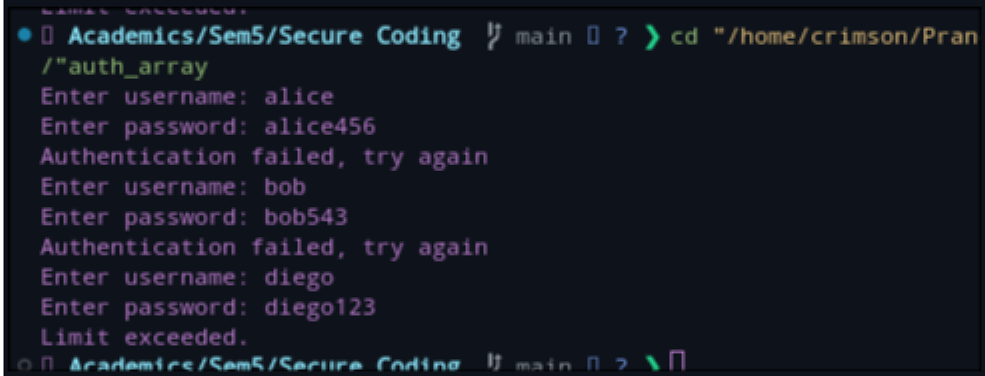
CB.SC.U4CYS23036
Praneesh R V

Secure Coding Assignment - 1

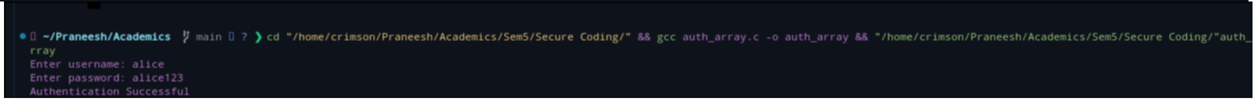
Q1) Write a C Program to authenticate a user using a username and password. Have a list of 5 usernames and passwords in an array. If the entered username and password match with the username/password combination in the array, then print as “Authentication Successful” else print “Authentication failed, try again”. The user is permitted to enter the wrong password only 3 times. If the user exceeds the limit, then print “Limit exceeded.

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

#define MAX_USERS 5
#define MAX_ATTEMPTS 3
#define USERNAME_LEN 32
#define PASSWORD_LEN 32

typedef struct {
   char username[USERNAME_LEN];
   char password[PASSWORD_LEN];
} User;

int main() {
   User users[MAX_USERS] = {
       {"alice", "alice123"},
       {"bob", "bobpass"},
       {"charlie", "charliepwd"},
       {"david", "davidpw"},
       {"eve", "evepass"}
   };
   char input_username[USERNAME_LEN];
   char input_password[PASSWORD_LEN];
   int attempts = 0, authenticated = 0;
   while (attempts < MAX_ATTEMPTS && !authenticated) {
       printf("Enter username: ");
```

