Programming Fundamental

Programming Day - Week 10

Introduction

Welcome to your favorite day of the week which is programming day🎉. This week, we shall work together to learn and implement new programming concepts.

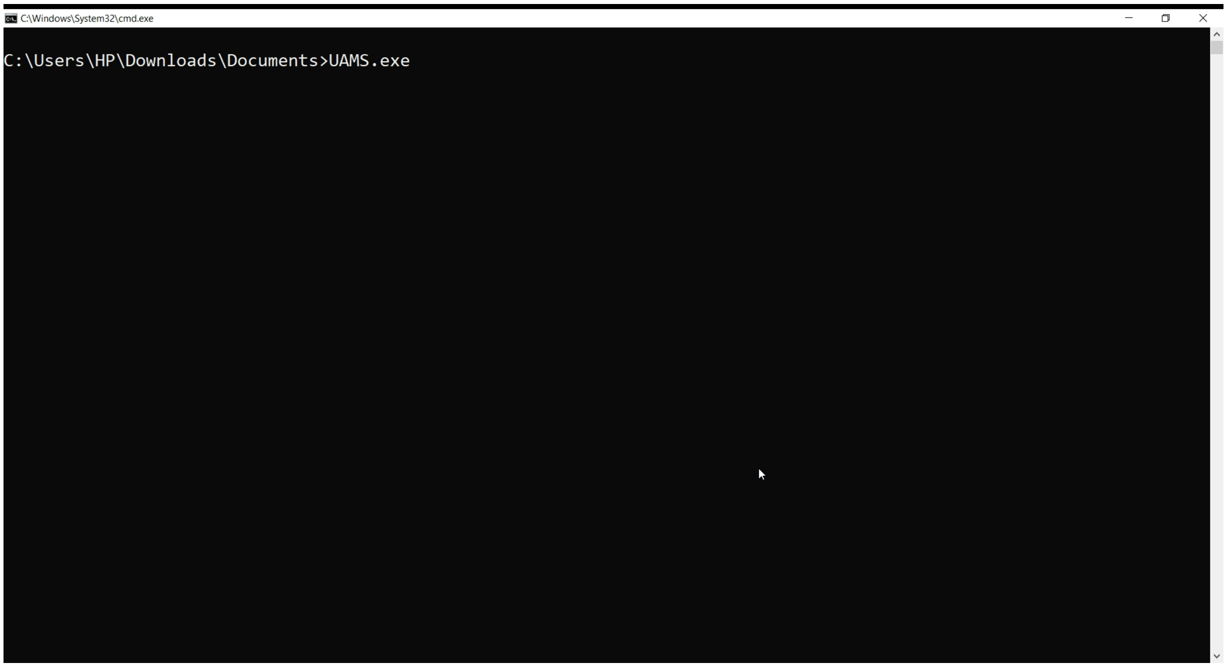
Let's do some coding.

University Admission Management System

Students, Let’s create the first version of the UAMS that has two roles

- User
- Admin

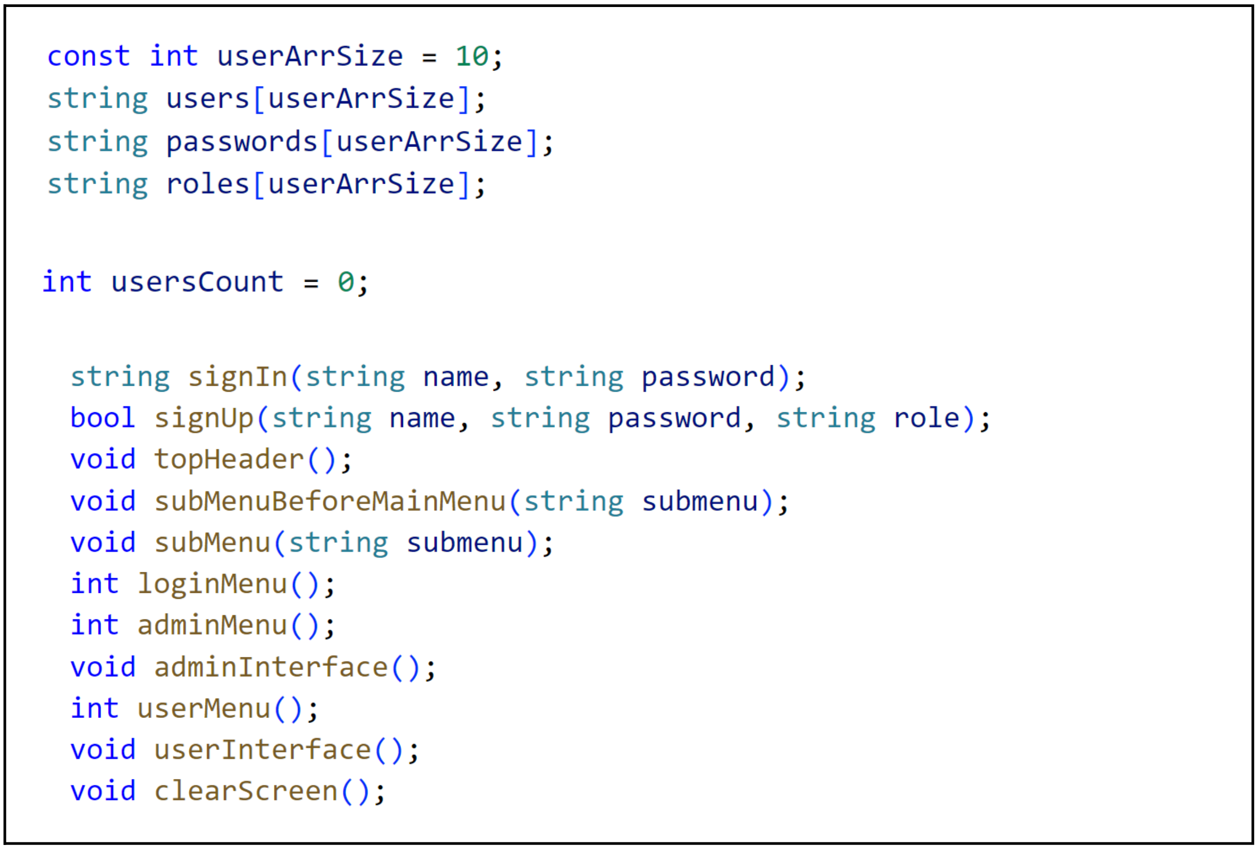
Notice the following .gif for better understanding



```
C:\Users\HP\Downloads\Documents>UAMS.exe
```

