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Week 2

1. WAP that takes a file as input and replaces blank spaces and tabs by single space and writes the output to a file.

Code:

```c
//WAP that takes a file as input and replaces blank spaces and tabs by
single space and writes the output to a file.
#include<stdio.h>
#include<stdlib.h>
int main(){
    FILE *fin, *fout;
    int c, instring = 0;
    fin = fopen("sample.c", "r");
    if(fin == NULL){
        printf("Cannot open file\n");
        exit(1);
    }
    fout = fopen("ex1out.c", "w");
    while((c = getc(fin)) != EOF){
        if(c == '"'){
            instring = !instring;
            putc(c, fout);
            continue;
        }
        if(instring){
            putc(c, fout);
            continue;
        }
        if(c == ' ' || c == '\t'){
            putc(' ', fout);
            while((c = getc(fin)) == ' ' || c == '\t');
            if(c != EOF){
                if(c == '"'){
                    instring = !instring;
                    putc(c, fout);
                } else {
                    putc(c, fout);
                }
            }
        }
        else{
            putc(c, fout);
        }
    }
```

```
    fclose(fin);
    fclose(fout);
    return 0;
}
```

Input/Output:

```
sapthamiupadhya@Sapthamis-MacBook-Air Lab2 % cc ex1.c -o spaces
sapthamiupadhya@Sapthamis-MacBook-Air Lab2 % ./spaces
sapthamiupadhya@Sapthamis-MacBook-Air Lab2 % cat sample.c
//This is a        single line comment
/* *****This is a
******Multiline Comment
**** */
/*
#include<stdio.h>
*/
//#include<stdio.h>
#include <stdio.h>
void main()
{
    FILE *fopen(), *fp;
    int c ;
    fp = fopen(".         prog.c", "r"); //Comment
    c = getc( fp ) ;
    while ( c != EOF )
    {
        putchar( c );
        c = getc ( fp );
    } /*multiline
    comment */
    fclose( fp );
}%
sapthamiupadhya@Sapthamis-MacBook-Air Lab2 % cat ex1out.c
//This is a single line comment
/* *****This is a
******Multiline Comment
**** */
/*
#include<stdio.h>
*/
//#include<stdio.h>
#include <stdio.h>
void main()
{
 FILE *fopen(), *fp;
 int c ;
 fp = fopen(".         prog.c", "r"); //Comment
 c = getc( fp ) ;
 while ( c != EOF )
 {
 putchar( c );
 c = getc ( fp );
 } /*multiline
 comment */
 fclose( fp );
}%
```

2. WAP to discard preprocessor directives from the given input C file.

Code:

```c
//WAP to discard preprocessor directives from the given input C file.
#include<stdio.h>
#include<stdlib.h>
int main(){
    int c, next, incomm = 0, instart = 1;
    FILE* fin = fopen("sample.c", "r");
    if(fin == NULL){
        printf("Cannot open file\n");
        exit(1);
    }
    FILE* fout = fopen("ex2out.c", "w");
    c = getc(fin);
    while(c != EOF){
        next = getc(fin);
        //comments
        if(!incomm && c == '/' && next == '*'){
            //only handle block comms coz single line comms are not
newline anyways
            incomm = 1;
            putc(c, fout);
            putc(next, fout);
            c = getc(fin);
            continue;
        }
        if(incomm){
            putc(c, fout);
            if(c == '*' && next == '/'){
                incomm = 0;
                putc(next, fout);
                c = getc(fin);
                continue;
            }
            c = next;
            continue;
        }
        //string
        if(c == '"'){
            putc(c, fout);
            c = next;
            while(c != '"' && c != EOF){
                putc(c, fout);
                c = getc(fin);
            }
            if(c == '"') putc(c, fout);
            instart = 0;
            c = getc(fin);
            continue;
        }
        if(instart && c == '#'){
```

```
            while(c != '\n' && c != EOF)
                c = getc(fin);
            instart = 1; //new line after skipping directives
            continue;
        }
        putc(c, fout);
        if(c == '\n')
            instart = 1;
        else if(c != ' ' && c != '\t') instart = 0; //treat leading spaces
as newline itself
        c = next;
    }
    fclose(fin);
    fclose(fout);
    return 0;
}
```

