BIRLA INSTITUTE OF TECHNOLOGY & SCIENCE PILANI, K. K. BIRLA GOA CAMPUS, I SEMESTER 2020-2021

Operating Systems (CS F372)

Component: Online #2 Weightage: 3% [9 Marks]

Date: 30/09/2020, Time: 11:59 P.M

Problem: System Call to Convert String to Floating point.

Note: What to submit?

<Your IDNo>_OSOnline2.tar.gz file containing the following:

- User space driver.c, stringToFloat.c, stringToFloat.h and makefile.
- Kernel space all the files you created new and you modified [Please don't submit the image file].
- A document containing screenshot of each step you executed [with its result]. The screenshot of your program executing various test cases also should be included as part of the document.

EndNote:

Problem Statement:

Write a new system call in Kernel space which takes a string representing a floating point number and the string length as arguments and returns its corresponding floating point value.

A user program of the following nature should execute the system call from your wrapper to give appropriate result to the user.

```
//Sample driver.c code
    #include <stdio.h>
    #include <unistd.h>
    #include <strings.h>
    #include <string.h>
    #include <stdlib.h>
    #include "stringToFloat.h"
    int main(int argc, char * argv[])
    {
       char str[50];
       printf("Enter a number: ");
       scanf(" %s", str);
       int len = strlen(str);
```

```
    float res = getFloat(str, len);
    printf("Float is : %.12f\n", res);
    return 0;
}
```

The wrapper function [implement it as ADT with stringToFloat.c and stringToFloat.h] should make sure the string is valid [containing [zero or one] minus sign [if present, only at the beginning], [zero or one] period [decimal point] and 0 to 9]. If the string is valid, then call system call from the wrapper function.

The system call returns the corresponding floating point number [in integer representation] if the number is within the range [-100000.0 to -0.01] and [0.01 to 100000.0]. It returns a specific number for each of the following scenarios. [You are allowed to decide on what the system call will return in these scenarios – the return value should be distinct.]

[A] Number greater than 100000.0

[B] Number between -0.01 and 0.01

[C] Number less than -100000.0

The wrapper returns a floating point number with following value to the user:

100001.0: The string is Invalid

100002.0: The resultant floating point number is greater than 100000.0

100003.0: The resultant floating point number is between -0.01 and 0.01

100004.0: The resultant floating point number is less than -100000.0

Converted floating point number as float: If the floating point number is within the specified range.

PS: You are not allowed to use floating point operations in kernel space. However, you have to pass the string as a parameter for the system call without modifying it in the wrapper. Additional steps are required in the kernel space to get the string from user space to kernel space. You are expected to learn about these steps on your own and implement them.