Lets write down the functions are arrays that will be required for developing this program.

- We need three global arrays for storing name, password, and roles of the users.
- In addition we need a global variable to count the number of students added in these arrays.
- Lastly, we need different single responsbility functions for implementing the logic of UAMS.



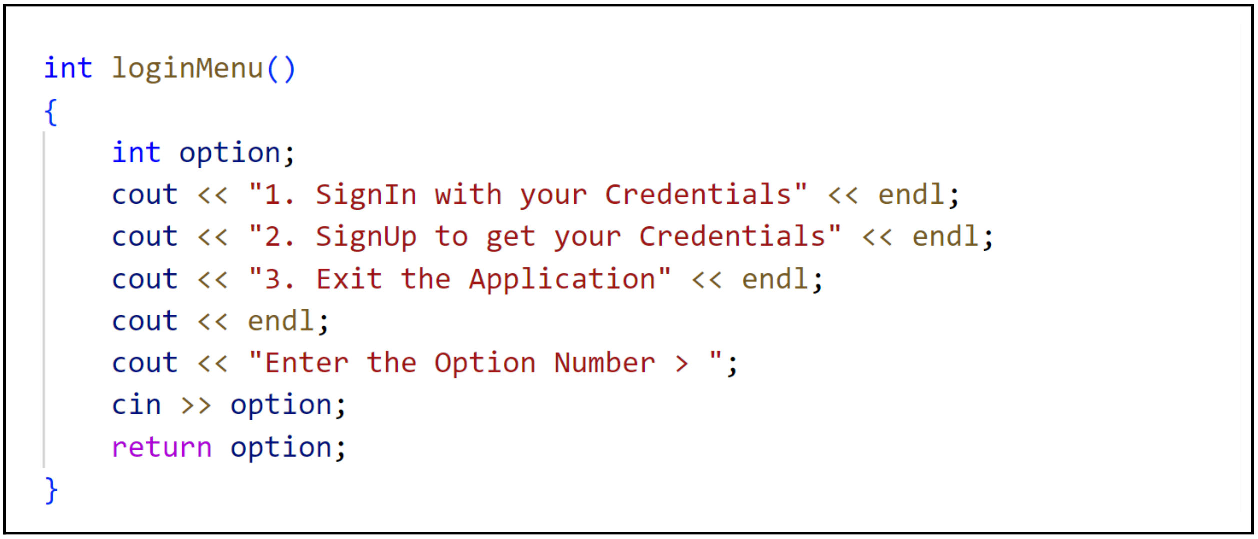
```
const int userArrSize = 10;
string users[userArrSize];
string passwords[userArrSize];
string roles[userArrSize];

int usersCount = 0;

  string signIn(string name, string password);
  bool signUp(string name, string password, string role);
  void topHeader();
  void subMenuBeforeMainMenu(string submenu);
  void subMenu(string submenu);
  int loginMenu();
  int adminMenu();
  void adminInterface();
  int userMenu();
  void userInterface();
  void clearScreen();
```

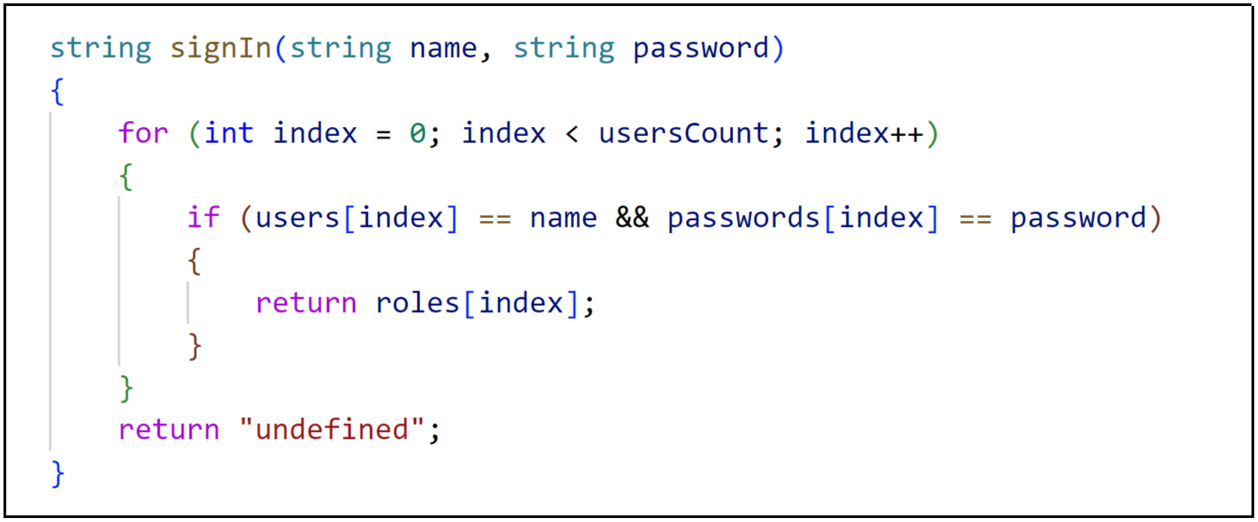
Lets define these functions one by one according to their functionality.

