Assignment 17

Strings

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

int countVowels(char str[]) {
    int count = 0;
    for (int i = 0; str[i] != '\0'; i++) {
        if (str[i] == 'a' || str[i] == 'e' || str[i] == 'i' || str[i] == 'o' || str[i] == 'u' ||
            str[i] == 'A' || str[i] == 'E' || str[i] == 'I' || str[i] == 'O' || str[i] == 'U') {
            count++;
        }
    }
    return count;
}

int isPalindrome(char str[]) {
    int len = strlen(str);
    for (int i = 0; i < len / 2; i++) {
        if (str[i] != str[len - i - 1]) {
            return 0;
        }
    }
    return 1;
}
```

```c
int isValidIP(char ip[]) {
    char *token = strtok(ip, ".");
    int count = 0;
    while (token != NULL) {
        int num = atoi(token);
        if (num < 0 || num > 255) {
            return 0;
        }
        count++;
        token = strtok(NULL, ".");
    }
    return (count == 4);
}

int minDistance(char *s[], char word1[], char word2[], int n) {
    int minDist = n;
    int posWord1 = -1, posWord2 = -1;
    for (int i = 0; i < n; i++) {
        if (strcmp(s[i], word1) == 0) {
            posWord1 = i;
        } else if (strcmp(s[i], word2) == 0) {
            posWord2 = i;
        }
        if (posWord1 != -1 && posWord2 != -1) {
            int dist = abs(posWord1 - posWord2);
            if (dist < minDist) {
                minDist = dist;}
        }
    }
    return minDist;}
int factorial(int n) {
    if (n == 0 || n == 1) {
        return 1;
    } else {
        return n * factorial(n - 1);
    }
}

int authenticate(char username[], char password[]) {
    char validUsername[] = "admin";
    char validPassword[] = "admin123";
    if (strcmp(username, validUsername) == 0 && strcmp(password, validPassword) == 0) {
        return 1;
    } else {
        return 0;
    }
}

int main() {
    //1 find the number of vowels in each of the 5 strings stored in two dimensional arrays, taken from the user.
    char strings[5][50];
    for (int i = 0; i < 5; i++) {
        printf("Enter string %d: ", i + 1);
        gets(strings[i]);
    }
    printf("\nNumber of vowels in each string:\n");
    for (int i = 0; i < 5; i++) {
```

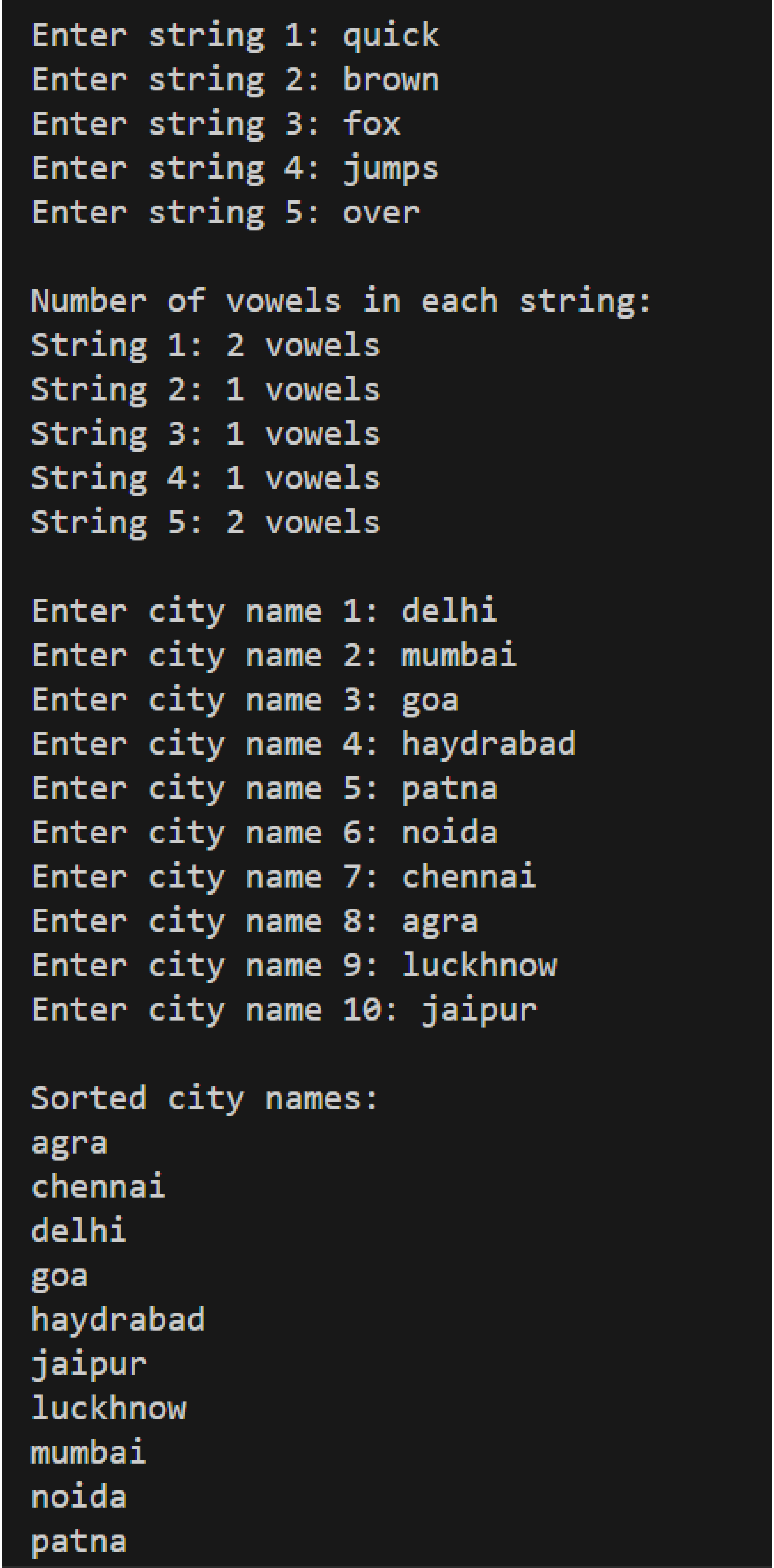
```
    printf("String %d: %d vowels\n", i + 1, countVowels(strings[i]));
}printf("\n");


