Mini Project Report

D. Y. Patil College of Engineering & Technology

(Approved by AICTE, New Delhi, Govt. of Maharashtra and Permanently Affiliated to Shivaji University Kolhapur)

(An Autonomous Institute)

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Class: SY ‘C’

Subject: Object Oriented Programming using C++

Project Title

Quiz Generator

Objective

The main objective of this project is to develop a Quiz Generator system using C++ that allows users to attempt quizzes consisting of multiple-choice questions. It helps improve knowledge, evaluate performance, and make learning more interactive and engaging.

Concepts Used in the Project

- 1. Object-Oriented Programming (OOP) — Used to structure the code using classes and objects for better organization.

2. Functions — To handle tasks like displaying questions, checking answers, and showing results.

3. Conditional Statements (if-else) — To compare the user's answer with the correct option.

4. Loops (for / while) — To display multiple questions one by one.

5. Arrays / Structures — To store questions, options, and correct answers.

6. File Handling (optional) — To load or save quiz questions and results.

7. Input and Output (cin, cout) — For user interaction and displaying results.

Project Description

The Quiz Generator project is a simple console-based C++ application designed to conduct quizzes automatically.It presents a series of questions to the user, each with four options (A, B, C, D). The user selects the correct option, and the program evaluates the response. After completing all questions, the program displays the total score and performance summary.This project demonstrates the use of C++ programming fundamentals, logical thinking, and modular coding. It can be expanded to include features like random question selection, categories, timer-based quizzes, or file-based question storage.

Features

Displays multiple-choice questions with four options.

Accepts user input for selected answers.

Checks and scores answers automatically.

Shows total marks and result at the end of the quiz.

Simple, user-friendly interface.

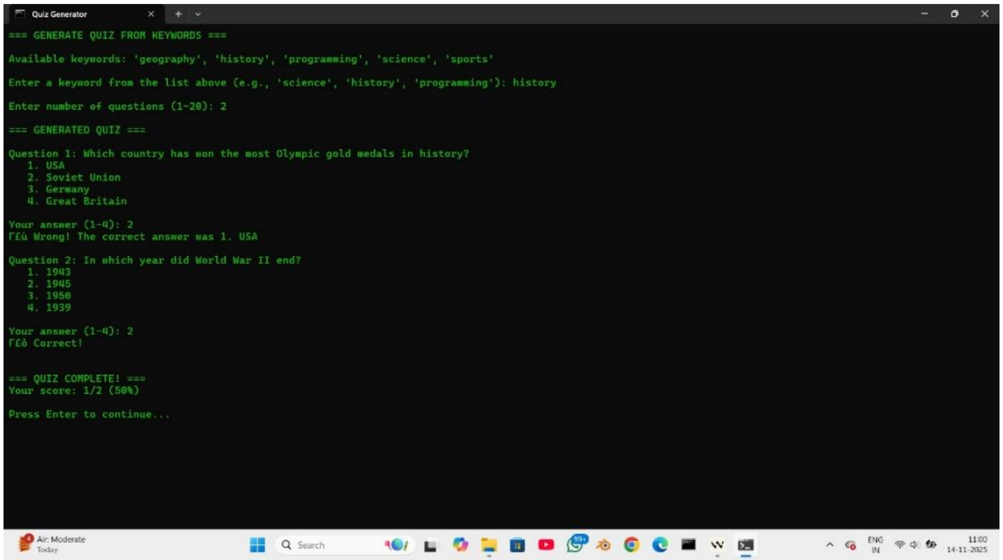
Can be easily extended to include more questions or levels.

Code:

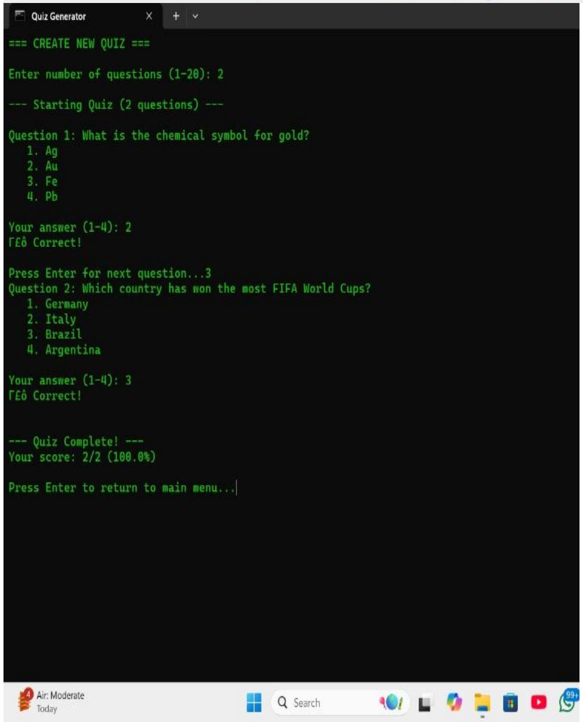
```
#include <iostream>
#include <fstream>
#include <vector>
#include <string>
#include <cstdlib>
#include <ctime>
#include <limits>
#include <iomanip>
#include <algorithm>
#include <chrono>
#include <thread>
#include <map>
#include <sstream>

using namespace std;

struct Question {
    string question;
    vector<string> options;
    int correctOption;
};

// Forward declarations
void clearScreen();
int showMainMenu();
void takeQuiz();
vector<Question> loadQuestions();
void generateFromKeywords();

// Sample question bank organized by categories
map<string, vector<Question>> questionBank = {
    {"science", {
        {"What is the chemical symbol for water?", {"H2O", "CO2", "NaCl", "O2"}, 1},
        {"Which planet is known as the Red Planet?", {"Venus", "Mars", "Jupiter", "Saturn"}, 2},
        {"What is the powerhouse of the cell?", {"Nucleus", "Mitochondria", "Ribosome", "Golgi"}, 2},
        {"What is the atomic number of Carbon?", {"4", "6", "8", "12"}, 2},
        {"Which gas is most abundant in Earth's atmosphere?", {"Oxygen", "Carbon Dioxide", "Nitrogen", "Argon"}, 3},
        {"What is the speed of light in vacuum (m/s)?", {"3x10^5", "3x10^6", "3x10^8", "3x10^10"}, 3},
        {"Which element has the chemical symbol 'Au'?", {"Silver", "Gold", "Aluminum", "Argon"}, 2},
        {"What is the hardest natural substance on Earth?", {"Gold", "Iron", "Diamond", "Platinum"}, 3},
        {"Which planet is known as the Morning Star?", {"Venus", "Mars", "Jupiter", "Mercury"}, 1},

        {"What is the chemical formula of table salt?", {"NaCl", "H2O", "CO2", "C6H12O6"}, 1},

        {"Which is the largest organ of the human body?", {"Liver", "Brain", "Skin", "Heart"}, 3},

        {"What is the pH value of pure water?", {"5", "6", "7", "8"}, 3},

        {"Which gas do plants absorb during photosynthesis?", {"Oxygen", "Carbon Dioxide", "Nitrogen", "Hydrogen"}, 2},

        {"What is the unit of electrical resistance?", {"Volt", "Ampere", "Ohm", "Watt"}, 3},

        {"Which planet has the most moons in our solar system?", {"Jupiter", "Saturn", "Neptune", "Uranus"}, 2},

        {"What is the chemical symbol for gold?", {"Ag", "Au", "Fe", "Pb"}, 2},

        {"Which blood type is the universal donor?", {"A", "B", "AB", "O"}, 4},

        {"What is the largest planet in our solar system?", {"Earth", "Jupiter", "Saturn", "Neptune"}, 2},

        {"Which vitamin is produced when the human body is exposed to sunlight?", {"A", "B", "C", "D"}, 4},

        {"What is the chemical formula for ozone?", {"O2", "O3", "CO2", "H2O"}, 2}

    }},

    {"history", {

        {"In which year did World War II end?", {"1943", "1945", "1950", "1939"}, 2},

        {"Who was the first President of the United States?",

            {"Thomas Jefferson", "George Washington", "John Adams", "Abraham Lincoln"}, 2},

        {"Which ancient civilization built the Great Pyramids?", {"Greeks", "Romans", "Egyptians", "Mayans"}, 3},

        {"Who painted the Mona Lisa?", {"Vincent van Gogh", "Pablo Picasso", "Leonardo da Vinci", "Michelangelo"}, 3},

        {"In which year did the Titanic sink?", {"1905", "1912", "1918", "1923"}, 2},

        {"Who was the first person to step on the Moon?", {"Neil Armstrong", "Buzz Aldrin", "Yuri Gagarin", "Alan Shepard"}, 1},

        {"Which empire was ruled by Genghis Khan?", {"Roman", "Mongol", "Ottoman", "British"}, 2},

        {"When was the Declaration of Independence signed?", {"1776", "1789", "1792", "1801"}, 1},

        {"Who was the first female Prime Minister of the UK?", {"Theresa May", "Margaret Thatcher", "Indira Gandhi", "Angela Merkel"}, 2},

        {"Which ancient wonder was located in Alexandria, Egypt?", {"Hanging Gardens", "Colossus of Rhodes", "Lighthouse of Alexandria", "Great Pyramid"}, 3},

        {"Who wrote 'The Art of War'?", {"Sun Tzu", "Confucius", "Lao Tzu", "Mencius"}, 1},

        {"In which year did the Berlin Wall fall?", {"1985", "1989", "1991", "1995"}, 2},

        {"Who was the first emperor of Rome?", {"Julius Caesar", "Augustus", "Nero", "Caligula"}, 2},

        {"Which war was fought between the North and South regions of the US?", {"Revolutionary War", "War of 1812", "Civil War", "Spanish-American War"}, 3},

        {"Who discovered America in 1492?", {"Christopher Columbus", "Vasco da Gama", "Ferdinand Magellan", "Marco Polo"}, 1},

        {"Which ancient city was destroyed by the eruption of Mount Vesuvius?", {"Athens", "Pompeii", "Sparta", "Troy"}, 2},
        {"Who was the first woman to win a Nobel Prize?", {"Marie Curie", "Mother Teresa", "Rosalind Franklin", "Jane Addams"}, 1},