```c
        if (scanf("%31s", input_username) != 1) break;
        printf("Enter password: ");
        if (scanf("%31s", input_password) != 1) break;
        for (int i = 0; i < MAX_USERS; i++) {
            if (strcmp(users[i].username, input_username) == 0 &&
strcmp(users[i].password, input_password) == 0) {
                authenticated = 1;
                break;
            }
        }
        if (authenticated) {
            printf("Authentication Successful\n");
        } else {
            attempts++;
            if (attempts < MAX_ATTEMPTS) printf("Authentication
failed, try again\n");
        }
    }
    if (!authenticated) printf("Limit exceeded.\n");
    return 0;
}
```



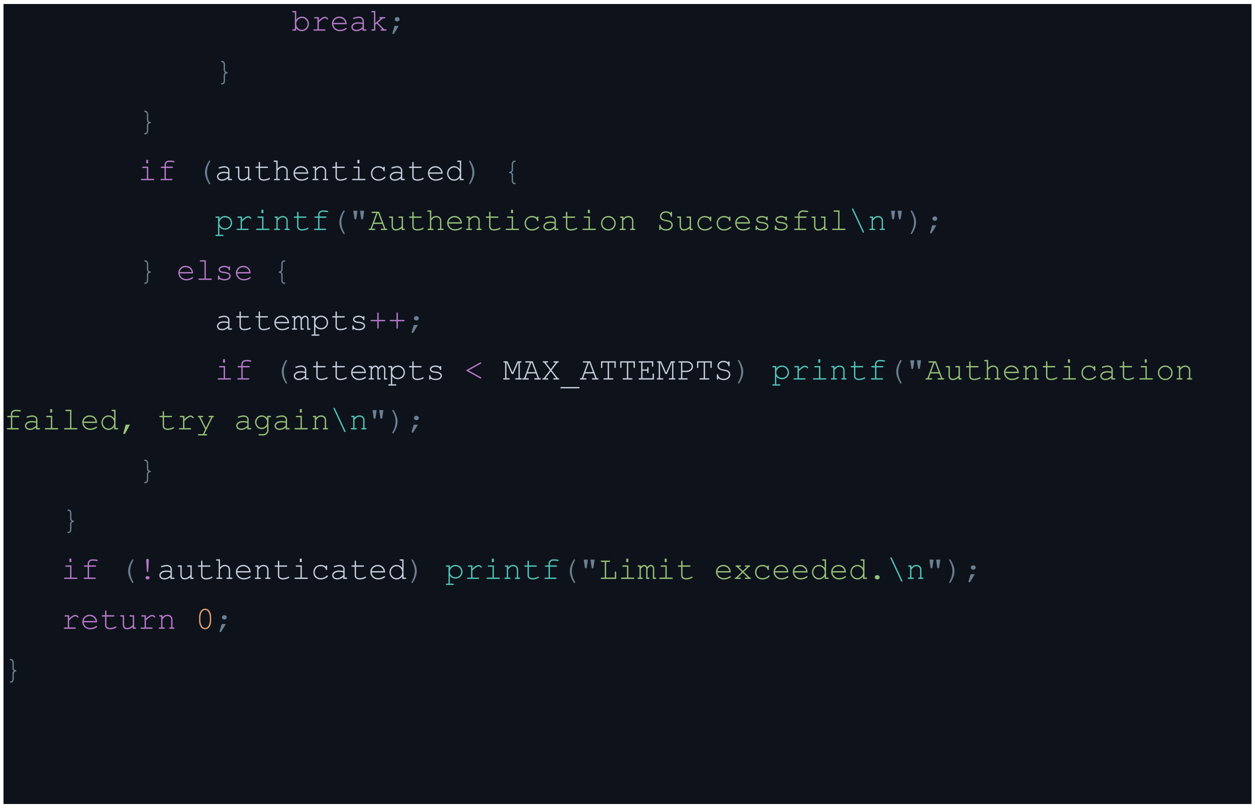
```
● Academics/Sem5/Secure Coding  main ? ❯ cd "/home/crimson/Pran
/"auth_array
Enter username: alice
Enter password: alice456
Authentication failed, try again
Enter username: bob
Enter password: bob543
Authentication failed, try again
Enter username: diego
Enter password: diego123
Limit exceeded.
○ Academics/Sem5/Secure Coding  main ? ❯
```



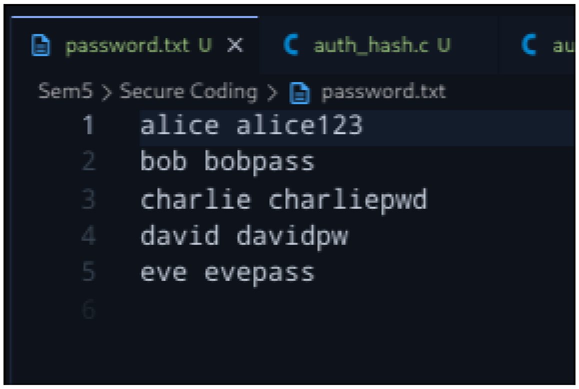
```
● ~/Praneesh/Academics  main ? ❯ cd "/home/crimson/Praneesh/Academics/Sem5/Secure Coding/" && gcc auth_array.c -o auth_array && "/home/crimson/Praneesh/Academics/Sem5/Secure Coding/"auth_
rray
Enter username: alice
Enter password: alice123
Authentication Successful
```

Q2,

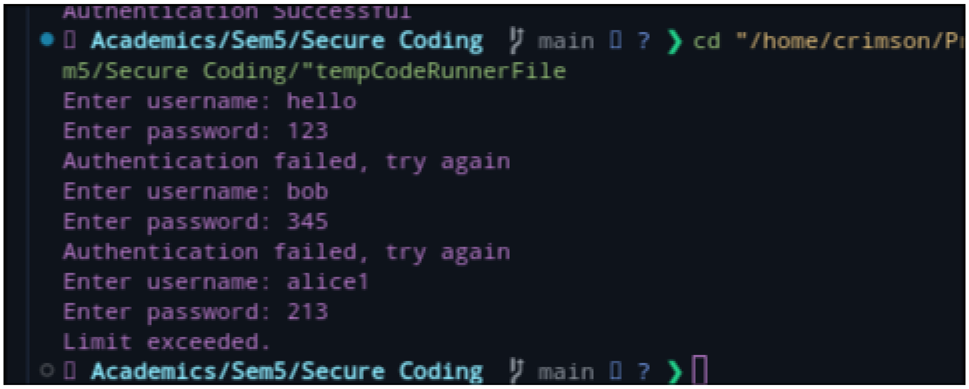
```
#include <stdio.h>
#include <string.h>

