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CSE D 44
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Q1. Count the number of vowels and consonants in the given input.

Code :

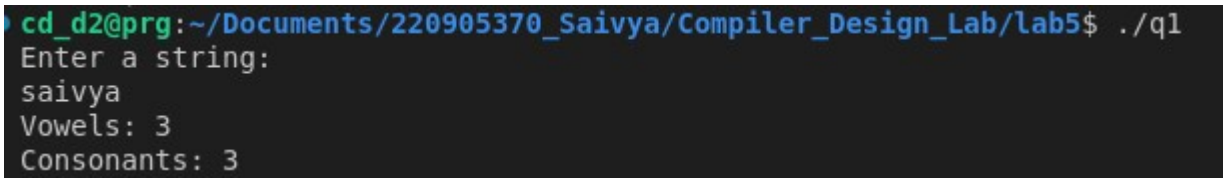
```
%{
#include <stdio.h>
#include <ctype.h>

int vowels = 0;
int consonants = 0;
int yywrap() { return 1; }
%}

%%
[aAeEiIoOuU]      { vowels++; }
[bcdfghjklnmpqstvwxyzBCDFGJKLNMPQSTVWXYZ] { consonants++; }
[ \t\n]
%%

int main() {
    printf("Enter a string:\n");
    yylex();
    printf("vowels: %d\n", vowels);
    printf("consonants: %d\n", consonants);
    return 0;
}
```

Output:



Q2. Count the number of words, characters, blanks and lines in a given text.

Code:

```
%{
#include <stdio.h>
#include <ctype.h>

int w = 0;
int c = 0;
int blank = 0;
int line = 0;
int yywrap() { return 1; }
%}

%%
\n              { line++; }
[ \t]           { blank++; }
[a-zA-Z0-9]+    { w++; c += yyleng; }
.               { c++; }
%%

int main() {
    yylex();
    printf("words: %d\n", w);
    printf("characters: %d\n", c);
    printf("blanks: %d\n", blank);
    printf("lines: %d\n", line);
    return 0;
}
```

Output:

```
cd_d2@prg:~/Documents/220905370_Saivya/Compiler_Design_Lab/lab5$ ./q2
my name is saivya
singh
Words: 5
Characters: 19
Blanks: 3
Lines: 2
```

Q3. Find the number of positive integer, negative integer, positive floating positive number and negative floating point number

Code:

```
%{
#include <stdio.h>

int pos_int = 0;
int neg_int = 0;
int pos_fl = 0;
int neg_fl = 0;
int yywrap() { return 1; }
%}

%%
[0-9]+          { pos_int++; }
-[0-9]+         { neg_int++; }
[0-9]+\.[0-9]+    { pos_fl++; }
-[0-9]+\.[0-9]+   { neg_fl++; }
%%

int main() {
   yylex();
   printf("positive integers : %d\n", pos_int);
   printf("negative integers : %d\n", neg_int);
   printf("positive floating point numbers : %d\n", pos_fl);
   printf("negative floating point numbers : %d\n", neg_fl);
   return 0;
}
```

Output:

```
cd_d2@prg:~/Documents/220905370_Saivya/Compiler_Design_Lab/lab5$ ./q3
3

-5

10

3.1341

positive integers : 2
negative integers : 1
positive floating point numbers : 1
negative floating point numbers : 0
```

Q4. Given a input C file, replace all scanf with READ and printf with WRITE statements also find the number of scanf and printf in the file.

Code:

```
%{
#include <stdio.h>

int scanf_count = 0;
int printf_count = 0;

int yywrap() {
    return 1;
}
%}

%%
scanf           { printf("READ "); scanf_count++; }
printf          { printf("WRITE "); printf_count++; }
.               { printf("%s", yytext); }
%%

int main() {

    FILE *input = fopen("input.c", "r");

    yyin = input;


    yylex();

    fclose(input);


    printf("\nnumber of scanf: %d\n", scanf_count);
    printf("number of printf: %d\n", printf_count);

    return 0;
}
```

Input:

```
#include <stdio.h>

int main() {
    int a;
    scanf("%d", &a);
    printf("Value: %d\n", a);
    return 0;
}
```

Output:

```
cd_d2@prg:~/Documents/220905370_Saivya/Compiler_Design_Lab/lab5$ ./q4
#include <stdio.h>

int main() {
    int a;
    READ ("%d", &a);
    WRITE ("Value: %d\n", a);
    return 0;
}

number of scanf: 1
number of printf: 1
```

Q5. That changes a number from decimal to hexadecimal notation.

Code:

```
%{
#include <stdio.h>
#include <stdlib.h>

int yywrap() { return 1; }
%}

%%
[0-9]+          {
                  int num = atoi(yytext);
                  printf("Hexadecimal: 0x%x\n",num);
                }

.               { }

%%

int main() {
   printf("enter a number: ");
   yylex();
   return 0;
}
```

Output:

```
cd_d2@prg:~/Documents/220905370_Saivya/Compiler_Design_Lab/lab5$ ./q5
enter a number: 93
Hexadecimal: 0x5d
```

Q6. Convert uppercase characters to lowercase characters of C file excluding the characters present in the comment.

Code:

```
%{
#include <stdio.h>
#include <ctype.h>

int yywrap() {
    return 1;
}

%}

%%
"//".*           { }
"/*"[^*]*"*/"     { }
[A-Z]             { printf("%c", tolower(yytext[0])); }
.                 { printf("%s", yytext); }
%%

int main() {

    FILE *input = fopen("input.c", "r");

    yyin = input;

    yylex();

    fclose(input);

    return 0;
}
```

Input:

```
#include <stdio.h>

int main() {
    int a;
    scanf("%d", &a);
    // THis is a comment
    /*This is also a commment*/
    PRINTF("Value: %d\n", a);
    return 0;
}
```

Output:

```
cd_d2@prg:~/Documents/220905370_Saivya/Compiler_Design_Lab/lab5$ ./q6
#include <stdio.h>

int main() {
    int a;
    scanf("%d", &a);
    // THis is a comment
    /*This is also a commment*/
    printf("value: %d\n", a);
    return 0;
}
```