        {"Which country was the first to give women the right to vote?", {"USA", "UK", "New Zealand", "France"}, 3},

        {"Who was the last Tsar of Russia?", {"Peter the Great", "Ivan the Terrible", "Nicholas II", "Alexander II"}, 3},

        {"In which year did World War I begin?", {"1912", "1914", "1916", "1918"}, 2}

    }},

    {"programming", {

        {"What does 'OOP' stand for?",

            {"Object-Oriented Programming", "Object-Oriented Process", "Object-Oriented Protocol", "Object-Oriented Project"}, 1},

        {"Which language is known as the 'mother of all languages'?",

            {"C", "Java", "Python", "Assembly"}, 1},

        {"What does HTML stand for?",

            {"Hyper Text Markup Language", "High Tech Modern Language", "Hyperlink and Text Markup Language", "Home Tool Markup Language"}, 1},

        {"Which of these is not a programming language?", {"Java", "Python", "HTML", "Ruby"}, 3},

        {"What is the correct way to declare a variable in Python?",

            {"variable name = value", "var name = value", "name = value", "String name = value"}, 3},

        {"Which data structure uses LIFO (Last In First Out) principle?",

            {"Queue", "Stack", "Array", "Linked List"}, 2},

        {"What is the output of 'print(2 ** 3)' in Python?", {"6", "8", "9", "23"}, 2},

        {"Which of these is not a valid variable name in most programming languages?",

            {"my_var", "2ndVar", "_private", "$amount"}, 2},

        {"What does API stand for?",

            {"Application Programming Interface", "Advanced Programming Interface", "Automated Program Interaction", "Application Process Integration"}, 1},

        {"Which language is used for styling web pages?", {"HTML", "CSS", "JavaScript", "PHP"}, 2},

        {"What is the correct syntax for an if statement in Python?",

            {"if x > y:", "if (x > y) then", "if x > y then", "if {x > y}"}, 1},

        {"Which symbol is used for single-line comments in Python?", {"//", "#", "/*", "--"}, 2},

        {"What is the correct way to create a function in JavaScript?",

            {"function = myFunction()", "function myFunction()", "def myFunction()", "function:myFunction()"}, 2},

        {"Which of these is not a JavaScript framework?", {"React", "Angular", "Django", "Vue"}, 3},

        {"What does SQL stand for?",

            {"Structured Query Language", "Simple Query Language", "Standard Query Language", "Sequential Query Language"}, 1},

        {"Which of these is not a valid data type in Python?", {"int", "float", "string", "character"}, 4},

        {"What is the correct way to create an array in JavaScript?",

            {"array = []", "array = {}", "array = ()", "array = new Array()"}, 1},

        {"Which operator is used for exponentiation in Python?", {"^", "", "^^", "*^"}, 2},

        {"What does CSS stand for?",
            {"Computer Style Sheets", "Creative Style Sheets", "Cascading Style Sheets", "Colorful Style Sheets"}, 3},

        {"Which of these is not a version control system?", {"Git", "SVN", "Mercurial", "Maven"}, 4}

    }},

    {"geography", {

        {"What is the capital of France?", {"London", "Berlin", "Paris", "Madrid"}, 3},

        {"Which is the longest river in the world?", {"Nile", "Amazon", "Yangtze", "Mississippi"}, 1},

        {"Which country has the largest population in the world?", {"India", "USA", "China", "Indonesia"}, 3},

        {"What is the largest ocean on Earth?", {"Atlantic", "Indian", "Arctic", "Pacific"}, 4},

        {"Which country is home to the Great Barrier Reef?", {"Brazil", "Australia", "Thailand", "Mexico"}, 2},

        {"What is the capital of Japan?", {"Beijing", "Seoul", "Tokyo", "Bangkok"}, 3},

        {"Which desert is the largest in the world?", {"Sahara", "Arabian", "Gobi", "Kalahari"}, 1},

        {"What is the smallest continent by land area?", {"Europe", "Australia", "Antarctica", "South America"}, 2},

        {"Which mountain is the highest in the world?", {"K2", "Kangchenjunga", "Mount Everest", "Lhotse"}, 3},

        {"Which country is known as the Land of the Rising Sun?", {"China", "South Korea", "Japan", "Vietnam"}, 3},

        {"What is the capital of Canada?", {"Toronto", "Vancouver", "Ottawa", "Montreal"}, 3},

        {"Which river flows through the Grand Canyon?", {"Mississippi", "Colorado", "Rio Grande", "Missouri"}, 2},

        {"What is the largest country by land area?", {"USA", "China", "Canada", "Russia"}, 4},

        {"Which city is located on two continents?", {"Istanbul", "Moscow", "Cairo", "Dubai"}, 1},

        {"What is the capital of Brazil?", {"Rio de Janeiro", "Sao Paulo", "Brasilia", "Buenos Aires"}, 3},