//2 sort 10 city names stored in two dimensional arrays, taken from the user.
char cities[10][50];
for (int i = 0; i < 10; i++) {
    printf("Enter city name %d: ", i + 1);
    gets(cities[i]);
}
for (int i = 0; i < 9; i++) {
    for (int j = i + 1; j < 10; j++) {
        if (strcmp(cities[i], cities[j]) > 0) {
            char temp[50];
            strcpy(temp, cities[i]);
            strcpy(cities[i], cities[j]);
            strcpy(cities[j], temp);
        }
    }
}
printf("\nSorted city names:\n");
for (int i = 0; i < 10; i++) {
    printf("%s\n", cities[i]);
}printf("\n");


//3 read and display a 2D array of strings in C language.
printf("Enter 3 strings:\n");
for (int i = 0; i < 3; i++) {
    printf("String %d: ", i + 1);
    scanf("%s", strings[i]);
}
printf("\n2D Array of Strings:\n");
for (int i = 0; i < 3; i++) {
    printf("%s\n", strings[i]);
}printf("\n");


//4 search a string in the list of strings.
char search[50];
printf("Enter 5 strings:\n");
for (int i = 0; i < 5; i++) {
    printf("String %d: ", i + 1);
    gets(strings[i]);
}
printf("Enter string to search: ");
gets(search);
int found = 0;
for (int i = 0; i < 5; i++) {
    if (strcmp(strings[i], search) == 0) {
        found = 1;
        break;
    }
}
if (found) {
    printf("String found in the list.\n\n");
} else {
    printf("String not found in the list.\n\n");
}
```

```
    //5 Suppose we have a list of email addresses, check whether all email addresses have '@'in it. Print the odd email out.

    char emails[5][50];

    printf("Enter 5 email addresses:\n");

    for (int i = 0; i < 5; i++) {

        printf("Email %d: ", i + 1);

        gets(emails[i]);

        if (strchr(emails[i], '@') == NULL) {

            printf("Odd email out: %s\n", emails[i]);

        }

    }printf("\n");



