COMPILER CONSTRUCTION

MID LAB

Name : Hussain Ali

Reg No. : FA21-BCS-066

Section : BCS-7A

QUESTION NO. 1

Source Code:

```
#include <iostream>
#include <string>
#include <vector>
#include <cstdlib>
using namespace std;

string registeredUsername = "movieLover";
```

```
string registeredPassword = "ticketSecure";

void displayMainMenu();
bool verifyUserCredentials();
void enableGuestMode();
void chooseMovie();
void presentMovieDetails(int movieID);
void bookSeat(const string& movieName, const string&
showtime);
void handlePayment(const string& movieName, const string&
showtime);
bool inquireAboutAnotherBooking();
void showSeatArrangement(const vector<vector<char>>&
seatingArrangement);

int main() {
    bool continueBooking = true;

    while (continueBooking) {
        displayMainMenu();
        int selectedOption;
```

```
cin >> selectedOption;

switch (selectedOption) {
case 1:
    if (verifyUserCredentials()) {
        chooseMovie();
    }
    break;
case 2:
    enableGuestMode();
    chooseMovie();
    break;
case 3:
    cout << "Thank you for using the system. Goodbye!\n";
    return 0;
default:
    cout << "Invalid option, please select a valid choice.\n";
}

continueBooking = inquireAboutAnotherBooking();
```

```
    }

    return 0;
}

void displayMainMenu() {
    cout << "==== Welcome to the Cinema Ticket Booking System
====\n";
    cout << "1. Enter Username and Password\n";
    cout << "2. Guest Checkout\n";
    cout << "3. Exit\n";
    cout << "Select an option: ";
}

bool verifyUserCredentials() {
    string inputUsername, inputPassword;
    int attemptsLeft = 3;

    while (attemptsLeft > 0) {
        cout << "Username: ";
```

```
        cin >> inputUsername;
        cout << "Password: ";
        cin >> inputPassword;

        if (inputUsername == registeredUsername &&
inputPassword == registeredPassword) {
            cout << "Login Successful! Enjoy your movie
experience.\n";
            return true;
        }
        else {
            attemptsLeft--;
            cout << "Invalid login. Attempts remaining: " <<
attemptsLeft << "\n";
        }
    }

    cout << "Login Failed. The program will exit now.\n";
    return false;
}
```

```
void enableGuestMode() {
    cout << "You are now in Guest Mode. Please note that
features may be limited.\n";
}

void chooseMovie() {
    int movieChoice;
    cout << "Select a movie from the list below:\n";
    cout << "1. Enigmatic Thriller\n";
    cout << "2. Family Fun\n";
    cout << "3. Futuristic Sci-Fi\n";
    cout << "4. Exit\n";
    cout << "Your choice: ";
    cin >> movieChoice;

    if (movieChoice == 4) {
        cout << "Exiting movie selection.\n";
        return;
    }
```

```
    switch (movieChoice) {
    case 1:
        presentMovieDetails(movieChoice);
        bookSeat("Enigmatic Thriller", "5:00 PM");
        break;
    case 2:
        presentMovieDetails(movieChoice);
        bookSeat("Family Fun", "6:30 PM");
        break;
    case 3:
        presentMovieDetails(movieChoice);
        bookSeat("Futuristic Sci-Fi", "8:00 PM");
        break;
    default:
        cout << "Invalid movie selection. Please try again.\n";
    }
}

void presentMovieDetails(int movieID) {
    switch (movieID) {
```

```
    case 1:
        cout << "Movie: Enigmatic Thriller | Genre: Thriller | Duration: 140 mins | Showtimes: 5:00 PM\n";
        break;
    case 2:
        cout << "Movie: Family Fun | Genre: Family | Duration: 100 mins | Showtimes: 6:30 PM\n";
        break;
    case 3:
        cout << "Movie: Futuristic Sci-Fi | Genre: Sci-Fi | Duration: 150 mins | Showtimes: 8:00 PM\n";
        break;
    default:
        cout << "Invalid movie selection. Please try again.\n";
    }
}

void bookSeat(const string& movieName, const string& showtime) {
    vector<vector<char>> seatingArrangement(5, vector<char>(6, 'O'));
    int rowChoice, columnChoice;
```

```
    while (true) {
        showSeatArrangement(seatingArrangement);
        cout << "Select your seat by entering row and column
numbers (e.g., 0 2): ";
        cin >> rowChoice >> columnChoice;


        if (rowChoice < 0 || rowChoice >=
seatingArrangement.size() || columnChoice < 0 ||
columnChoice >= seatingArrangement[0].size()) {
            cout << "Invalid seat choice. Please try again.\n";
        }
        else if (seatingArrangement[rowChoice][columnChoice] ==
'O') {
            seatingArrangement[rowChoice][columnChoice] = 'X';
            cout << "Seat successfully reserved!\n";
            handlePayment(movieName, showtime);
            break;
        }
        else {
            cout << "This seat is already taken. Please select a
different one.\n";
```

```
        }
    }
}

void showSeatArrangement(const vector<vector<char>>&
seatingArrangement) {
    cout << "Seat Map (O = Available, X = Occupied):\n";
    for (const auto& row : seatingArrangement) {
        for (const auto& seat : row) {
            cout << seat << " ";
        }
        cout << endl;
    }
}

void handlePayment(const string& movieName, const string&
showtime) {
    int paymentMethod;
    cout << "Choose your payment option:\n";
    cout << "1. Credit Card\n";
    cout << "2. Mobile Wallet\n";
```