        {"Which African country was formerly known as Abyssinia?", {"Ethiopia", "Ghana", "Kenya", "Tanzania"}, 1},

        {"What is the largest island in the world?", {"Borneo", "Greenland", "Madagascar", "New Guinea"}, 2},

        {"Which country is the largest producer of coffee in the world?", {"Brazil", "Colombia", "Vietnam", "Indonesia"}, 1},

        {"What is the capital of South Africa?", {"Cape Town", "Johannesburg", "Pretoria", "Durban"}, 3},

        {"Which sea is the saltiest body of water on Earth?", {"Dead Sea", "Red Sea", "Black Sea", "Caspian Sea"}, 1}

    }},

    {"sports", {

        {"In which sport would you perform a slam dunk?", {"Basketball", "Tennis", "Soccer", "Volleyball"}, 1},

        {"Which country won the 2018 FIFA World Cup?", {"Germany", "Brazil", "France", "Croatia"}, 3},

        {"How many players are there in a standard soccer team?", {"9", "10", "11", "12"}, 3},

        {"Which sport uses terms like 'love' and 'deuce'?", {"Tennis", "Golf", "Cricket", "Badminton"}, 1},

        {"In which country were the first Olympic Games held?", {"Rome", "Athens", "Olympia", "Sparta"}, 3},

        {"Which athlete has won the most Olympic gold medals?", {"Michael Phelps", "Usain Bolt", "Carl Lewis", "Larisa Latynina"}, 1},
        {"In which sport would you perform a 'hole in one'?", {"Golf", "Tennis", "Basketball", "Baseball"}, 1},
        {"Which country won the first ever Cricket World Cup in 1975?", {"England", "West Indies", "Australia", "India"}, 2},
        {"How many players are there in a standard baseball team on the field?", {"7", "8", "9", "10"}, 3},
        {"Which country hosted the 2016 Summer Olympics?", {"Japan", "Brazil", "UK", "China"}, 2},
        {"In tennis, what is a score of 40-40 called?", {"Deuce", "Advantage", "Match Point", "Set Point"}, 1},
        {"Which sport is associated with Wimbledon?", {"Golf", "Tennis", "Cricket", "Rugby"}, 2},
        {"How many players are there in a standard cricket team on the field?", {"9", "10", "11", "12"}, 3},
        {"Which country has won the most FIFA World Cups?", {"Germany", "Italy", "Brazil", "Argentina"}, 3},
        {"In which sport would you use a 'birdie'?", {"Badminton", "Golf", "Tennis", "Table Tennis"}, 1},
        {"How many players are there in a standard volleyball team on the court?", {"5", "6", "7", "8"}, 2},
        {"Which country won the most medals in the 2020 Tokyo Olympics?", {"USA", "China", "Japan", "Great Britain"}, 1},
        {"In which sport would you perform a 'home run'?", {"Basketball", "Baseball", "Cricket", "Hockey"}, 2},
        {"Which country has won the most Olympic gold medals in history?", {"USA", "Soviet Union", "Germany", "Great Britain"}, 1},
        {"How many players are there in a standard rugby union team on the field?", {"13", "14", "15", "16"}, 3}
    }}
};


// Function to generate questions based on keywords
vector<Question> generateQuestions(const string& keyword, int count) {
    vector<Question> generatedQuestions;
    string lowerKeyword = keyword;
    transform(lowerKeyword.begin(), lowerKeyword.end(), lowerKeyword.begin(), ::tolower);


    // Search in all categories
    for (const auto& category : questionBank) {
        for (const auto& question : category.second) {
            string questionText = question.question;
            transform(questionText.begin(), questionText.end(), questionText.begin(), ::tolower);


            if (questionText.find(lowerKeyword) != string::npos) {
generatedQuestions.push_back(question);
                if (generatedQuestions.size() >= static_cast<size_t>(count)) {
                    return generatedQuestions;
                }
            }
        }
    }


    // If not enough questions found with keyword, add some from the same category
    for (const auto& category : questionBank) {
        if (lowerKeyword.find(category.first) != string::npos) {
            for (const auto& question : category.second) {
                if (find(generatedQuestions.begin(), generatedQuestions.end(), question) == generatedQuestions.end()) {

                    generatedQuestions.push_back(question);
                    if (generatedQuestions.size() >= static_cast<size_t>(count)) {
                        return generatedQuestions;
                    }
                }
            }
        }
    }

    return generatedQuestions;
}


void clearScreen() {
    system("cls");
}


int showMainMenu() {
    clearScreen();
    cout << "\n=== QUIZ GENERATOR ===\n";
    cout << "[1] Create New Quiz\n";
    cout << "[2] Generate from Keywords\n";
    cout << "[3] Manage Questions\n";