    //6 print the strings which are palindrome in the list of strings.

    printf("Enter 5 strings:\n");

    for (int i = 0; i < 5; i++) {

        printf("String %d: ", i + 1);

        gets(strings[i]);

    }

    printf("\nPalindrome strings:\n");

    for (int i = 0; i < 5; i++) {

        if (isPalindrome(strings[i])) {

            printf("%s\n", strings[i]);

        }

    }printf("\n");



    //7 From the list of IP addresses, check whether all ip addresses are valid.
```

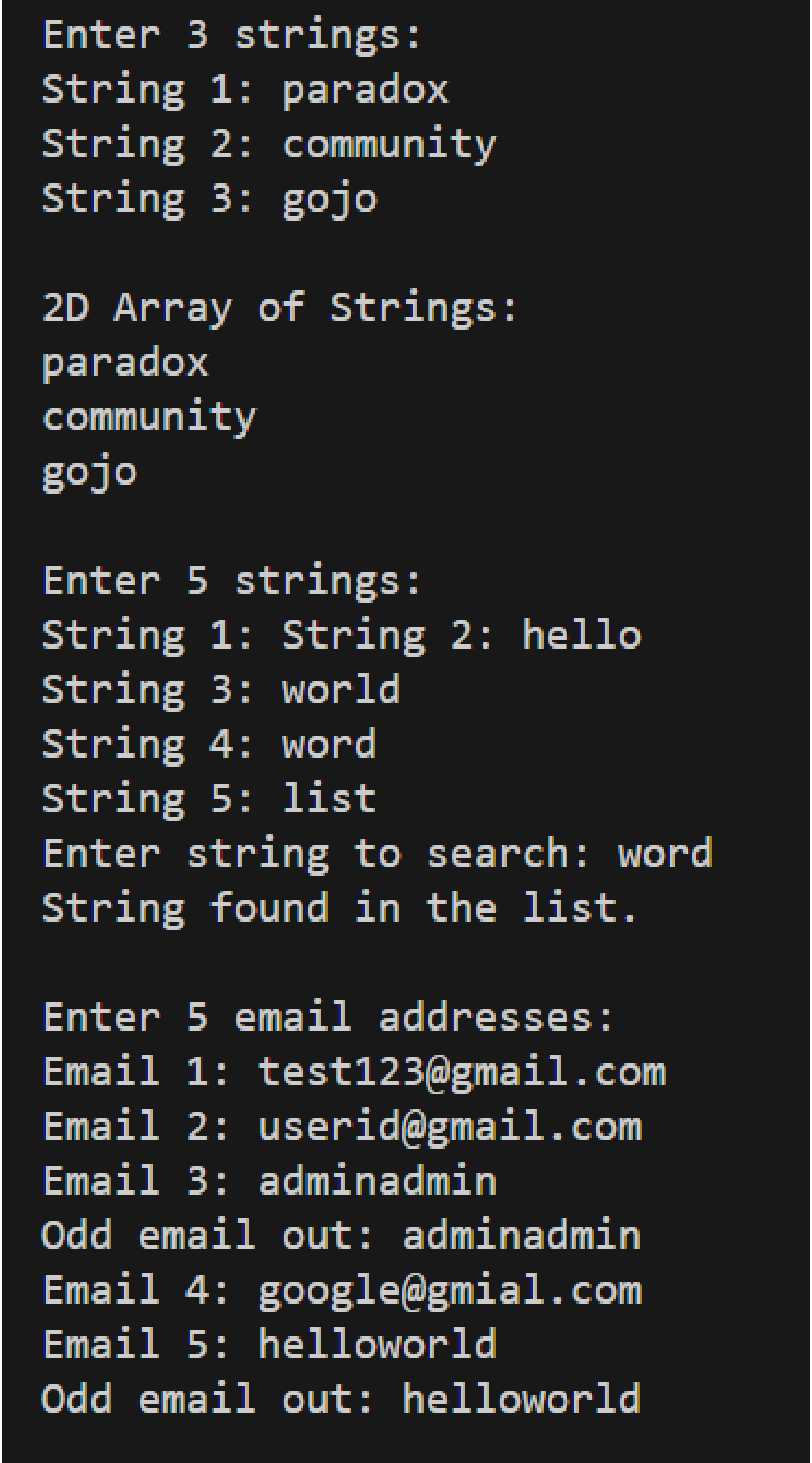
```c
    char ips[3][20];
    printf("Enter 3 IP addresses:\n");
    for (int i = 0; i < 3; i++) {
        printf("IP %d: ", i + 1);
        gets(ips[i]);

        if (!isValidIP(ips[i])) {
            printf("Invalid IP address: %s\n", ips[i]);
        }
    }printf("\n");


