ACRELEC

Technical Skills Evaluation - v1.6 (2022)

Name: _____Date: ____/_____/_____

Considerations

- You have **120 minutes** to complete the challenges;
- Write down your assumptions whenever necessary for our better understanding;
- Write the APIs in any of the following languages: C#, Python, JS/TS or C/C++;
- Return the challenges in TXT format file;

Algorithms

Expected API / function, illustration purpose only:

```
int foo(int z, int y) {
      int w = 0;
      // logic implementation
      return w;
}
```

1. Write an API, which receives an integer N and returns a Boolean Z; the API shall determine if the given integer N is odd or even.

   Considerations:

   a) it is **ONLY** allowed to use addition or subtraction operations;
   b) zero shall be considered as even;
   c) N is an integer, which can be negative or positive;

2. Write an API, which receives a string S and returns a Boolean Z; the API shall determine if the content of the given string S is **properly nested**.

   Considerations:

   a) it is NOT allowed to use regular expression;
   b) string S consists only of the following characters: "(", "{", "[", "]", "}" and/or ")";
   c) S has the form "(U)" or "[U]" or "{U}", where U is a properly nested string; For example, given S = "**{[()()]}**", the API should return true and for given S = "**([)()]**", the API should return false;
   d) empty string shall be considered as properly nested;

3. Write an API, which receives an integer N and returns an integer Y; the API shall calculate the maximal sequence of consecutive zeros that is surrounded by ones at both ends in the binary representation of N.

   Considerations:

   a) if N is 9 (1**00**1), it should return 2;
   b) if N is 328 (101**00**1000), it should return 2;
   c) if N is 20 (1**0**100), it should return 1;

d) if N is 30 (11110), it should return 0;

4. Write an API, which receives two integers X and Y and returns Z; the API shall return the bitwise AND product (Z) for all the numbers of the given range (X and Y).

   Considerations:

   a) X and Y are positive integers and X<=Y;
   b) for example, the bitwise AND **product** when X=5 and Y=7 is 4, because:
      5(101) **bitand** 6(110) **bitand** 7(111) = 4(100)

5. Write an API, which receives an array of integers A, an integer N and returns an array of integers Z; the API shall return an array Z with the rotated elements of the array A, based on the given integer (rotation) N;

   Considerations:

   a) N is an integer, which can be negative or positive;
   b) if N is positive, then the elements should be rotated to the right position;
   c) if N is negative, then the elements should be rotated to the left position;
   d) for example, given array A = [3, 8, 9, 7, 6] and N = -1, the API should return [8, 9, 7, 6, 3];