Assignment II

This C program is a simple text-based game. In this game, the player tries to reach the door using keyboard instructions (“w”, “a”, “s”, “d”). If the player reaches the door, they win the game. However, if the player moves out of the board, they lose the game.

In the first part of the game, some variables are declared. Then, the program attempts to open the file and checks whether it exists. If the file does not exist, a new file named game_state.txt is created. After that, a character is read using the fgetc() function to check whether the file is empty. If the character read equals the end of the file, it means the file is empty. In this case, a new board is generated. The program then asks the user for the width and height of the board and validates the inputs. After generating the board, the coordinates of the player and the door are determined using the rand() function. To use rand(), the srand(time(NULL)) function is called. The file is then opened again in write mode, and all the generated data is written to it, completing the first part of the game.

The second part of the game starts if the file is not empty, meaning a game has already been started. In this part, the data is retrieved from the file by opening it in read mode and using the fscanf() function. The program then takes input from the user to determine the next move (WASD) and validates the input. Based on the user’s input, the player’s coordinates are updated and saved back to the file in write mode. With these updates, the second part of the game is completed.

The final part of the game checks whether the player has won or lost. After every move, the player's coordinates are compared with the door's coordinates. If they are the same, the player wins the game, a new board is generated, and the data is saved again to the file. However, if the player moves out of bounds, Program can detect that and close the program. Player can try again.

Screenshot is on the next page

```
goksu@goksu:~/Desktop/CSE-102/Assignment2$ ./assignment2
Generating a new board...
Enter the width and height of board:
5 5
Player moves up to (4, 2)
Width: 5, Height: 5, Player: (4,2), Door: (3,1)
goksu@goksu:~/Desktop/CSE-102/Assignment2$ ./assignment2
Enter move (WASD): w
Player moves up to (4, 3)
Game continues
goksu@goksu:~/Desktop/CSE-102/Assignment2$ ./assignment2
Enter move (WASD): d
Player moves right to (5, 3)
Game continues
goksu@goksu:~/Desktop/CSE-102/Assignment2$ ./assignment2
Enter move (WASD): d
Out of bounds moves are rejected!
goksu@goksu:~/Desktop/CSE-102/Assignment2$ ./assignment2
Enter move (WASD):
a
Player moves left to (4, 3)
Game continues
goksu@goksu:~/Desktop/CSE-102/Assignment2$ ./assignment2
Enter move (WASD): a
Player moves left to (3, 3)
Game continues
goksu@goksu:~/Desktop/CSE-102/Assignment2$ ./assignment2
Enter move (WASD): s
Player moves down to (3, 2)
Game continues
goksu@goksu:~/Desktop/CSE-102/Assignment2$ ./assignment2
Enter move (WASD): s
Player moves down to (3, 1)
Congratulations! You escaped!
Generating a new board...
Enter the width and height of board:
4 4
Width: 4, Height: 4, Player: (4,3), Door: (2,4)
goksu@goksu:~/Desktop/CSE-102/Assignment2$ ./assignment2
Enter move (WASD): a
Player moves left to (3, 3)
Game continues
goksu@goksu:~/Desktop/CSE-102/Assignment2$ ./assignment2
Enter move (WASD): a
Player moves left to (2, 3)
```

```c
#include <stdio.h>
#include <time.h>
#include <stdlib.h>

int main() {
    int width, height; /* Input variables */
    int playerX, playerY, doorX, doorY; /* Coordinate variables */
    char ch; /* get char from file to check is file empty */
    char key_inst; /* Keyboard Instruction Input*/

    FILE * open_file;
    open_file = fopen("game_state.txt", "r");

    /* Check file is open */
    if (open_file == NULL) {
        open_file = fopen("game_state.txt", "w");
    }

    ch = fgetc(open_file);
    fclose(open_file);

    /* Check file is empty. If it is yes generate a new board. */
    if (ch == EOF) {
        printf("Generating a new board...\n");
        printf("Enter the width and height of board:\n");
        scanf("%d %d", &width, &height);

        /* Check Inputs are valid */
        if (width <= 0 || height <= 0) {
            printf("Invalid Input. Please try again!");
            return -1;
        }

        /* Generate coordinates of player and door */
        srand(time(NULL));
        playerX = rand() % width + 1;
        playerY = rand() % height + 1;
        doorX = rand() % width + 1;
```