    //8 Given a list of words followed by two words, the task is to find the minimum distance between the given two words in the list of words.
    char *words[] = {"the", "quick", "brown", "fox", "quick"};
    char word1[20], word2[20];
    printf("Enter two words: ");
    scanf("%s %s", word1, word2);
    int distance = minDistance(words, word1, word2, 5);
    printf("Minimum distance between '%s' and '%s' is: %d\n\n", word1, word2, distance);


    //9 asks the user to enter a username. If the username entered is one of the names in the list then the user is allowed to calculate the factorial of a number.
    //Otherwise, an error message is displayed
    char usernames[][20] = {"user1", "user2", "user3"};
    char inputUsername[20];
    int n;
    printf("Enter your username: ");
```

```c
gets(inputUsername);
puts(inputUsername);
int validUser = 0;
for (int i = 0; i < 3; i++) {
    if (strcmp(usernames[i], inputUsername) == 0) {
        validUser = 1;
        break;
    }
}
if (validUser) {
    printf("Enter a number to calculate its factorial: ");
    scanf("%d", &n);
    printf("Factorial of %d is: %d\n\n", n, factorial(n));
} else {
    printf("Error: Invalid username.\n\n");
}

//10 Create an authentication system. It should be menu driven.
char username[20], password[20];
int choice;
while (choice != 2){
    printf("\nMenu:\n");
    printf("1. Login\n");
    printf("2. Exit\n");
    printf("Enter your choice: ");
    scanf("%d", &choice);
    switch (choice) {
        case 1:
            printf("Enter username: ");
```

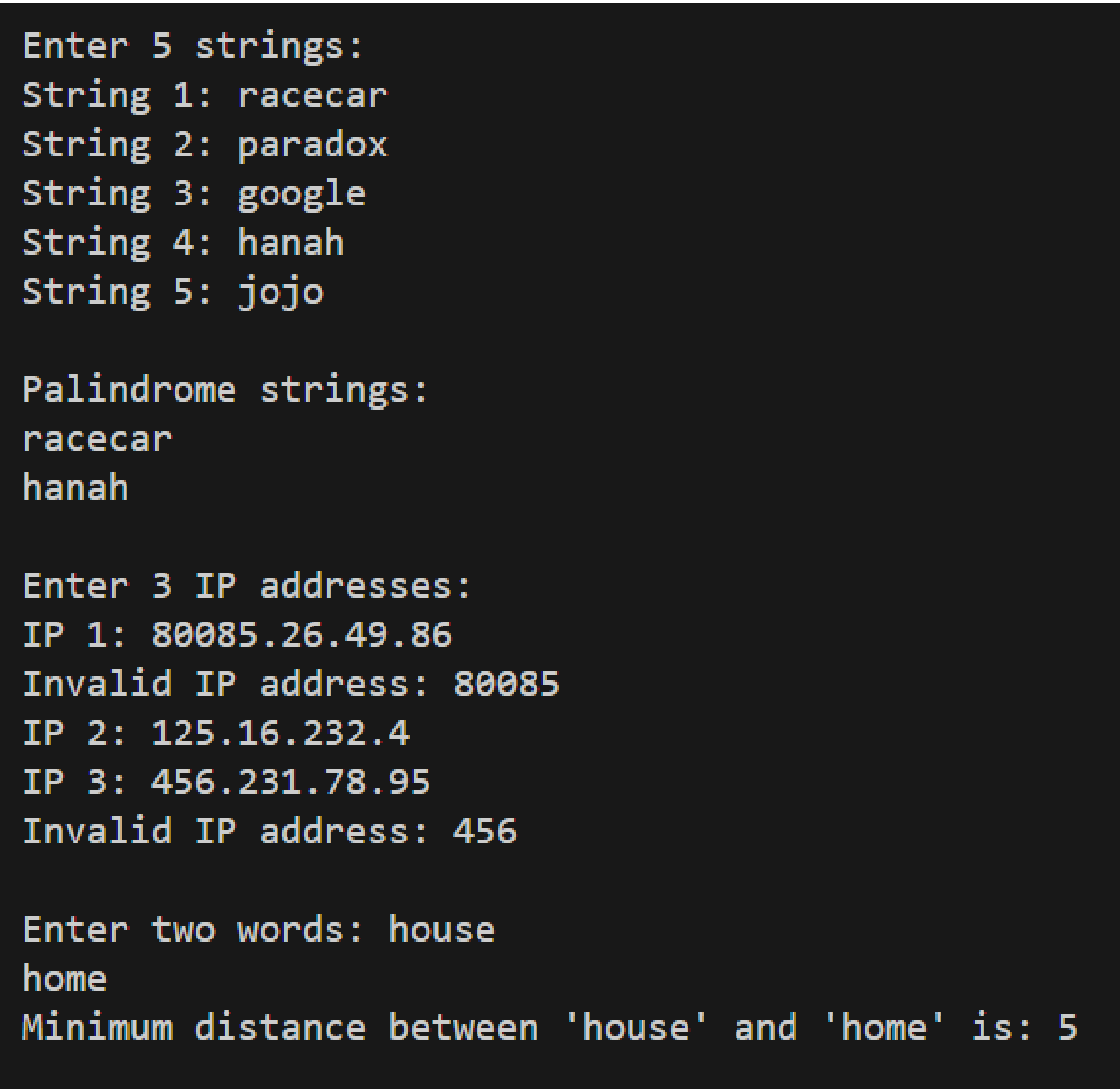
```
                scanf("%s", username);
                printf("Enter password: ");
                scanf("%s", password);