#define MAX_USERS 5
#define MAX_ATTEMPTS 3
#define USERNAME_LEN 32
#define PASSWORD_LEN 32

typedef struct {
   char username[USERNAME_LEN];
   char password[PASSWORD_LEN];
} User;

int main() {
   User users[MAX_USERS];
   FILE *fp = fopen("password.txt", "r");
   if (!fp) { printf("Could not open password.txt\n"); return 1;
}
   int count = 0;
   while (count < MAX_USERS && fscanf(fp, "%31s %31s",
users[count].username, users[count].password) == 2) count++;
   fclose(fp);
   char input_username[USERNAME_LEN];
   char input_password[PASSWORD_LEN];
   int attempts = 0, authenticated = 0;
   while (attempts < MAX_ATTEMPTS && !authenticated) {
       printf("Enter username: ");
       if (scanf("%31s", input_username) != 1) break;
       printf("Enter password: ");
       if (scanf("%31s", input_password) != 1) break;
       for (int i = 0; i < count; i++) {
           if (strcmp(users[i].username, input_username) == 0 &&
strcmp(users[i].password, input_password) == 0) {
               authenticated = 1;
```



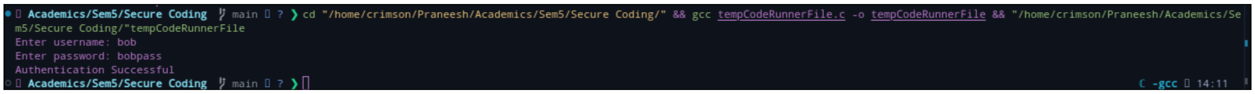
```
                break;
            }
        }
        if (authenticated) {
            printf("Authentication Successful\n");
        } else {
            attempts++;
            if (attempts < MAX_ATTEMPTS) printf("Authentication
failed, try again\n");
        }
    }
    if (!authenticated) printf("Limit exceeded.\n");
    return 0;
}
```