- The first menu that will return the choice of the user as an interger number.



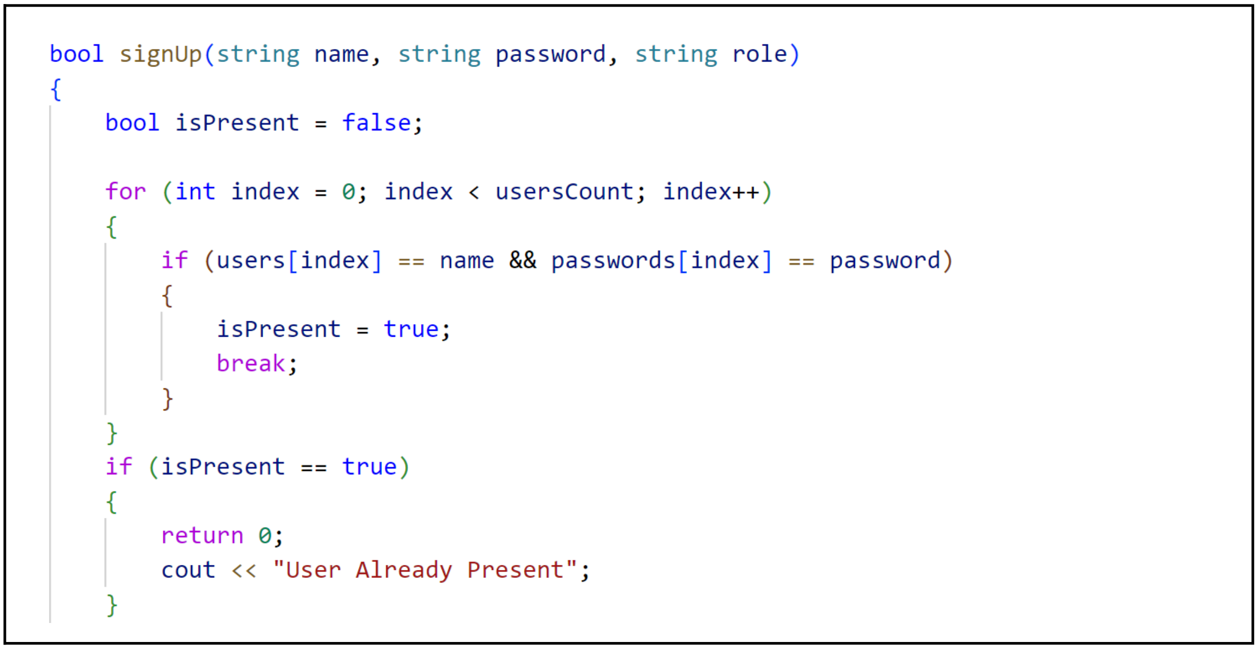
```
int loginMenu()
{
    int option;
    cout << "1. SignIn with your Credentials" << endl;
    cout << "2. SignUp to get your Credentials" << endl;
    cout << "3. Exit the Application" << endl;
    cout << endl;
    cout << "Enter the Option Number > ";
    cin >> option;
    return option;
}
```

- The signIn function that will return the role of the user and take two input parameters as name and password.



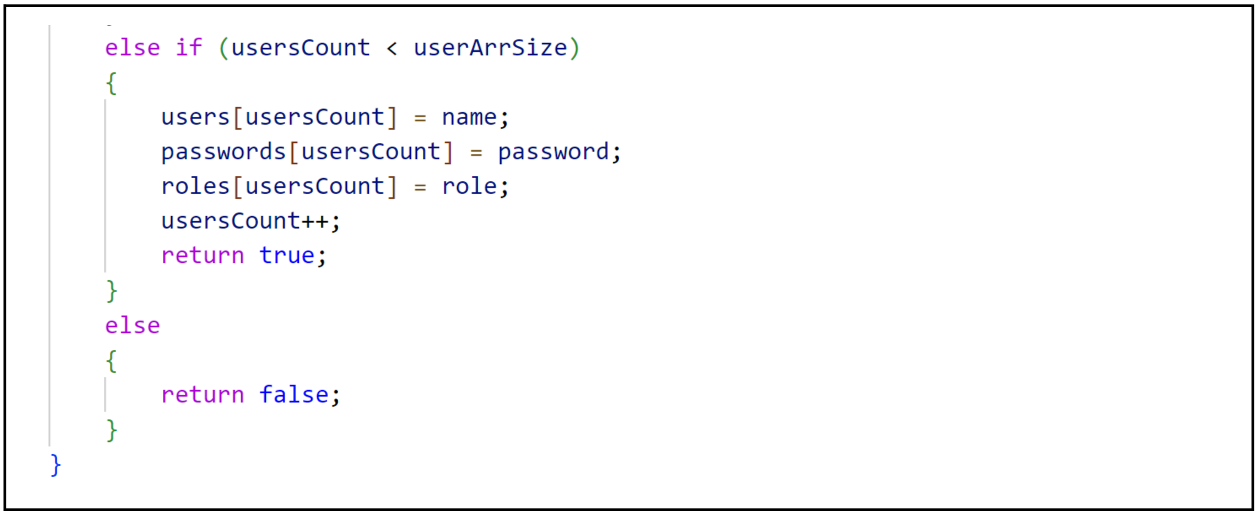
```
string signIn(string name, string password)
{
    for (int index = 0; index < usersCount; index++)
    {
        if (users[index] == name && passwords[index] == password)
        {
            return roles[index];
        }
    }
    return "undefined";
}
```