    cout << "[4] View Statistics\n";
    cout << "[0] Exit\n";
    cout << "\nSelect an option (0-4): ";


    int choice;
    cin >> choice;
    return choice;
}


// Forward declarations for all functions
void clearScreen();
int showMainMenu();
void takeQuiz();
vector<Question> loadQuestions();
void generateFromKeywords();
vector<Question> generateQuestions(const string& keyword, int count);
void addQuestion();


// Function to compare questions for finding duplicates
bool operator==(const Question& q1, const Question& q2) {
    return q1.question == q2.question &&
           q1.options == q2.options &&
           q1.correctOption == q2.correctOption;
}


void addQuestion() {
    // First, load existing questions
    vector<Question> existingQuestions = loadQuestions();
    // Get new question from user
    Question q;
    cout << "\n=== ADD NEW QUESTION ===\n\n";
    cout << "Enter the question: ";
    cin.ignore();
    getline(cin, q.question);

    // Validate if question already exists
    for (const auto& existingQ : existingQuestions) {
        if (existingQ.question == q.question) {
            cout << "\nError: This question already exists!\n";
            cout << "Press Enter to continue...";
            cin.ignore();
            return;
        }
    }

    cout << "Enter number of options (2-4): ";
    int numOptions;
    cin >> numOptions;

    if (numOptions < 2 || numOptions > 4) {
        cout << "Invalid number of options. Setting to 4.\n";
        numOptions = 4;
    }

    cin.ignore();
    for (int i = 0; i < numOptions; i++) {
        string option;
        cout << "Enter option " << (i + 1) << ": ";
        getline(cin, option);
        q.options.push_back(option);
    }

    cout << "Enter the correct option number (1-" << numOptions << "): ";
    cin >> q.correctOption;

    // Add to existing questions
    existingQuestions.push_back(q);

    // Save all questions back to file (overwrite)
    ofstream outFile("quiz_questions.txt", ios::trunc);  // Truncate existing content
    if (!outFile) {
        cerr << "Error opening file for writing!" << endl;
        return;
    }

    for (const auto& question : existingQuestions) {
        outFile << question.question << "\n";
        outFile << question.options.size() << "\n";
        for (const auto& option : question.options) {
            outFile << option << "\n";
        }
        outFile << question.correctOption << "\n\n";
    }
    outFile.close();
    cout << "\nQuestion added successfully!\n";
    cout << "Press Enter to continue...";
    cin.ignore();
    cin.get();
}

vector<Question> loadQuestions() {
    vector<Question> questions;
    ifstream inFile("quiz_questions.txt");

    if (!inFile) {
        // If file doesn't exist, return empty vector
        return questions;
    }

    string line;
    while (getline(inFile, line)) {
        if (line.empty()) continue;  // Skip empty lines between questions

        Question q;
        q.question = line;

        // Read number of options
        if (!getline(inFile, line)) break;
        int numOptions;
        try {
            numOptions = stoi(line);
        } catch (...) {
            // If we can't read the number, skip this question
            continue;
        }

        // Read options
        for (int i = 0; i < numOptions; i++) {
            if (!getline(inFile, line)) break;
            q.options.push_back(line);
        }

        // Read correct option
        if (!getline(inFile, line)) break;
        try {
            q.correctOption = stoi(line);
        } catch (...) {
            // If we can't read the correct option, skip this question
            continue;
        }

        questions.push_back(q);
    }

    inFile.close();
    return questions;
}

void viewAllQuestions() {
    clearScreen();
    cout << "=== ALL QUESTIONS ===\n\n";
    for (const auto& category : questionBank) {
        cout << "\n--- " << category.first << " ---\n";
        int qNum = 1;
        for (const auto& question : category.second) {
            cout << "\n" << qNum++ << ". " << question.question << "\n";
            for (size_t i = 0; i < question.options.size(); i++) {
                cout << "   " << (i + 1) << ") " << question.options[i];
                if ((i + 1) == question.correctOption) cout << " (Correct)";
                cout << "\n";
            }
        }
    }

    cout << "\nPress Enter to continue...";
    cin.ignore();
    cin.get();
}

void manageQuestions() {
    while (true) {
        clearScreen();
        cout << "=== MANAGE QUESTIONS ===\n\n";
        cout << "[1] View All Questions\n";
        cout << "[2] Add New Question\n";
