Compiler Design Lab

ASSIGNMENT - 1

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Section: A-1
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The following codes have been implemented and tested with GNU Flex 2.6.4 and GCC 9.3.0 on Linux Operating System (Distro Choice: Ubuntu 20.04 LTS).

Compiling and Executing a Lex File

I have written a shell script named **run.sh** that compiles a lex file to generate **lex.yy.c** file, then compiles the C program file to generate binary executable having an extension of .out (**a.out)** and finally executes the program and deletes both **lex.yy.c** and **a.out.**

The shellscript contains the following :

```
#!/usr/bin/bash
lex $1
gcc lex.yy.c
./a.out
rm lex.yy.c
rm a.out
```

We have to set executable permission for **run.sh.** Then just type **`./run.sh [lex_filename].l`** on the terminal, followed by the input we are testing on and finally press **Enter** and then **ctrl+d** to print the output on the terminal.

e.g., **`./run.sh a1q1.l`**

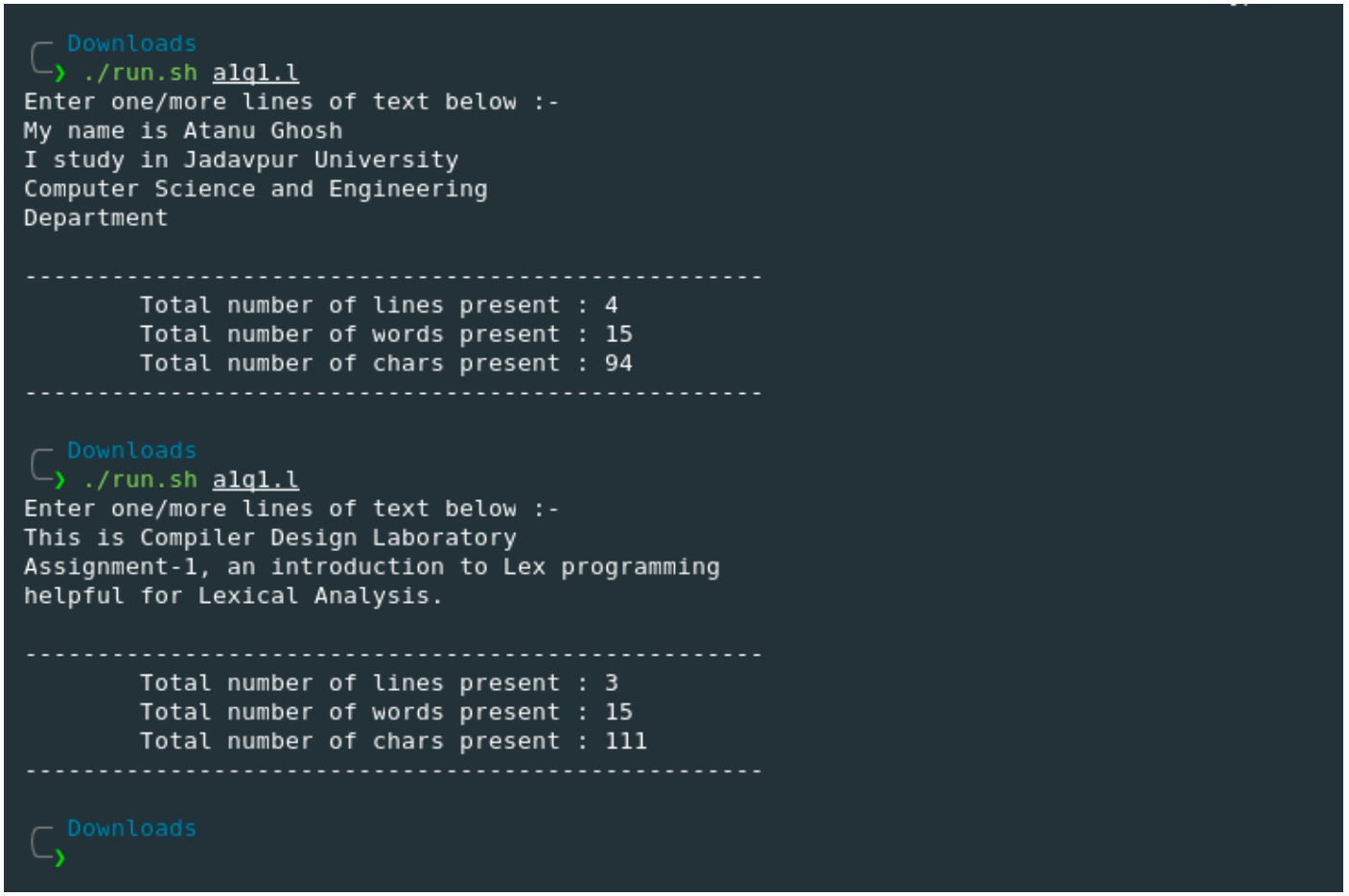
Question-1

Write a lex file to count the number of lines, words and characters in the input.

Code Snippet

```
%{
      int cnt_lines=0, cnt_words=0, cnt_chars=0;
%}

%%
\n {
    cnt_lines++;
}

[^ \t\n]+ {
    cnt_words++;
    cnt_chars += yyleng;
}

. {
    cnt_chars++;
}
%%


int yywrap(void) {
    return 1;
}

int main() {

    printf("Enter one/more lines of text below :-\n");

    yylex();

    printf("\n-------------------------------------------------\n\t");
    printf("Total number of lines present : %d\n\t", cnt_lines);
    printf("Total number of words present : %d\n\t", cnt_words);
    printf("Total number of chars present : %d\n", cnt_chars);
    printf("-------------------------------------------------\n");

    return 0;
}
```

