain the following combinations of 3 and 2 letters:
- `ABC, ACB, BAC, BCA, CAB, CBA`
- `AB, BA, AC, CA, BC, CB`

Steps to follow

- A string is in minimal alphabetical order if its letters satisfy the relationship: `s[i] <= s[i+1]`

  For instance, the string "ABC" is in minimal alphabetical order.

- A string is in maximal alphabetical order if its letters satisfy the relationship: `s[i] >= s[i+1]`

  For example, "CBA" is in maximal alphabetical order.

- Consider the following procedure:
  1) Starting from a given string, find the largest terminal substring that is in maximal order. Let i be the index of the letter that is to the left of this substring.
  2) Find in the terminal substring located to the right of the ith letter, the closest to this ith letter among those which are superior to it. Let j be its index.
  3) Swap the ith letter and the jth letter.
  4) Rearrange the substring to the right of the ith letter so that it is in minimal order.

  You have to start with a string in minimal order.

  We stop when we obtain a string in maximal order.

Note: In the second part of the project, the aim is to integrate the search in a dictionary (planar tree) to find the longest word (or all the words of n letters).