COMPILER CONSTRUCTION

GROUP ASSIGNMENT 1

GROUP MEMBERS

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1) **Write a LEX specification files to:**

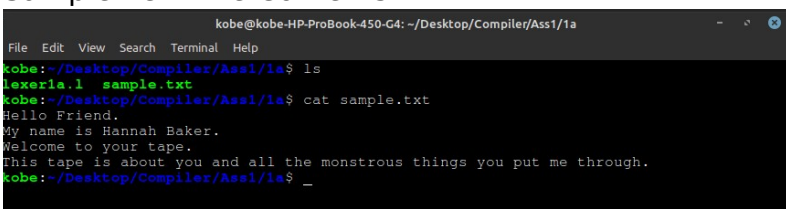
a) **Count the number of words in a file and their total size**

Solution

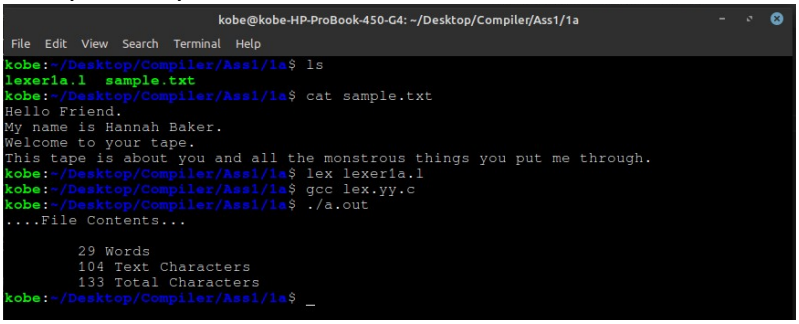
```
%{
        #include <stdio.h>
        int words=0, c_letters=0, total=0;
%}

%%
\n {words++;}
[\t ' '] words++;
[a-zA-Z] c_letters++;
%%

int main(){
        yyin=fopen("sample.txt","r");
        yylex();
        total = c_letters+words;
        printf("File Contents...\n");
        printf("\n\t%d Words",words);
        printf("\n\t%d Text Characters",c_letters);
        printf("\n\t%d Total Characters\n",total);
        return 0;
}
int yywrap(){
        return 1;
}
```

Result

Sample Text File Contents:



Sample Output



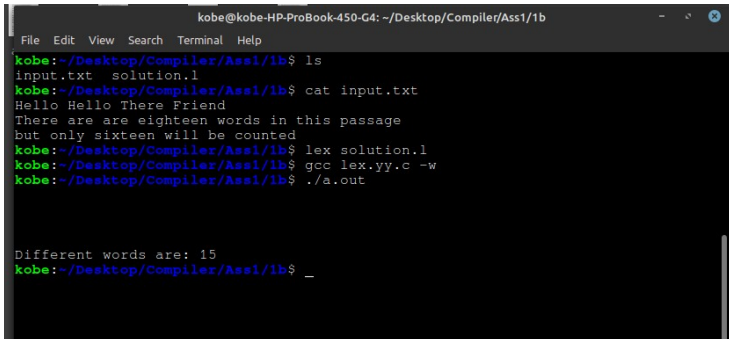
b) **Counts the number of different words in an input**

Solution

```
%{
int words = 0; // will be counter for our different words

char *cache = NULL; // the unique words will be put in the 'cache' variable
%}

%%
[a-zA-Z0-9]+{
        int ret_code = 0; //retrival code: code to check if input matches
regular expression
        char *target = NULL;
        char *found = NULL;
        // add a 'space' before and after the word for words matching and
word boundaries.
        ret_code = asprintf(&target, " %s ", yytext);
        if (ret_code < 0) {//returns No<0 if input does not match reg exp
            exit(1);
        }

        // check for NULL in cache var
        if (NULL != cache) {
            found = strstr(cache, target); //checks for first occurence of a word
        }
        // if the word has NOT been found
        if (NULL == found) {
            words++;
            // store this new different word into the cache
            ret_code = asprintf(&cache, "%s%s", cache, target);
            if (ret_code < 0) {
                exit(1);
            }

        }
    }
.       ; //ignore other words not defined above
%%

int main(int argc, char **argv) {
    yyin = fopen("input.txt", "r"); //open and read input file
    yylex(); //opening and reading input stream
    printf("\nDifferent words are: %d\n", words);
    return 0;
```

```
}
int yywrap() { return(1); } //shows end of input
```

