



---

ACADEMY OF TECHNOLOGY  
Lab Assignment (Assignment 13)

Paper name: Data Structure and Algorithm  
Code: PCC-CS391  
Discipline: CSE

Semester: 3<sup>rd</sup>  
Time: 2 Hours

Date: November 9, 2020

---

1. Given a string, write a recursive function to count total number of consonants in it.

---

*Algorithm 1: TOTAL-CONSONANTS (str, n)*

---

```
// Count total number of consonants from 0 to n - 1
1 if n = 1 then
2   | return IS-CONSONANT(str[0]);
3 end
4 return TOTAL-CONSONANTS(str, n - 1) + IS-CONSONANT(str[n - 1]);
```

---

2. Given a string, write a recursive function to find its first upper-case letter.

---

*Algorithm 2: FIRST-UPPER-CASE (str, n)*

---

```
// Let str contains the characters from 0 to n - 1
1 if str[i] = null then return 0;
2 if IS-UPPER(str[i]) then return str[i];
3 return FIRST-UPPER-CASE(str, i + 1);
```

---

3. Given two strings, write a program to copy one string to other using recursion.

---

*Algorithm 3: STRING-COPY (str1, str2, index)*

---

```
// Let source is str1 and destination is str2, index is
  initially 0
// copy each character from str1 to str2
1 str2[index] := str1[index];
  // if source string reaches to end then stop
2 if str1[index] = null then return;
  // Copy the next character
3 STRING-COPY(str1, str2, index + 1);
```

---

- 
4. Given a string, write a recursive function that returns **1** if the given string is palindrome, else returns **0**.

---

*Algorithm 4: IS-PALINDROME ( $str$ ,  $left$ ,  $right$ )*

---

```
// Let  $str$  is a string.  $left$  and  $right$  are two pointers
1 if  $left = right$  then return 1; // If there is only one character
  // If left and right characters do not match
2 if  $str[left] \neq str[right]$  then return 0;
  // If middle substring contains more than 2 characters then check if
  // middle substring is also palindrome or not.
3 if  $left < right + 1$  then return IS-PALINDROME( $str, left + 1, right - 1$ );
4 return 1;
```

---

5. Given a number, write a recursive function which checks if the given number is palindrome or not.
-