                if (authenticate(username, password)) {
                    printf("Authentication successful. Welcome, %s!\n",
username);
                    // Add your logic for the authenticated user here
                } else {
                    printf("Authentication failed. Invalid username or
password.\n");
                }
                break;

            case 2:
                printf("Exiting program.\n");
                break;

            default:
                printf("Invalid choice. Please enter 1 or 2.\n");
        }
    }
    return 0;
}
```



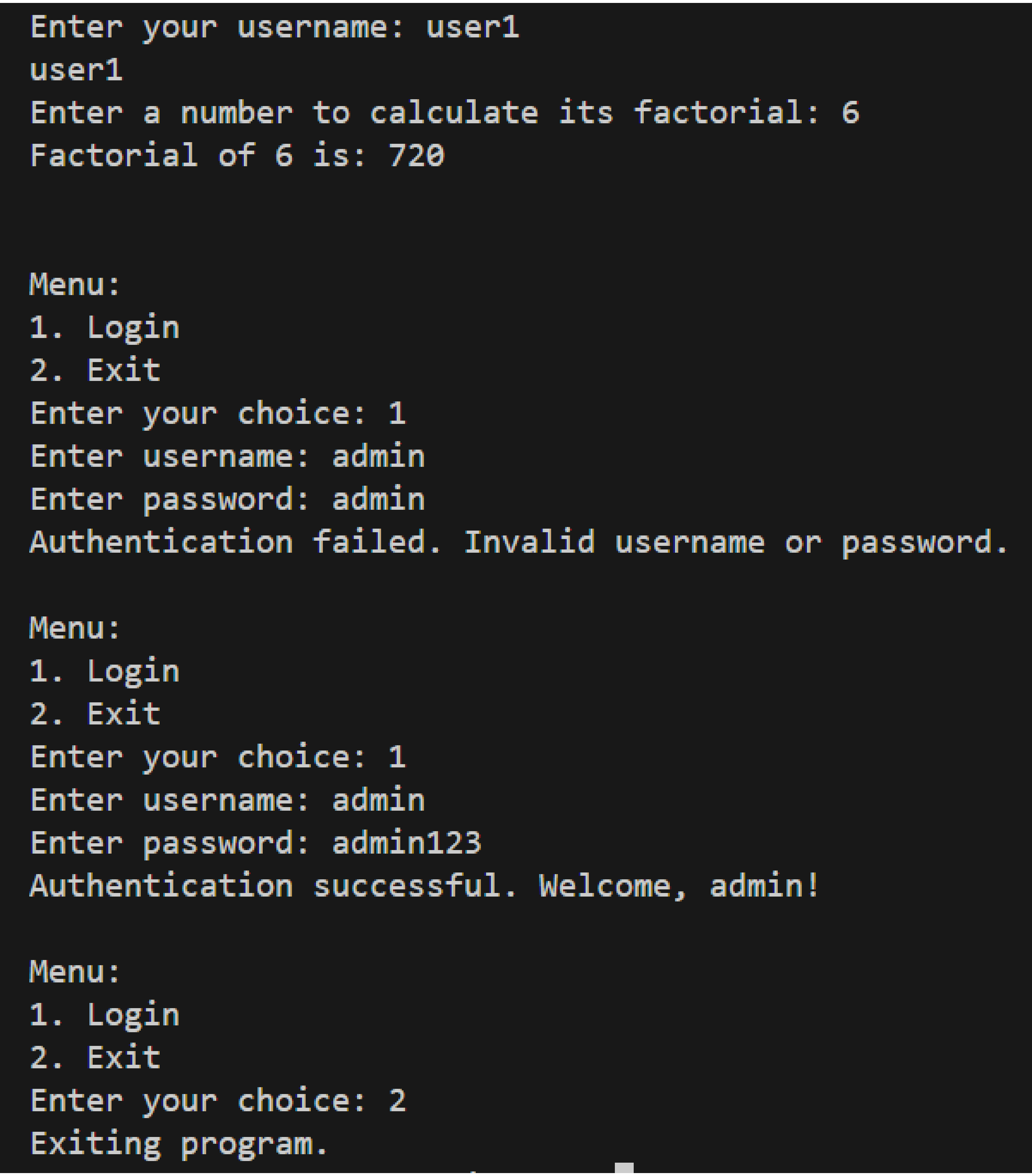
```
Enter string 1: quick
Enter string 2: brown
Enter string 3: fox
Enter string 4: jumps
Enter string 5: over

Number of vowels in each string:
String 1: 2 vowels
String 2: 1 vowels
String 3: 1 vowels
String 4: 1 vowels
String 5: 2 vowels

Enter city name 1: delhi
Enter city name 2: mumbai
Enter city name 3: goa
Enter city name 4: haydrabad
Enter city name 5: patna
Enter city name 6: noida
Enter city name 7: chennai
Enter city name 8: agra
Enter city name 9: luckhnow
Enter city name 10: jaipur

Sorted city names:
agra
chennai
delhi
goa
haydrabad
jaipur
luckhnow
mumbai
noida
patna
```



```
Enter 3 strings:
String 1: paradox