I/O - Screenshot



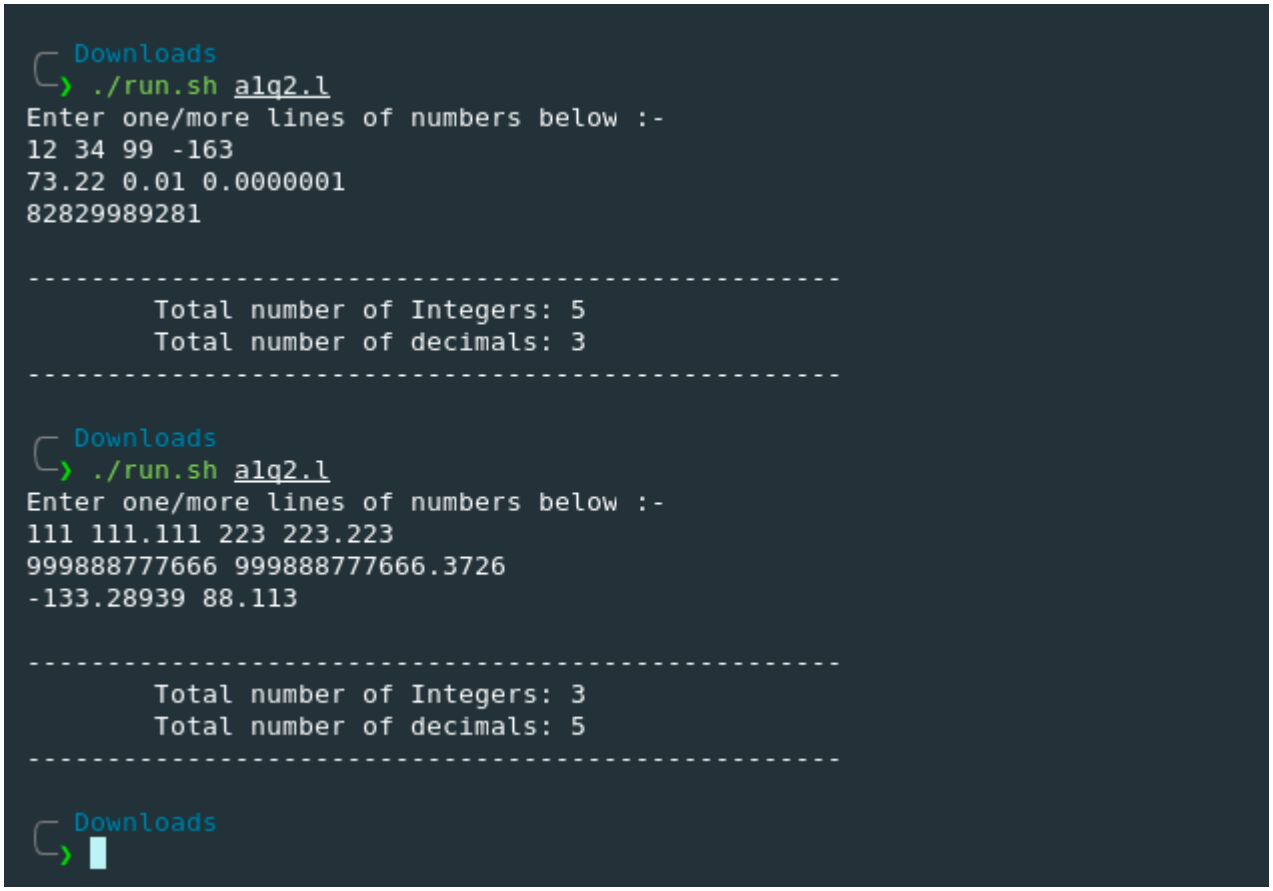
Question-2

Write a lex file to count the number of numbers appearing in the input. Count the number of integers (without a decimal) separately from the number of floating point numbers (with a decimal, and at least one digit on either side of the decimal).

Code Snippet

```
%{
    int cnt_integers = 0, cnt_decimals = 0;
%}


%%

[0-9]+\.[0-9]+[ \t\n] {
    cnt_decimals++;
}

[0-9]+[ \t\n]+ {
    cnt_integers++;
}

. ;


%%


int yywrap(void){
    return 1;
}

int main() {

    printf("Enter one/more lines of numbers below :-\n");

    yylex();

    printf("\n-------------------------------------------------\n\t");
    printf("Total number of Integers: %d\n\t", cnt_integers);
    printf("Total number of decimals: %d\n", cnt_decimals);
    printf("-------------------------------------------------\n");

    return 0;
}
```

I/O - Screenshot



Question-3

Write a lex file to count the number of words in an input text that start with a vowel.

Code Snippet

```
%{
    int cnt_vowels = 0;
%}


%%

[aeiouAEIOU][a-zA-z0-9]* {
    cnt_vowels++;
}

[a-zA-Z0-9]* ;

. ;


%%


int yywrap(void){
    return 1;
}


int main() {

    printf("Enter one/more lines of numbers below :-\n");

    yylex();

    printf("\n-----------------------------------------------------\n");
    printf(" Total number of words starting with a vowel: %d\n", cnt_vowels);
    printf("-----------------------------------------------------\n");

    return 0;
}
```

I/O - Screenshot

```
Downloads
❯ ./run.sh a1q3.l
Enter one/more lines of numbers below :-
I am a student of Engg

I study in JU

Things I love are coding, football, movies and music


-----------------------------------------------------
 Total number of words starting with a vowel : 10
-----------------------------------------------------
```

```
Downloads                                                                                                    53s
❯ ./run.sh a1q3.l
Enter one/more lines of numbers below :-
Implement a key-value store using socket programming. The server implements the key-value store and clients make use of it. The server must accept clients' connections
 and serve their requests for 'get' and 'put' key value pairs. All key-value pairs should be stored by the server only in memory. Keys and values are strings. The clie
nt accepts a variable no of command line arguments where the first argument is the server hostname followed by port no. It should be followed by any sequence of "get "
 and/or "put ". ./client 192.168.124.5 5555 put city Kolkata put country India get country get city get Institute India Kolkata The server should be running on a desig
nated port no. The server should support multiple clients and maintain their key-value stores separately. Comment on the port nos used by the server and the clients. I
mplement authorization so that only a few clients having the role "manager" can access other's keyvalue stores. A user is assigned the "guest" role by default. The ser
ver can upgrade a "guest" user to a "manager" user.


-----------------------------------------------------
 Total number of words starting with a vowel : 51
-----------------------------------------------------

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❯
```