        cout << "[3] Back to Main Menu\n";
        cout << "\nSelect an option (1-3): ";

        int choice;
        cin >> choice;

        switch (choice) {
            case 1:
                viewAllQuestions();
                break;
            case 2:
                addQuestion();
                break;
            case 3:
                return;
            default:
                cout << "Invalid choice. Please try again.\n";
                cin.ignore();
                cin.get();
        }
    }
}

void viewStatistics() {
    clearScreen();
    cout << "=== QUIZ STATISTICS ===\n\n";

    // Count total questions in all categories
    int totalQuestions = 0;
    for (const auto& category : questionBank) {
        totalQuestions += category.second.size();
    }

    cout << "Total Categories: " << questionBank.size() << "\n";
    cout << "Total Questions: " << totalQuestions << "\n";
    cout << "\nQuestions by Category:\n";

    for (const auto& category : questionBank) {
        cout << "- " << category.first << ": " << category.second.size() << " questions\n";
    }

    cout << "\nPress Enter to continue...";
    cin.ignore();
    cin.get();
}

void takeQuiz() {
    clearScreen();
    cout << "=== CREATE NEW QUIZ ===\n\n";

    // Ask for number of questions
    int numQuestions;
    cout << "Enter number of questions (1-20): ";
    cin >> numQuestions;
    numQuestions = max(1, min(20, numQuestions));

    // Load questions from both questionBank and quiz_questions.txt
    vector<Question> allQuestions;

    // Add questions from questionBank
    for (const auto& category : questionBank) {
        allQuestions.insert(allQuestions.end(), category.second.begin(), category.second.end());
    }

    // Add questions from file
    vector<Question> fileQuestions = loadQuestions();
    allQuestions.insert(allQuestions.end(), fileQuestions.begin(), fileQuestions.end());

    if (allQuestions.empty()) {
        cout << "No questions available. Please add questions first.\n";
        cin.ignore();
        cin.get();
        return;
    }

    // Shuffle questions
    srand(time(0));
    random_shuffle(allQuestions.begin(), allQuestions.end());

    // Take only the requested number of questions
    if (numQuestions > allQuestions.size()) {
        cout << "Only " << allQuestions.size() << " questions available. Using all.\n";
        numQuestions = allQuestions.size();
    } else {
        allQuestions.resize(numQuestions);
    }

    // Start the quiz
    int score = 0;
    cout << "\n--- Starting Quiz (" << numQuestions << " questions) ---\n\n";

    for (int i = 0; i < numQuestions; i++) {
        const Question& q = allQuestions[i];

        cout << "Question " << (i + 1) << ": " << q.question << "\n";
        for (size_t j = 0; j < q.options.size(); j++) {
            cout << "   " << (j + 1) << ". " << q.options[j] << "\n";
        }

        int answer;
        while (true) {
            cout << "\nYour answer (1-" << q.options.size() << "): ";
            cin >> answer;
            if (answer >= 1 && answer <= static_cast<int>(q.options.size())) {
                break;
            }
            cout << "Please enter a number between 1 and " << q.options.size() << ".\n";
        }

        if (answer == q.correctOption) {
            cout << "✓ Correct!\n\n";
            score++;
        } else {
            cout << "✗ Wrong! The correct answer was " << q.correctOption
                 << ". " << q.options[q.correctOption - 1] << "\n\n";
        }

        // Pause between questions
        if (i < numQuestions - 1) {
            cout << "Press Enter for next question...";
            cin.ignore();
            cin.get();
        }
    }

    // Show results
    cout << "\n--- Quiz Complete! ---\n";
    cout << "Your score: " << score << "/" << numQuestions
         << " (" << fixed << setprecision(1) << (score * 100.0 / numQuestions) << "%)\n";

    cout << "\nPress Enter to return to main menu...";
    cin.ignore();
    cin.get();
}

void showMenu() {
    while (true) {
        cout << "\n=== Quiz Generator ===\n";
        cout << "1. Add a Question\n";
        cout << "2. Take a Quiz\n";
        cout << "3. Exit\n";
        cout << "Enter your choice (1-3): ";

        int choice;
        cin >> choice;

        switch (choice) {
            case 1:
                addQuestion();
                break;
            case 2:
                takeQuiz();
                break;
            case 3:
                cout << "Thank you for using Quiz Generator!\n";
                return;
            default:
                cout << "Invalid choice. Please try again.\n";
        }