- The signUp function that will return a boolean value after taking in input parameters name, password and role of the user.



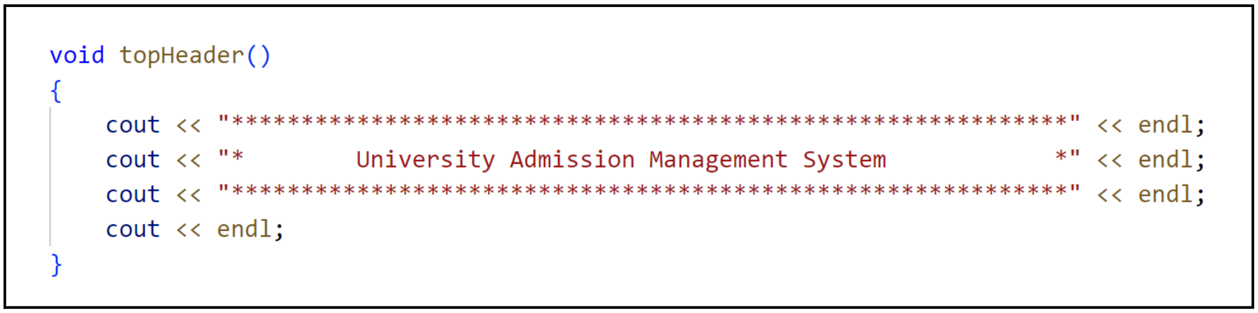
```
bool signUp(string name, string password, string role)
{
    bool isPresent = false;

    for (int index = 0; index < usersCount; index++)
    {
        if (users[index] == name && passwords[index] == password)
        {
            isPresent = true;
            break;
        }
    }
    if (isPresent == true)
    {
        return 0;
        cout << "User Already Present";
    }
```



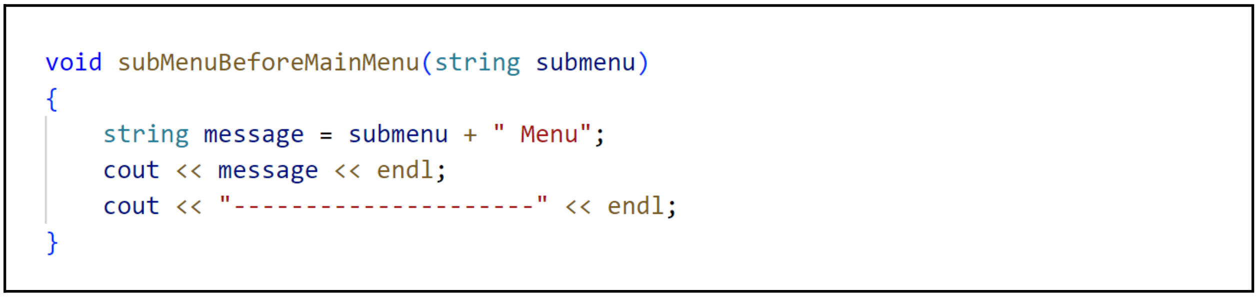
```
    else if (usersCount < userArrSize)
    {
        users[usersCount] = name;
        passwords[usersCount] = password;
        roles[usersCount] = role;
        usersCount++;
        return true;
    }
    else
    {
        return false;
    }
}
```

- topHeader function will be used to print the main header of the UAMS.



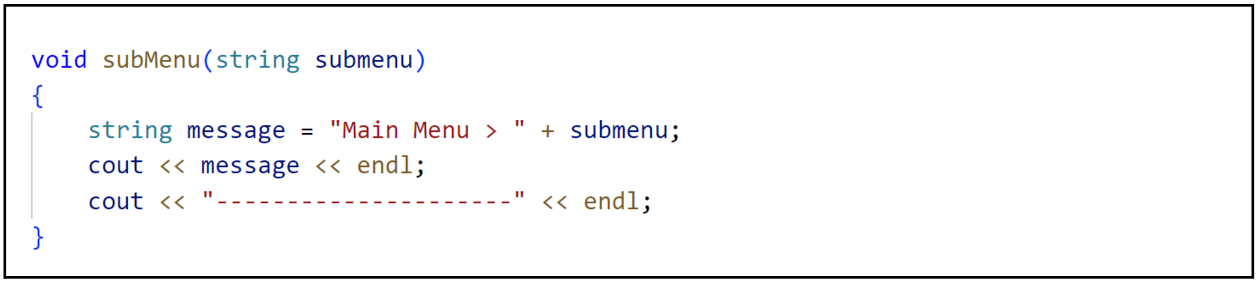
```
void topHeader()
{
    cout << "*************************************************************" << endl;
    cout << "*        University Admission Management System             *" << endl;
    cout << "*************************************************************" << endl;
    cout << endl;
}
```

