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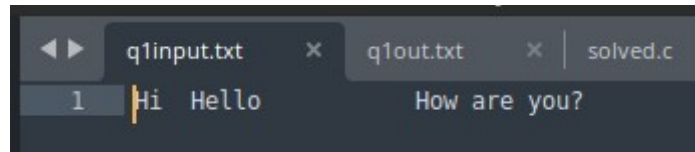Roll No. 22
D1

LAB 2

Q1)Write a 'C' program
1. That takes a file as input and replaces blank spaces and tabs by single space and writes the output to a file.

CODE:

```c
#include <stdio.h>

int main() {
    FILE *inputFile, *outputFile;
    char inputFileName[100], outputFileName[100];
    int currentChar, previousChar = 0;
    printf("Enter the name of the input file: ");
    scanf("%s", inputFileName);
    inputFile = fopen(inputFileName, "r");
    if (inputFile == NULL) {
        printf("Cannot open file %s.\n", inputFileName);
        return 1;
    }
    printf("Enter the name of the output file: ");
    scanf("%s", outputFileName);
    outputFile = fopen(outputFileName, "w");
    if (outputFile == NULL) {
        printf("Cannot open file %s.\n", outputFileName);
        fclose(inputFile);
        return 1;
    }
    while ((currentChar = getc(inputFile)) != EOF) {
        if (currentChar == ' ' || currentChar == '\t') {
            if (previousChar != ' ') {
                putc(' ', outputFile);
                previousChar = ' ';
            }
        } else {
            putc(currentChar, outputFile);
            previousChar = currentChar;
        }
    }

    // Close the files
    fclose(inputFile);
    fclose(outputFile);

    printf("Processing complete. Output written to %s.\n", outputFileName);
    return 0;
}
```
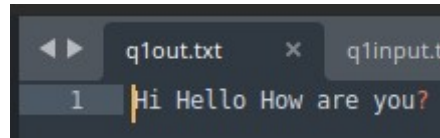
Input file : q1in.txt

Terminal


```
student@oslab-02:~/220905128/lab2/q1$ cc q1.c
student@oslab-02:~/220905128/lab2/q1$ ./a.out
Enter the name of the input file: q1input.txt
Enter the name of the output file: q1out.txt
Processing complete. Output written to q1out.txt.
student@oslab-02:~/220905128/lab2/q1$
```

Output file: q1out.txt

Q2) To discard preprocessor directives from the given input 'C' file.

CODE:

```c
#include <stdio.h>
#include <string.h>
#include <stdbool.h>

bool is_preprocessor_directive(const char *line) {
    // Skip leading spaces or tabs
    while (*line == ' ' || *line == '\t') {
        line++;
    }
    return *line == '#';
}

int main() {
    char input_file_name[256], output_file_name[256];
    printf("Enter the input file name: ");
    scanf("%s", input_file_name);
    printf("Enter the output file name: ");
    scanf("%s", output_file_name);
    FILE *input_file = fopen(input_file_name, "r");
    FILE *output_file = fopen(output_file_name, "w");

    if (!input_file || !output_file) {
        printf("Error opening file.\n");
        return 1;
    }
    char line[1024];
    while (fgets(line, sizeof(line), input_file)) {
        if (!is_preprocessor_directive(line)) {
            fputs(line, output_file);
        }
    }
    fclose(input_file);
    fclose(output_file);
    printf("Preprocessor directives removed and output written to %s\n", output_file_name);
    return 0;
}
```

Input file: q2in.c

```c
#include <stdio.h>

#define gfg 7

#if gfg > 200
#undef gfg
#define gfg 200
#elif gfg < 50
#undef gfg
#define gfg 50
#else
#undef gfg
#define gfg 100
#endif

void printValue(int value) { printf("%d", value); }

int main()
{
    printValue(gfg); // gfg = 50
    #qq
    PrintLineNum;
    printf("#hi");
    return 0;
}
```

Terminal:

```
student@oslab-02:~/220905128/lab2/q2$ cc q2.c
student@oslab-02:~/220905128/lab2/q2$ ./a.out
Enter the input file name: q2in.c
Enter the output file name: q2out.c
Preprocessor directives removed and output written to q2out.c
```

Output file: q2out.c

```
1
2
3
4    void printValue(int value) { printf("%d", value); }
5
6    int main()
7    {
8        printValue(gfg); // gfg = 50
9        PrintLineNum;
10        printf("#hi");
11        return 0;
12
13    }
```

Q3)That takes C program as input, recognizes all the keywords and prints them in upper case.