        cout << "\nPress Enter to continue...";
        cin.ignore();
        cin.get();
        clearScreen();
    }
}
```

```
// Function to handle the Generate from Keywords feature
void generateFromKeywords() {
    clearScreen();
    cout << "=== GENERATE QUIZ FROM KEYWORDS ===\n\n";

    // Display available keywords
    cout << "Available keywords: ";
    bool first = true;
    for (const auto& category : questionBank) {
        if (!first) cout << ", ";
        cout << """ << category.first << """;
        first = false;
    }
    cout << "\n\n";

    string keyword;
    int numQuestions;

    cout << "Enter a keyword from the list above (e.g., 'science', 'history', 'programming'): ";
    cin.ignore();
    getline(cin, keyword);

    // Convert keyword to lowercase for case-insensitive comparison
    string lowerKeyword = keyword;
    transform(lowerKeyword.begin(), lowerKeyword.end(), lowerKeyword.begin(), ::tolower);

    // Check if keyword exists
    bool keywordExists = false;
    for (const auto& category : questionBank) {
        string lowerCategory = category.first;
        transform(lowerCategory.begin(), lowerCategory.end(), lowerCategory.begin(), ::tolower);
        if (lowerCategory == lowerKeyword) {
            keywordExists = true;
            keyword = category.first; // Use the original case
            break;
        }
    }

    if (!keywordExists) {
        cout << "\nWarning: The keyword '" << keyword << "' doesn't match any category. "
             << "You can still proceed, but the quiz might be empty.\n";
    }

    cout << "\nEnter number of questions (1-20): ";
    cin >> numQuestions;
    numQuestions = max(1, min(20, numQuestions));  // Ensure between 1-20

    vector<Question> generatedQuestions = generateQuestions(keyword, numQuestions);

    if (generatedQuestions.empty()) {
        cout << "\nNo questions found for the given keyword.\n";
    } else {
        cout << "\n=== GENERATED QUIZ ===\n\n";
        int score = 0;

        for (size_t i = 0; i < generatedQuestions.size(); i++) {
            const Question& q = generatedQuestions[i];

            cout << "Question " << (i + 1) << ": " << q.question << "\n";
            for (size_t j = 0; j < q.options.size(); j++) {
                cout << "   " << (j + 1) << ". " << q.options[j] << "\n";
            }

            int answer;
            cout << "\nYour answer (1-" << q.options.size() << "): ";
            cin >> answer;

            if (answer == q.correctOption) {
                cout << "✓ Correct!\n\n";
                score++;
            } else {
                cout << "✗ Wrong! The correct answer was " << q.correctOption
                     << ". " << q.options[q.correctOption - 1] << "\n\n";
            }
        }

        cout << "\n=== QUIZ COMPLETE! ===\n";
        cout << "Your score: " << score << "/" <<
generatedQuestions.size()
             << " (" << (score * 100.0 /
generatedQuestions.size()) << "%)\n";
    }


    cout << "\nPress Enter to continue...";
    cin.ignore();
    cin.get();
}


int main() {
    // Set up console for better display
    system("title Quiz Generator");
    system("color 0A");  // Black background with
green text


    while (true) {
        clearScreen();
        cout << "\n=== QUIZ GENERATOR
MAIN MENU ===\n\n";
        cout << "[1] Create New Quiz\n";
        cout << "[2] Generate from Keywords\n";
        cout << "[3] Manage Questions\n";
        cout << "[4] View Statistics\n";
        cout << "[0] Exit\n";
        cout << "\nSelect an option (0-4): ";


        int choice;
        cin >> choice;


        switch (choice) {
            case 0: // Exit
                cout << "\nThank you for using Quiz
Generator!\n";
                return 0;


            case 1: // Create New Quiz
                takeQuiz();
                break;


            case 2: // Generate from Keywords
                generateFromKeywords();
                break;


            case 3: // Manage Questions
                manageQuestions();
                break;


            case 4: // View Statistics
                // Add your statistics code here
                cout << "\nStatistics feature coming
soon!\n";
                cout << "Press Enter to continue...";
                cin.ignore();
                cin.get();
                break;


            default:
                cout << "\nInvalid choice. Please try
again.\n";
                cout << "Press Enter to continue...";
                cin.ignore();
                cin.get()
break;
        }                                              return 0;
    }                                              }
```