- The subMenuBeforeMainMenu will print the submenu



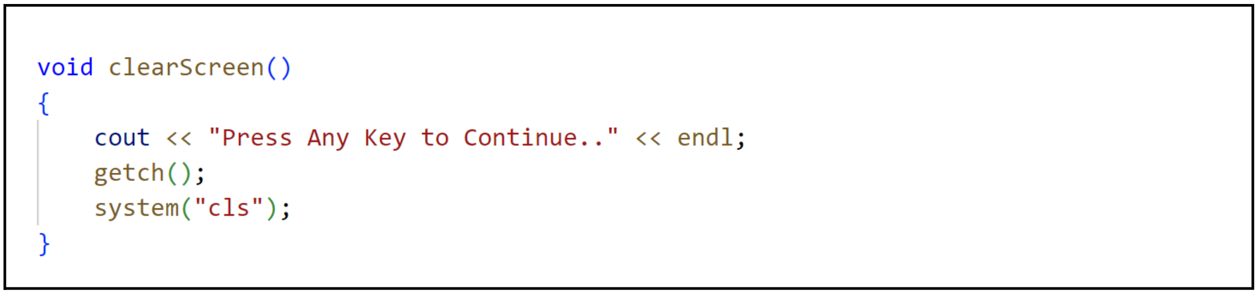
```
void subMenuBeforeMainMenu(string submenu)
{
    string message = submenu + " Menu";
    cout << message << endl;
    cout << "----------------------" << endl;
}
```

- The subMenu will print the submenu



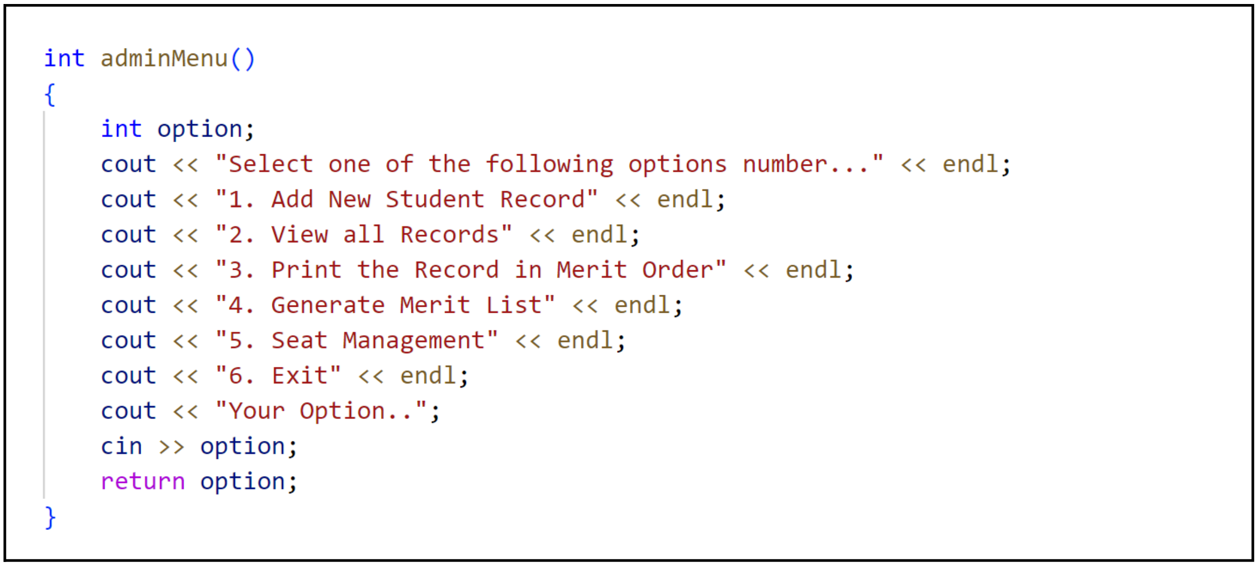
```
void subMenu(string submenu)
{
    string message = "Main Menu > " + submenu;
    cout << message << endl;
    cout << "----------------------" << endl;
}
```

- clearScreen function will clear the screen.



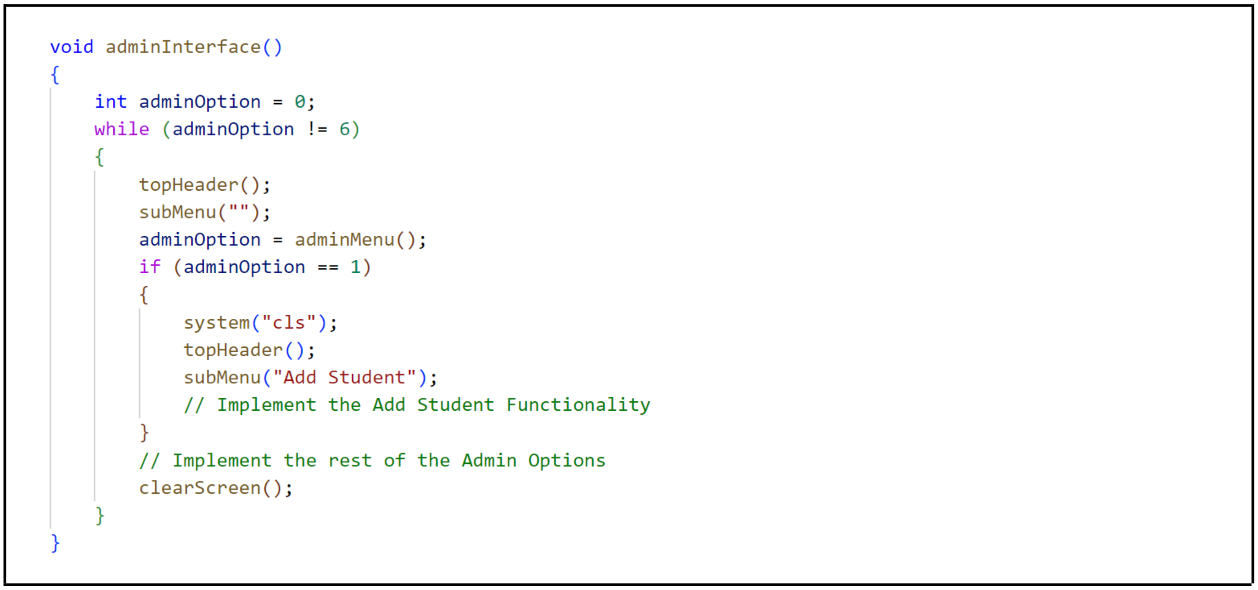
```
void clearScreen()
{
    cout << "Press Any Key to Continue.." << endl;
    getch();
    system("cls");
}
```