Input/Output:

```
sapthamiupadhya@Sapthamis-MacBook-Air Lab2 % cc ex2.c -o directives
sapthamiupadhya@Sapthamis-MacBook-Air Lab2 % ./directives
sapthamiupadhya@Sapthamis-MacBook-Air Lab2 % cat sample.c
//This is a        single line comment
/* *****This is a
******Multiline Comment
**** */
/*
#include<stdio.h>
*/
//#include<stdio.h>
#include <stdio.h>
void main()
{
    FILE *fopen(), *fp;
    int c ;
    fp = fopen(".         prog.c", "r"); //Comment
    c = getc( fp ) ;
    while ( c != EOF )
    {
        putchar( c );
        c = getc ( fp );
    } /*multiline
    comment */
    fclose( fp );
}%
sapthamiupadhya@Sapthamis-MacBook-Air Lab2 % cat ex2out.c
//This is a        single line comment
/* *****This is a
******Multiline Comment
**** */
/*
#include<stdio.h>
*/
//#include<stdio.h>

void main()
{
    FILE *fopen(), *fp;
    int c ;
    fp = fopen(".         prog.c", "r"); //Comment
    c = getc( fp ) ;
    while ( c != EOF )
    {
        putchar( c );
        c = getc ( fp );
    } /*multiline
    comment */
    fclose( fp );
}%
```

3. WAP that takes C program as input, recognizes all the keywords and prints them in upper case.

Code:

```c
//WAP that takes C program as input, recognizes all the keywords and
prints them in upper case.
#include<stdio.h>
#include<stdlib.h>
#include<string.h>
#include<ctype.h>
```

```c
int main(){
    int c, k = 0;
    int incomm = 0, instring = 0;
    char word[100];
    char dict[][20] = {
        "break", "case", "char", "const", "continue",
        "default", "do", "double", "else", "enum",
        "float", "for", "if", "int", "long",
        "return", "sizeof", "switch", "void", "while"};

    FILE* fin = fopen("sample.c", "r");
    if(fin == NULL){
        printf("Cannot open file\n");
        exit(1);
    }
    FILE* fout = fopen("ex3out.c", "w");

    while((c=getc(fin)) != EOF){
        //strings
        if(!incomm && c == '"'){
            instring = !instring;
            putc(c, fout);
            continue;
        }
        if(instring){
            putc(c, fout);
            continue;
        }
        //comments
        if(!incomm && c =='/'){
            int next = getc(fin);
            if(next == '*'){
                incomm = 1;
                putc(c, fout);
                putc(next, fout);
                continue;
            }
            else if(next == '/'){
                putc(c, fout);
                putc(next, fout);
                while((c=getc(fin)) != '\n' && c!= EOF)
                    putc(c, fout);
                if(c == '\n') putc('\n', fout);
                continue;
            }
            else{
                putc(c, fout);
                c = next;
            }
        }
        if(incomm){
            putc(c, fout);
            if(c == '*'){
                int next = getc(fin);
```

```
                if(next =='/'){
                    incomm = 0;
                    putc(next, fout);
                }
                else{
                    c = next;
                    if(c != EOF) continue;
                }
            }
            continue;
        }
        if(isalpha(c)){
            word[k++] = c;
            while((c=getc(fin)) != EOF && isalpha(c)) word[k++] = c;
            word[k] = '\0';
            int key=0;
            for(int i = 0; i < 20; i++){
                if(strcmp(word, dict[i]) == 0){
                    key = 1;
                    break;
                }
            }
            if(key){
                for(int i = 0; i < strlen(word); i++)
                    putc(toupper(word[i]), fout);
            }
            else {
                for(int i = 0; i < strlen(word); i++)
                    putc(word[i], fout);
            }
            if(c != EOF) putc(c, fout);
            k = 0;
        }
        else putc(c, fout);
    }
    fclose(fin);
    fclose(fout);
    return 0;
}
```

Input/Output:

```
sapthamiupadhya@Sapthamis-MacBook-Air Lab2 % cc ex3.c -o keywords
sapthamiupadhya@Sapthamis-MacBook-Air Lab2 % ./keywords
sapthamiupadhya@Sapthamis-MacBook-Air Lab2 % cat sample.c
//This is a        single line comment
/* *****This is a
******Multiline Comment
**** */
/*
#include<stdio.h>
*/
//#include<stdio.h>
#include <stdio.h>
void main()
{
    FILE *fopen(), *fp;
    int c ;
    fp = fopen(".         prog.c", "r"); //Comment
    c = getc( fp ) ;
    //if do switch
    while ( c != EOF )
    {
        putchar( c );
        c = getc ( fp );
    } /*multiline
    comment */
    fclose( fp );
}%
sapthamiupadhya@Sapthamis-MacBook-Air Lab2 % cat ex3out.c
//This is a        single line comment
/* ***his is a
***Multiline Comment
** */
/*
#include<stdio.h>
*/
//#include<stdio.h>
#include <stdio.h>
VOID main()
{
    FILE *fopen(), *fp;
    INT c ;
    fp = fopen(".         prog.c", "r"); //Comment
    c = getc( fp ) ;
    //if do switch
    WHILE ( c != EOF )
    {
        putchar( c );
        c = getc ( fp );
    } /*multiline
    comment */
    fclose( fp );
}%
```