CODE:

```c
#include <stdio.h>
#include <string.h>
#include <ctype.h>
#define MAX_KEYWORDS 32
const char *keywords[MAX_KEYWORDS] = {
    "auto", "break", "case", "char", "const", "continue", "default", "do",
    "double", "else", "enum", "extern", "float", "for", "goto", "if",
    "int", "long", "register", "return", "short", "signed", "sizeof",
    "static", "struct", "switch", "typedef", "union", "unsigned", "void",
    "volatile", "while"
};
int isKeyword(const char *word) {
    for (int i = 0; i < MAX_KEYWORDS; i++) {
        if (strcmp(word, keywords[i]) == 0) {
            return 1; // It's a keyword
        }
    }
    return 0;
}
void toUpperCase(char *str) {
    for (int i = 0; str[i]; i++) {
        str[i] = toupper(str[i]);
    }
}
int main() {
    FILE *inputFile, *outputFile;
    char inputFileName[100], outputFileName[100];
    char word[256];
    int ch, index = 0;
    printf("Enter the name of the input C file: ");
    scanf("%s", inputFileName);
    inputFile = fopen(inputFileName, "r");
    if (inputFile == NULL) {
        printf("Cannot open file %s.\n", inputFileName);
        return 1;
    }
    printf("Enter the name of the output file: ");
    scanf("%s", outputFileName);
    outputFile = fopen(outputFileName, "w");
    if (outputFile == NULL) {
        printf("Cannot open file %s.\n", outputFileName);
        fclose(inputFile);
        return 1;
    }
    while ((ch = getc(inputFile)) != EOF) {
        if (isalnum(ch) || ch == '_') {
            word[index++] = ch;
        } else {
            if (index > 0) {
```

```
49              if (index > 0) {
50                  // End of a word
51                  word[index] = '\0';
52                  if (isKeyword(word)) {
53                      toUpperCase(word);
54                  }
55                  fputs(word, outputFile);
56                  index = 0;
57              }
58              putc(ch, outputFile);
59          }
60      }
61      if (index > 0) {
62          word[index] = '\0';
63          if (isKeyword(word)) {
64              toUpperCase(word);
65          }
66          fputs(word, outputFile);
67      }
68      fclose(inputFile);
69      fclose(outputFile);
70
71      printf("Processing complete. Keywords have been converted to uppercase in %s.\n", outputFileName);
72      return 0;
73  }
```
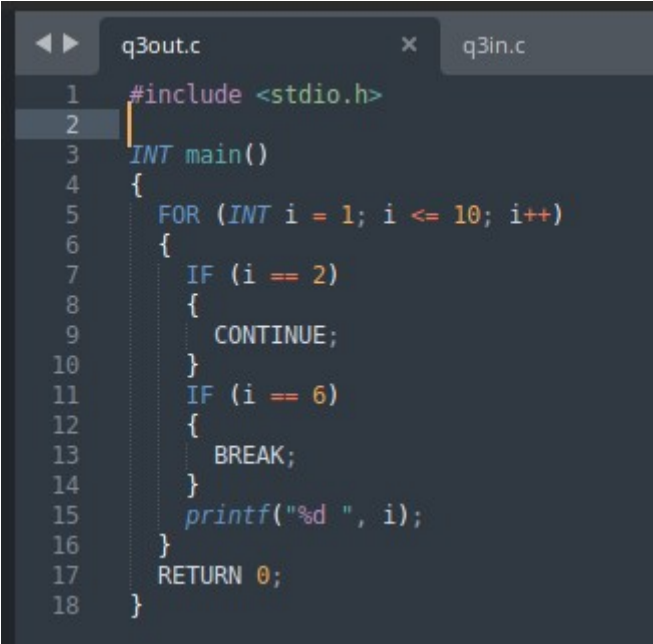
Input file: q3in.c

```
q3in.c                    ×    q3.c
1    #include <stdio.h>
2    |
3    int main()
4    {
5      for (int i = 1; i <= 10; i++)
6      {
7        if (i == 2)
8        {
9          continue;
10       }
11       if (i == 6)
12       {
13         break;
14       }
15       printf("%d ", i);
16     }
17     return 0;
18   }
```

Terminal:

```
student@oslab-02:~/220905128/lab2/q3$ cc q3.c
student@oslab-02:~/220905128/lab2/q3$ ./a.out
Enter the name of the input C file: q3in.c
Enter the name of the output file: q3out.c
Processing complete. Keywords have been converted to uppercase in q3out.c.
student@oslab-02:~/220905128/lab2/q3$
```

Output file: q3out.c

```
q3out.c                    ×    q3in.c
1    #include <stdio.h>
2    |
3    INT main()
4    {
5      FOR (INT i = 1; i <= 10; i++)
6      {
7        IF (i == 2)
8        {
9          CONTINUE;
10       }
11       IF (i == 6)
12       {
13         BREAK;
14       }
15       printf("%d ", i);
16     }
17     RETURN 0;
18   }
```