- adminMenu will print the admin panel on the console.



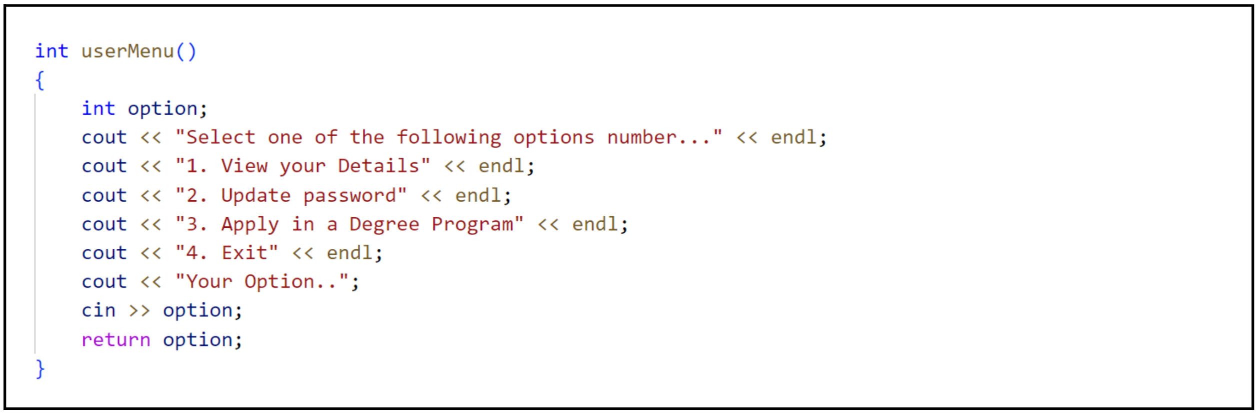
```
int adminMenu()
{
    int option;
    cout << "Select one of the following options number..." << endl;
    cout << "1. Add New Student Record" << endl;
    cout << "2. View all Records" << endl;
    cout << "3. Print the Record in Merit Order" << endl;
    cout << "4. Generate Merit List" << endl;
    cout << "5. Seat Management" << endl;
    cout << "6. Exit" << endl;
    cout << "Your Option..";
    cin >> option;
    return option;
}
```

- adminInterface will be the controller function for admin panel



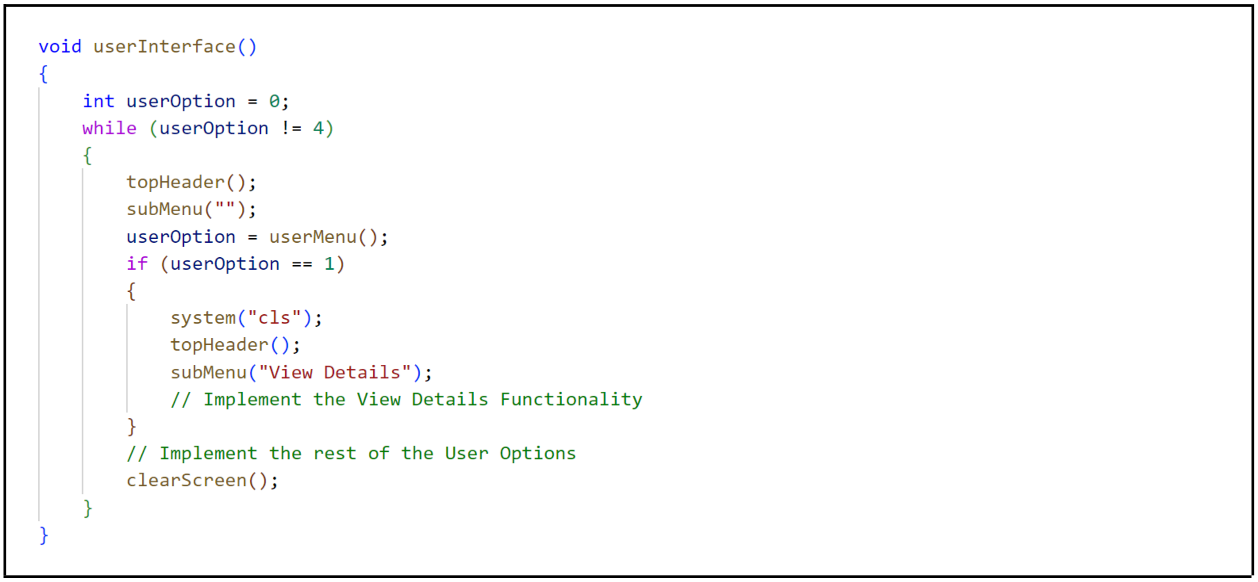
```cpp
void adminInterface()
{
    int adminOption = 0;
    while (adminOption != 6)
    {
        topHeader();
        subMenu("");
        adminOption = adminMenu();
        if (adminOption == 1)
        {
            system("cls");
            topHeader();
            subMenu("Add Student");
            // Implement the Add Student Functionality
        }
        // Implement the rest of the Admin Options
        clearScreen();
    }
}
```