```
alice alice123
bob bobpass
charlie charliepwd
david davidpw
eve evepass
```



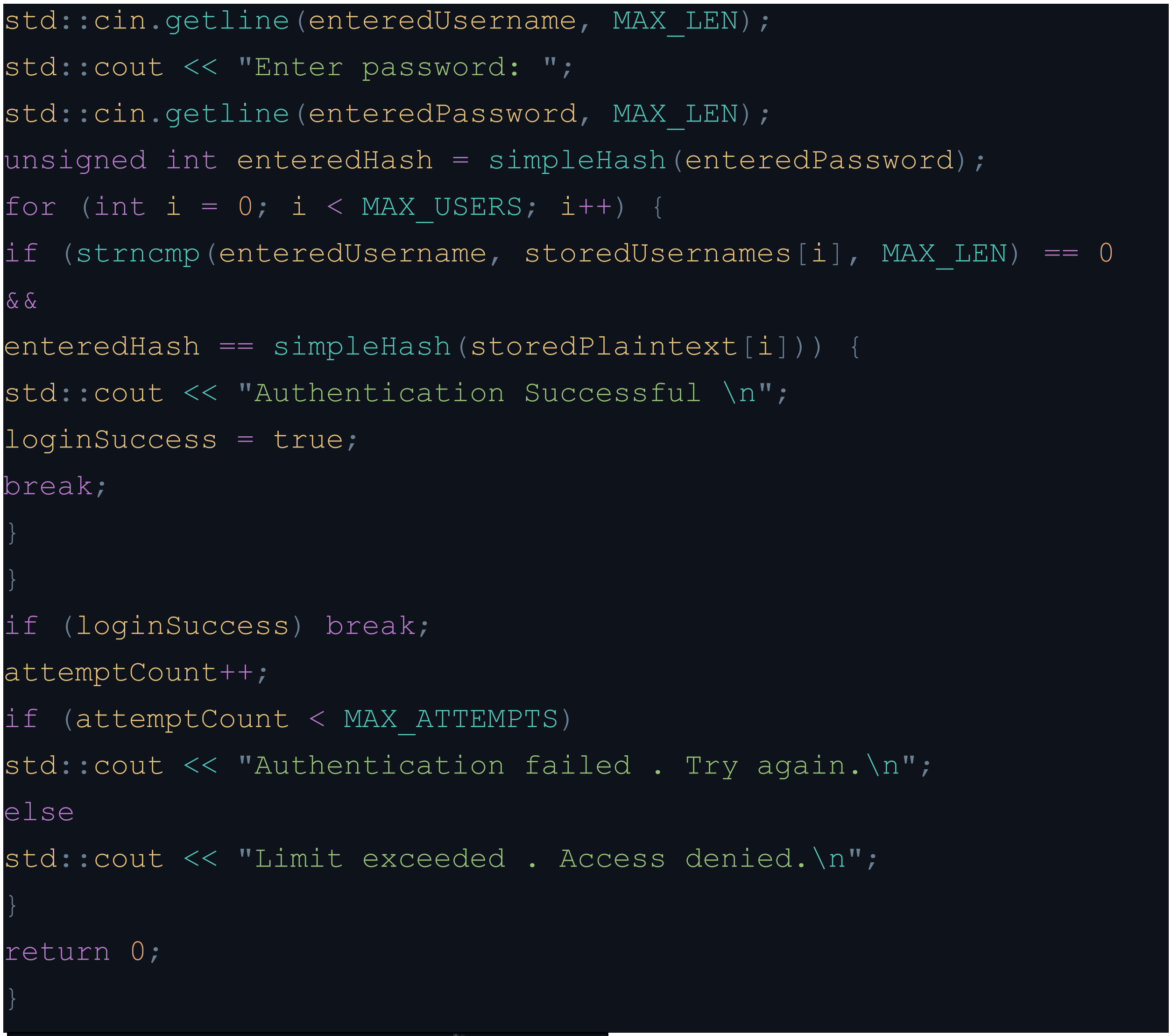
```
Authentication Successful
● Academics/Sem5/Secure Coding  main ? ❯ cd "/home/crimson/Pr
m5/Secure Coding/"tempCodeRunnerFile
Enter username: hello
Enter password: 123
Authentication failed, try again
Enter username: bob
Enter password: 345
Authentication failed, try again
Enter username: alice1
Enter password: 213
Limit exceeded.
○ Academics/Sem5/Secure Coding  main ? ❯
```



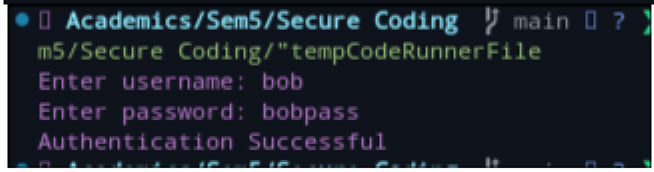
```
Academics/Sem5/Secure Coding  main ? ❯ cd "/home/crimson/Praneesh/Academics/Sem5/Secure Coding/" && gcc tempCodeRunnerFile.c -o tempCodeRunnerFile && "/home/crimson/Praneesh/Academics/Se
m5/Secure Coding/"tempCodeRunnerFile
Enter username: bob
Enter password: bobpass
Authentication Successful
Academics/Sem5/Secure Coding  main ? ❯                                                                    -gcc  14:11
```

Q3,

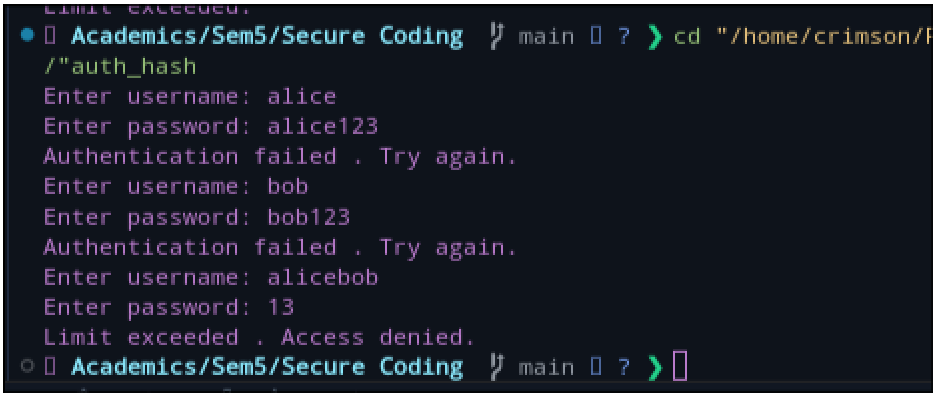
```
#include <iostream>
#include <fstream>
#include <cstring>
#define MAX_USERS 5
#define MAX_ATTEMPTS 3
#define MAX_LEN 30
unsigned int simpleHash(const char* str) {
unsigned int hash = 0;
while (*str) {
hash = hash * 31 + *str;
str++;
}
return hash;
}
int main() {
char storedUsernames[MAX_USERS][MAX_LEN];
char storedPlaintext[MAX_USERS][MAX_LEN];
std::ifstream file("password_hash.txt");
if (!file) {
std::cerr << "Could not open password.txt\n";
return 1;
}
for (int i = 0; i < MAX_USERS; i++) {
file >> storedUsernames[i] >> storedPlaintext[i];
}
file.close();
char enteredUsername[MAX_LEN], enteredPassword[MAX_LEN];
int attemptCount = 0;
bool loginSuccess = false;
while (attemptCount < MAX_ATTEMPTS) {
std::cout << "Enter username: ";
```