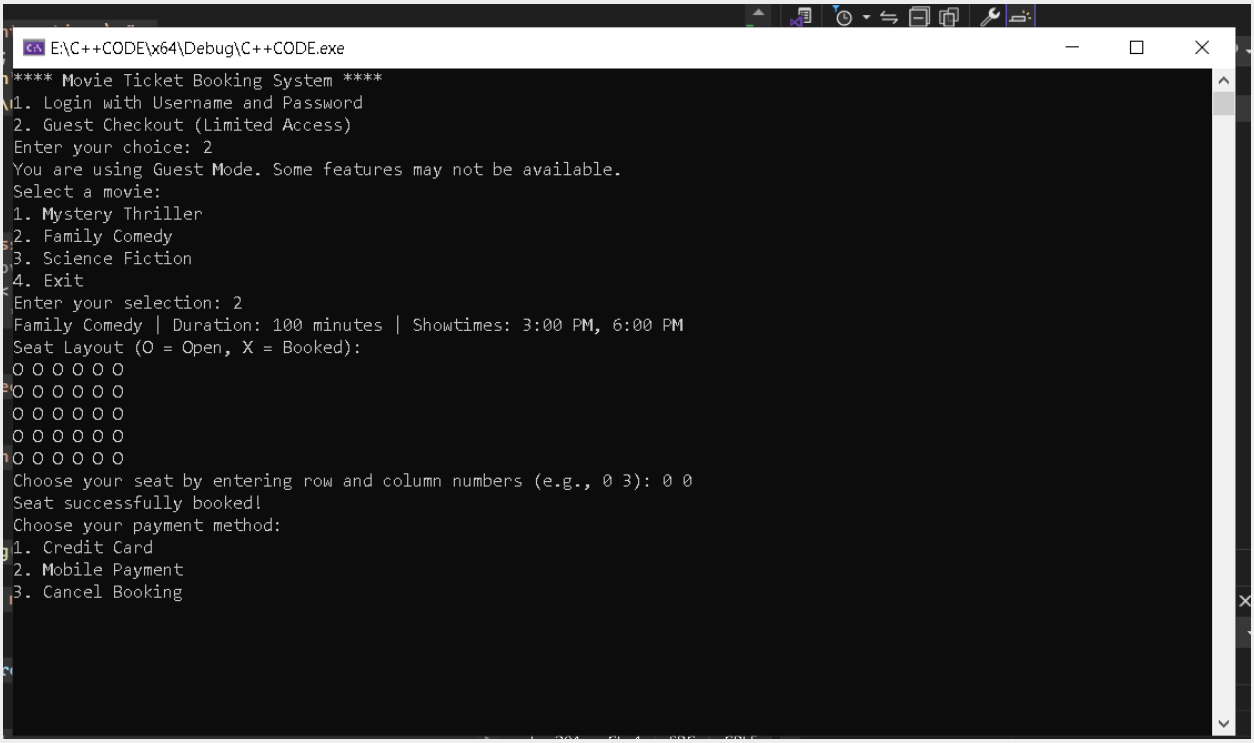
```
    cout << "3. Cancel Booking\n";
    cin >> paymentMethod;

    switch (paymentMethod) {
    case 1:
    case 2:
        cout << "Payment successful! Your booking is
confirmed.\n";
        cout << "Movie: " << movieName << "\n";
        cout << "Showtime: " << showtime << "\n";
        cout << "Reference ID: " << rand() % 10000 + 1000 << "\n";
        break;
    case 3:
        cout << "Booking has been cancelled.\n";
        break;
    default:
        cout << "Invalid option, please choose again.\n";
    }
}
```

```
bool inquireAboutAnotherBooking() {
    string reply;
    cout << "Would you like to make another booking? (Yes/No): ";
    cin >> reply;

    return (reply == "Yes" || reply == "yes");
}
```

