

Name: _____ Tutorial Section: 02 03 04 05 06 09
Important Note: Please write your student number on the back of this page.

APS 105

QUIZ # 4

Computer Fundamentals

Fall 2010

SECTION: 2-3PM

Tuesday, November 23

All quizzes, tests, and exams in this course are **closed book** with **no calculators**.

[10 Marks] Write a function named `toLowerCase` that uses a recursive algorithm to replace all upper case characters in a given string `s` with their corresponding lower case characters. Characters that are not upper case characters are left unchanged. In the following example, `toronto canada` will be printed.

```
char s[20] = "Toronto Canada";
toLowerCase(s);
printf("%s", s);
```

You **must** write a solution that uses recursion. You may find it helpful to use a “helper” function, though the use of such a function is not required. A non-recursive solution will earn no marks.

Solution 1:

```
void toLowerCaseHelper (char *s, int index)
{
    if (*(s + index) == '\0')
        return;

    if (*(s + index) >= 'A' && *(s + index) <= 'Z')
        *(s + index) += 'a' - 'A';

    toLowerCaseHelper(s, index + 1);
}

void toLowerCase (char *s)
{
    toLowerCaseHelper(s, 0);
}
```

Solution 2:

```
void toLowerCase (char s[])
{
    if (s[0] != '\0')
```

```
{  
    if (s[0] >= 'A' && s[0] <= 'Z')  
        s[0] = s[0] + 'a' - 'A';  
    toLowerCase(&s[1]);  
}  
}
```