String 2: community
String 3: gojo

2D Array of Strings:
paradox
community
gojo

Enter 5 strings:
String 1: String 2: hello
String 3: world
String 4: word
String 5: list
Enter string to search: word
String found in the list.

Enter 5 email addresses:
Email 1: test123@gmail.com
Email 2: userid@gmail.com
Email 3: adminadmin
Odd email out: adminadmin
Email 4: google@gmial.com
Email 5: helloworld
Odd email out: helloworld
```



```
Enter 5 strings:
String 1: racecar
String 2: paradox
String 3: google
String 4: hanah
String 5: jojo

Palindrome strings:
racecar
hanah

Enter 3 IP addresses:
IP 1: 80085.26.49.86
Invalid IP address: 80085
IP 2: 125.16.232.4
IP 3: 456.231.78.95
Invalid IP address: 456

Enter two words: house
home
Minimum distance between 'house' and 'home' is: 5
```



```
Enter your username: user1
user1
Enter a number to calculate its factorial: 6
Factorial of 6 is: 720



Menu:
1. Login
2. Exit
Enter your choice: 1
Enter username: admin
Enter password: admin
Authentication failed. Invalid username or password.

Menu:
1. Login
2. Exit
Enter your choice: 1
Enter username: admin
Enter password: admin123
Authentication successful. Welcome, admin!

Menu:
1. Login
2. Exit
Enter your choice: 2
Exiting program.
```