OUTPUT:



Question No. 2

Source Code:

```
using System;
using System.Collections.Generic;
using System.Text.RegularExpressions;
using System.Windows.Forms;

namespace WindowsFormsApp2
{
    public partial class Form1 : Form
    {
        private static readonly HashSet<string> cppKeywords =
new HashSet<string>
        {
            "int", "void", "bool", "string", "while", "if", "else",
"return", "using", "namespace",
```

```
        "cout", "cin", "include", "vector", "true", "false", "case",
"break"
    };

    private static readonly HashSet<string> cppOperators =
new HashSet<string>
    {
        "+", "-", "*", "/", "=", "==", ">", "<", ">=", "<=", "&&",
"||", "!", "++", "--"
    };

    private static readonly Regex varPattern = new
Regex(@"^[a-zA-Z_][a-zA-Z0-9_]*$");
    private static readonly Regex opPattern = new
Regex(@"[\+\-\*\/\=\>\<\&\|\!]{1,2}");
    private static readonly Regex strPattern = new
Regex(@"^""[^""]*""$");

    public Form1()
    {
        InitializeComponent();
    }
```

```
        private void SubmitButton_Click(object sender, EventArgs
e)
        {
            TokenizedOutput.Clear();
            string sourceCode = SourceCode.Text;
            List<string> tokens = TokenizeSourceCode(sourceCode);
            DisplayTokens(tokens);
        }

        private List<string> TokenizeSourceCode(string code)
        {
            List<string> extractedTokens = new List<string>();
            string[] words = code.Split(new[] { ' ', '\n', '\t', ';', '(', ')', '{',
'}', '[', ']', ',', '.' }, StringSplitOptions.RemoveEmptyEntries);

            foreach (var word in words)
            {
                if (cppKeywords.Contains(word))
                    extractedTokens.Add($"Keyword: {word}");
                else if (cppOperators.Contains(word))
```

