

# COMPILER DESIGN

## ASSIGNMENT 1

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### Problem 1

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

#### LEX Code

*/\*lex code to count the number of lines, tabs and spaces used in the input\*/*

```
%{
// #include<stdio.h>
int nlines, nwords, nchars;
}%

%%
\n {
    nchars++; nlines++;
}

[^ \n\t]+ {nwords++, nchars=nchars+yyldeng;}
. {nchars++;}
%%
int yywrap(void)
{
    return 1;
}
int main(int argc, char*argv[])
{
    yyin=fopen(argv[1],"r");
    yylex();
    printf("Lines = %d\nChars=%d\nWords=%d",nlines,nchars,nwords);
    return 0;
}
```

## Output

```
C:\WINDOWS\system32\cmd.exe

C:\cygwin64\bin>cat input.txt
hello
world
how are you doing
ok bye

C:\cygwin64\bin>.\flex a1q1.1

C:\cygwin64\bin>gcc lex.yy.c

C:\cygwin64\bin>a.exe input.txt
Lines = 4
Chars=37
Words=8
C:\cygwin64\bin>
```

## Problem 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).

## LEX Code

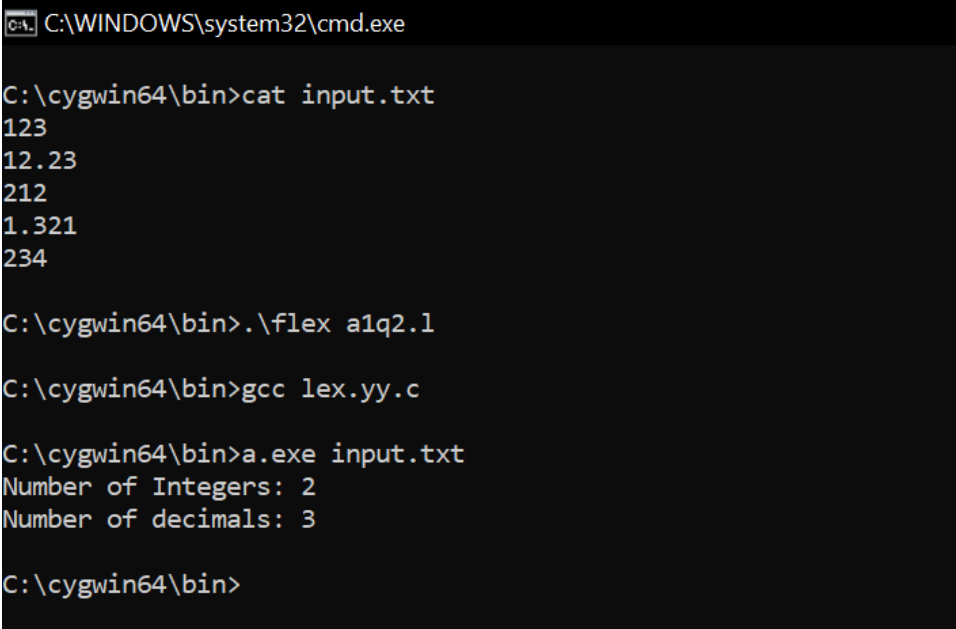
```
%{
    #include<stdio.h>
    int total_numbers = 0, total_decimals = 0;
}%
```

```
%%
[0-9]+\.[0-9]+[ \t\n]    {total_numbers++;}
[0-9]+[ \t\n]+          {total_decimals++;}
.                        ;
%%
```

```
int yywrap(void){}
```

```
int main(int argc, char* argv[])
{
    yyin=fopen(argv[1],"r");
    yylex();
    printf("Number of Integers: %d\n", total_numbers);
    printf("Number of decimals: %d\n", total_decimals);
    return 0;
}
```

## Output



```
C:\WINDOWS\system32\cmd.exe

C:\cygwin64\bin>cat input.txt
123
12.23
212
1.321
234

C:\cygwin64\bin>.\flex a1q2.1

C:\cygwin64\bin>gcc lex.yy.c

C:\cygwin64\bin>a.exe input.txt
Number of Integers: 2
Number of decimals: 3

C:\cygwin64\bin>
```

## Problem 3

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

## LEX Code

```
%{
    #include<stdio.h>
    int wordcnt = 0;
}%

%%

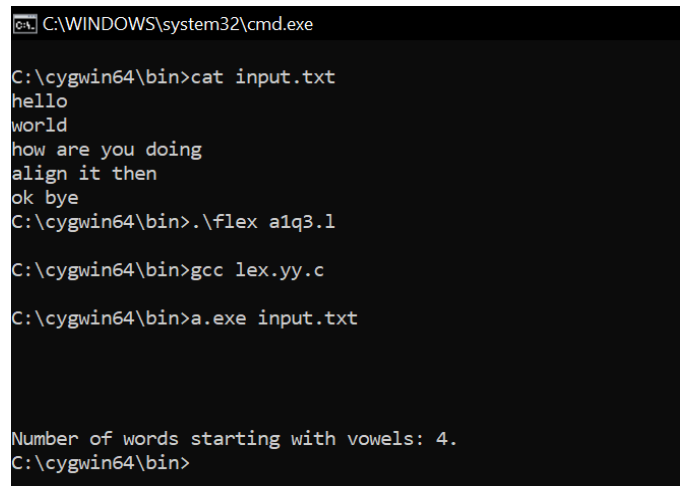
[aeiouAEIOU][a-zA-Z0-9]+ {wordcnt++;}
[a-zA-Z0-9]*          ;
.                      ;

%%

int yywrap(void)
{
    return 1;
}

int main(int argc, char*argv[])
{
    yyin=fopen(argv[1],"r");
    yylex();
    printf("Number of words starting with vowels: %d.", wordcnt);
    return 0;
}
```

## Output



```
C:\WINDOWS\system32\cmd.exe

C:\cygwin64\bin>cat input.txt
hello
world
how are you doing
align it then
ok bye
C:\cygwin64\bin>.\flex a1q3.1

C:\cygwin64\bin>gcc lex.yy.c

C:\cygwin64\bin>a.exe input.txt

Number of words starting with vowels: 4.
C:\cygwin64\bin>
```