Result



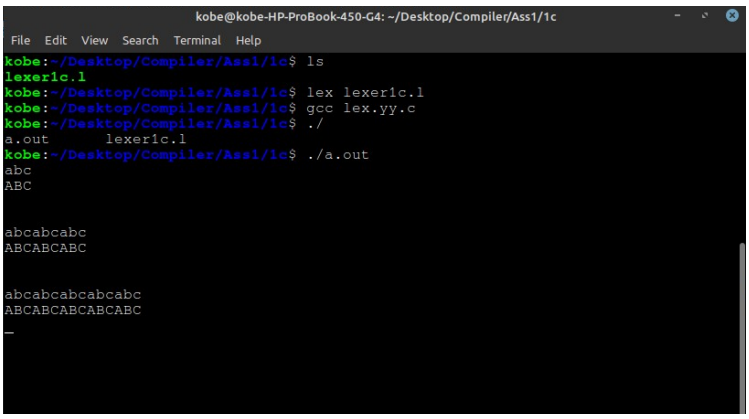
c) **Accepts the English language words (without bothering for the meaning) and replaces each occurrence of the string "abc" in it to "ABC".**

Solution

```
%{
#include<stdio.h>
#include<string.h>
int i;
%}

%%

[a-zA-Z]*       {
                        for(i=0;i<=yyleng;i++)
                        {

        if((yytext[i]=='a')&&(yytext[i+1]=='b')&&(yytext[i+2]=='c'))
                                {
                                        yytext[i]='A';
                                        yytext[i+1]='B';
                                        yytext[i+2]='C';
                                }
                        }
                        printf("%s",yytext);
                }

.*              {ECHO;}
\n              {printf("%s",yytext);}

%%
```

```
int main()
{
        yylex();
        return 0;
}

int yywrap()
{
        return 1;
}
```

Result



2) The following is a listing of a set of verbs:

is am are were *do does did will* *has have had go*

was be being been *would should can could*

Write a simple LEX specification to recognize these verbs

Solution

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

%%

[\t ' ']+                /* ignore whitespace */ ;

is |
am |
are |
were |
was |
```

```
be |
being |
been |
do |
does |
did  |
will |
would |
should |
can  |
could |
has  |
have |
had |
go        { printf("%s: is a verb\n", yytext); }
[a-zA-Z]+ { printf("%s: is not a verb\n", yytext); }

.|\n      { ECHO; /* normal default anyway */ }
%%

int main()
{
     yylex() ;
     return 0;
}

int yywrap(){
    return 1;
}
```

Result

```
kobe:~/Desktop/Compiler/Ass1/2$ ls
lexer2a.l
kobe:~/Desktop/Compiler/Ass1/2$ lex lexer2a.l
kobe:~/Desktop/Compiler/Ass1/2$ gcc lex.yy.c
kobe:~/Desktop/Compiler/Ass1/2$ ls
a.out  lexer2a.l  lex.yy.c
kobe:~/Desktop/Compiler/Ass1/2$ ./a.out
happy
happy: is not a verb

have
have: is a verb

I should be reading but I have to go to the beach.
I: is not a verb
should: is a verb
be: is a verb
reading: is not a verb
but: is not a verb
I: is not a verb
have: is a verb
to: is not a verb
go: is a verb
to: is not a verb
the: is not a verb
beach: is not a verb
.I: is not a verb
```