```
std::cin.getline(enteredUsername, MAX_LEN);
std::cout << "Enter password: ";
std::cin.getline(enteredPassword, MAX_LEN);
unsigned int enteredHash = simpleHash(enteredPassword);
for (int i = 0; i < MAX_USERS; i++) {
if (strncmp(enteredUsername, storedUsernames[i], MAX_LEN) == 0
&&
enteredHash == simpleHash(storedPlaintext[i])) {
std::cout << "Authentication Successful \n";
loginSuccess = true;
break;
}
}
if (loginSuccess) break;
attemptCount++;
if (attemptCount < MAX_ATTEMPTS)
std::cout << "Authentication failed . Try again.\n";
else
std::cout << "Limit exceeded . Access denied.\n";
}
return 0;
}
```



```
● □ Academics/Sem5/Secure Coding  main □ ? ❯
  m5/Secure Coding/"tempCodeRunnerFile
  Enter username: bob
  Enter password: bobpass
  Authentication Successful
```



```
  Limit exceeded.
● □ Academics/Sem5/Secure Coding  main □ ? ❯ cd "/home/crimson/F
  /"auth_hash
  Enter username: alice
  Enter password: alice123
  Authentication failed . Try again.
  Enter username: bob
  Enter password: bob123
  Authentication failed . Try again.
  Enter username: alicebob
  Enter password: 13
  Limit exceeded . Access denied.
○ □ Academics/Sem5/Secure Coding  main □ ? ❯ □
```