Output:



```
=== GENERATE QUIZ FROM KEYWORDS ===

Available keywords: 'geography', 'history', 'programming', 'science', 'sports'

Enter a keyword from the list above (e.g., 'science', 'history', 'programming'): history

Enter number of questions (1-20): 2

=== GENERATED QUIZ ===

Question 1: Which country has won the most Olympic gold medals in history?
   1. USA
   2. Soviet Union
   3. Germany
   4. Great Britain

Your answer (1-4): 2
Γ£ù Wrong! The correct answer was 1. USA

Question 2: In which year did World War II end?
   1. 1943
   2. 1945
   3. 1950
   4. 1939

Your answer (1-4): 2
Γ£ô Correct!


=== QUIZ COMPLETE! ===
Your score: 1/2 (50%)

Press Enter to continue...
```



```
=== CREATE NEW QUIZ ===

Enter number of questions (1-20): 2

--- Starting Quiz (2 questions) ---

Question 1: What is the chemical symbol for gold?
   1. Ag
   2. Au
   3. Fe
   4. Pb

Your answer (1-4): 2
Γ£ô Correct!

Press Enter for next question...3
Question 2: Which country has won the most FIFA World Cups?
   1. Germany
   2. Italy
   3. Brazil
   4. Argentina

Your answer (1-4): 3
Γ£ô Correct!


--- Quiz Complete! ---
Your score: 2/2 (100.0%)

Press Enter to return to main menu...
```

Conclusion

The Quiz Generator project successfully demonstrates the practical implementation of C++ programming concepts such as loops, functions, conditional statements, and object-oriented programming. It provides an interactive way for users to test their knowledge while helping developers understand how to structure and manage data efficiently in a real-world application.Through this project, we learned how to design a logical flow for question handling, score calculation, and user interaction. The project can be further enhanced by adding features like random question generation, file-based storage, or a graphical interface to make it more dynamic and user-friendly.

Teacher's Remark

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Signature of Teacher: ___________________