- userMenu will print the user menu on the console screen.



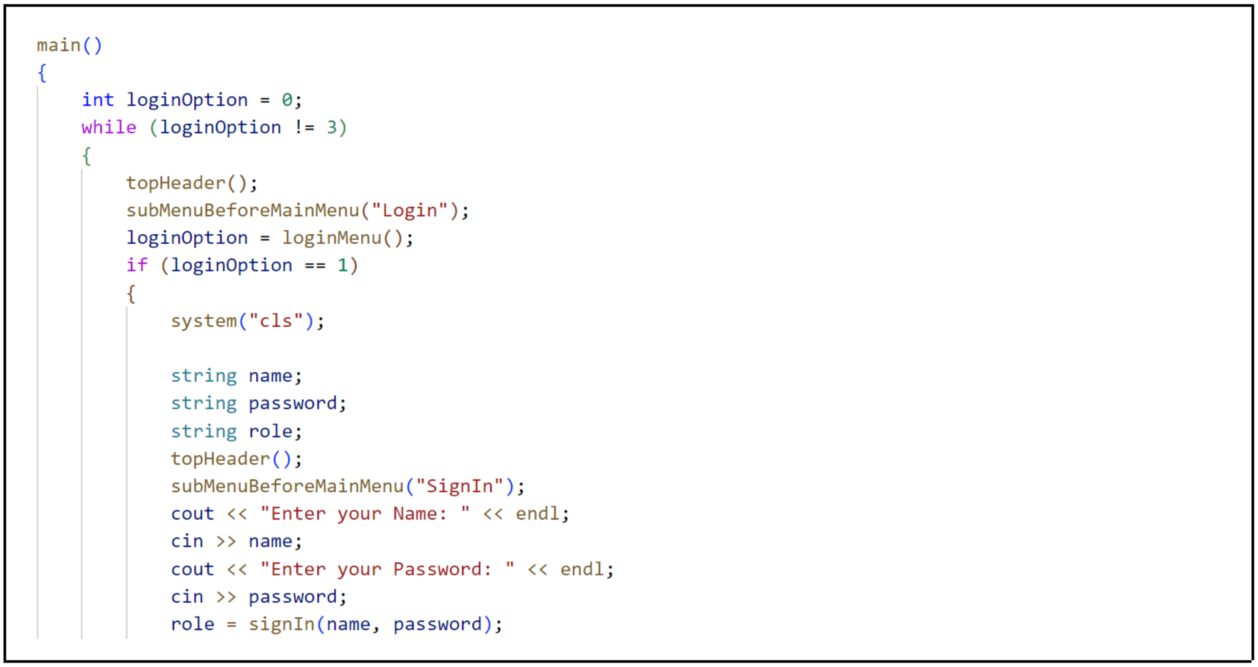
```cpp
int userMenu()
{
    int option;
    cout << "Select one of the following options number..." << endl;
    cout << "1. View your Details" << endl;
    cout << "2. Update password" << endl;
    cout << "3. Apply in a Degree Program" << endl;
    cout << "4. Exit" << endl;
    cout << "Your Option..";
    cin >> option;
    return option;
}
```

