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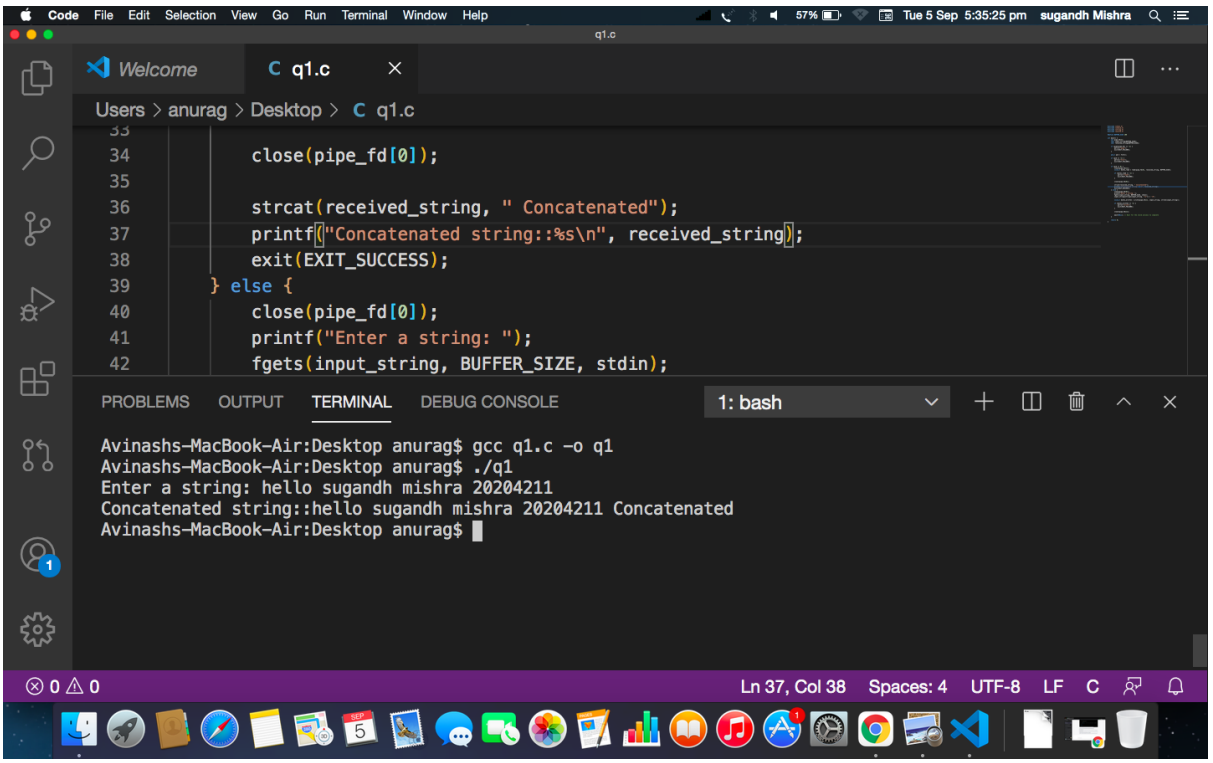
Distributed System (CS17201) B.Tech (CSE) – VII Sem Lab 1

1. Write a program to create two processes. First process takes a string and passes it to second process through a pipe. The second process concatenates the received string with another string without using string function and sends it back to the first process for printing.

```
#include <stdio.h>
#include <stdlib.h>
#include <string.h>
#include <unistd.h>

#define BUFFER_SIZE 100

int main() {
    int pipe_fd[2];
    char input_string[BUFFER_SIZE];
    char received_string[BUFFER_SIZE];

    if (pipe(pipe_fd) == -1) {
        perror("pipe");
        exit(EXIT_FAILURE);
    }

    pid_t pid = fork();

    if (pid == -1) {
        perror("fork");
        exit(EXIT_FAILURE);
    }

    if (pid == 0) {
        close(pipe_fd[1]);
        ssize_t bytes_read = read(pipe_fd[0], received_string, BUFFER_SIZE);

        if (bytes_read == -1) {
```

```
        perror("read");
        exit(EXIT_FAILURE);
    }

    close(pipe_fd[0]);

    strcat(received_string, " Concatenated");
    printf("Concatenated string::%s\n", received_string);
    exit(EXIT_SUCCESS);
} else {
    close(pipe_fd[0]);
    printf("Enter a string: ");
    fgets(input_string, BUFFER_SIZE, stdin);
    input_string[strcspn(input_string, "\n")] = '\0';

    ssize_t bytes_written = write(pipe_fd[1], input_string, strlen(input_string));

    if (bytes_written == -1) {
        perror("write");
        exit(EXIT_FAILURE);
    }

    close(pipe_fd[1]);

    wait(NULL); // Wait for the child process to complete
}

return 0;
}
```



2. Develop a program in which the parent process sends two matrices to its child process through a pipe and the child process returns the sum of the matrices to the parent through a pipe. The parent should print the result.

```
#include <stdio.h>
#include <stdlib.h>
#include <unistd.h>

#define ROWS 3
#define COLS 3

void sendMatrix(int pipe_fd[2], int matrix[ROWS][COLS]) {
    close(pipe_fd[0]);
    write(pipe_fd[1], matrix, sizeof(int) * ROWS * COLS);
    close(pipe_fd[1]);
}

void receiveMatrix(int pipe_fd[2], int result[ROWS][COLS]) {
    close(pipe_fd[1]);
    read(pipe_fd[0], result, sizeof(int) * ROWS * COLS);
    close(pipe_fd[0]);
}

int main() {
```

```
int matrix1[ROWS][COLS] = {{3, 2, 3}, {4, 1, 6}, {2, 8, 3}};
int matrix2[ROWS][COLS] = {{4, 4, 7}, {6, 5, 4}, {3, 2, 1}};
int result[ROWS][COLS] = {0};

int pipe_parent_to_child[2];
int pipe_child_to_parent[2];

if (pipe(pipe_parent_to_child) == -1 || pipe(pipe_child_to_parent) == -1) {
    perror("pipe");
    exit(EXIT_FAILURE);
}

pid_t pid = fork();

if (pid == -1) {
    perror("fork");
    exit(EXIT_FAILURE);
}

if (pid == 0) {
    int child_result[ROWS][COLS] = {0};

    receiveMatrix(pipe_parent_to_child, matrix1);
    receiveMatrix(pipe_parent_to_child, matrix2);

    for (int i = 0; i < ROWS; i++) {
        for (int j = 0; j < COLS; j++) {
            child_result[i][j] = matrix1[i][j] + matrix2[i][j];
        }
    }

    sendMatrix(pipe_child_to_parent, child_result);
    exit(EXIT_SUCCESS);
} else {
    sendMatrix(pipe_parent_to_child, matrix1);
    sendMatrix(pipe_parent_to_child, matrix2);

    receiveMatrix(pipe_child_to_parent, result);

    printf("Sum of Matrices:\n");
    for (int i = 0; i < ROWS; i++) {
        for (int j = 0; j < COLS; j++) {
            printf("%d\t", result[i][j]);
        }
```

```
            printf("\n");
        }
    }

    return 0;
}
```