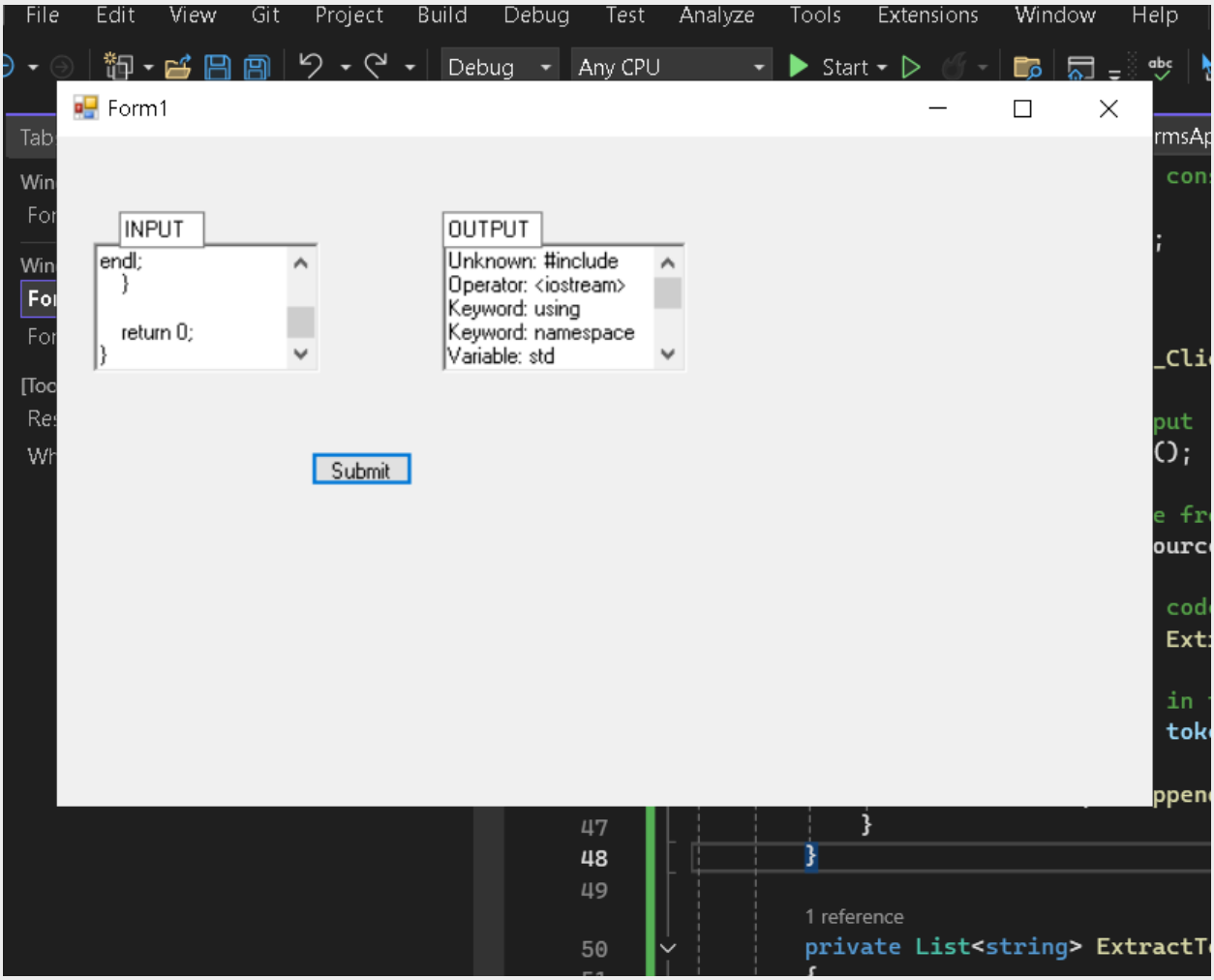
```
                extractedTokens.Add($"Operator: {word}");
            else if (varPattern.IsMatch(word))
                extractedTokens.Add($"Variable: {word}");
            else if (strPattern.IsMatch(word))
                extractedTokens.Add($"String: {word}");
            else if (opPattern.IsMatch(word))
                extractedTokens.Add($"Operator: {word}");
            else
                extractedTokens.Add($"Identifier: {word}");
        }

        return extractedTokens;
    }

    private void DisplayTokens(List<string> tokens)
    {
        foreach (var token in tokens)
        {
            TokenizedOutput.AppendText(token +
Environment.NewLine);
```

```
            }
        }
    }
}
```

Output:



----------THE END----------