- userInterface is the driver function for the user panel



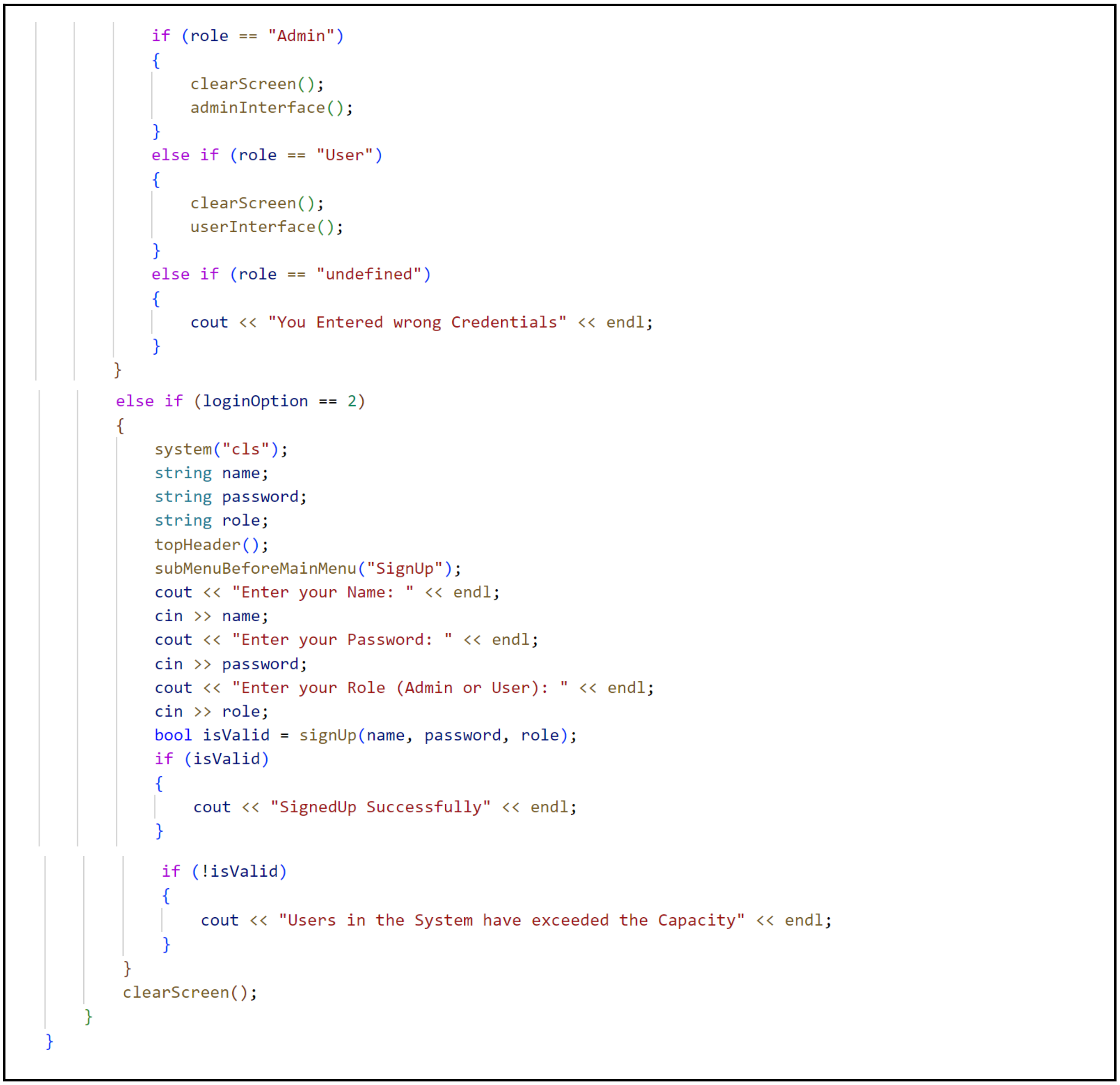
```
void userInterface()
{
    int userOption = 0;
    while (userOption != 4)
    {
        topHeader();
        subMenu("");
        userOption = userMenu();
        if (userOption == 1)
        {
            system("cls");
            topHeader();
            subMenu("View Details");
            // Implement the View Details Functionality
        }
        // Implement the rest of the User Options
        clearScreen();
    }
}
```

Let’s now implement the Main() driver function.



```
main()
{
    int loginOption = 0;
    while (loginOption != 3)
    {
        topHeader();
        subMenuBeforeMainMenu("Login");
        loginOption = loginMenu();
        if (loginOption == 1)
        {
            system("cls");

            string name;
            string password;
            string role;
            topHeader();
            subMenuBeforeMainMenu("SignIn");
            cout << "Enter your Name: " << endl;
            cin >> name;
            cout << "Enter your Password: " << endl;
            cin >> password;
            role = signIn(name, password);
```



```
            if (role == "Admin")
            {
                clearScreen();
                adminInterface();
            }
            else if (role == "User")
            {
                clearScreen();
                userInterface();
            }
            else if (role == "undefined")
            {
                cout << "You Entered wrong Credentials" << endl;
            }
        }
        else if (loginOption == 2)
        {
            system("cls");
            string name;
            string password;
            string role;
            topHeader();
            subMenuBeforeMainMenu("SignUp");
            cout << "Enter your Name: " << endl;
            cin >> name;
            cout << "Enter your Password: " << endl;
            cin >> password;
            cout << "Enter your Role (Admin or User): " << endl;
            cin >> role;
            bool isValid = signUp(name, password, role);
            if (isValid)
            {
                cout << "SignedUp Successfully" << endl;
            }

            if (!isValid)
            {
                cout << "Users in the System have exceeded the Capacity" << endl;
            }
        }
        clearScreen();
    }
}
```

Congratulations !! You have implemented your first version of the UAMS.

Project Version 01: Complete your business application with the help from Teaching Assitant assigned to you.

Bonus Tasks (optional)

Task 01(CP):

Create a function that determines whether elements in an array can be re-arranged to form a consecutive list of numbers where each number appears exactly once.

Test Cases:

Array Length: 5 [5, 1, 4, 3, 2]	**True**	// Can be re-arranged to form [1, 2, 3, 4, 5]
Array Length: 6 [5, 1, 4, 3, 2, 8]	**False**	
Array Length: 6 [5, 6, 7, 8, 9, 9]	**False**	// 9 appears twice

Task 02(CP):

Given a list of directions to spin, "left" or "right", return an integer of how many full 360° rotations were made. Note that each word in the array counts as a 90° rotation in that direction.

["right", "right", "right", "right", "left", "right"]	1	// You spun right 4 times (90 * 4 = 360)
		// You spun left once (360 - 90 = 270)
		// But you spun right once more to make a full rotation (270 + 90 = 360)

["left", "right", "left", "right"]	0	
["right", "right", "right", "right", "right", "right", "right", "right"]	2	
["left", "left", "left", "left"]	1	

Good Luck and Best Wishes !!

Happy Coding ahead :)