Midterm Project: Quiz Me!

SECTION #3

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Problem

For this project, we were assigned to create a quiz program, which would assign the user a three-question quiz pseudo randomly based on their given “lucky number”.

Each quiz needed to have one true/false question, one multiple choice question, and one short-answer question. The user would take this quiz and be given a score percentage, repeating until they had obtained 100%. Afterwards, they would be given an overall score, and optionally asked if they wanted to take another quiz.

Analysis

As the problem involved numerous similar tasks (three questions, each with the same format), I felt that a somewhat modular design would help avoid unnecessary repetition, while also decreasing the amount of debugging necessary.

Design

Building off this idea of a modular design, I designed each question type as its own universal function, receiving the question string and correct answers (as well as incorrect answers, for multiple choice) as inputs, then returning one or zero depending on whether the correct answer had been given.

While I considered making the quizzes in the same format, that would require managing a large number of string inputs, and would likely clutter up either main() or takeQuiz() functions. . Thus, I decided to make each quiz its own separate function, with correct and incorrect strings contained within.

Testing

During testing, I had some trouble with the overall scores, as I had failed to properly separate the total score for a quiz, and the total score for all quizzes. Once I addressed this, things went fairly smoothly.

I also found that to avoid uncertainty in capitalization, it was easiest to use toLower() to convert all submitted answers before comparing them.

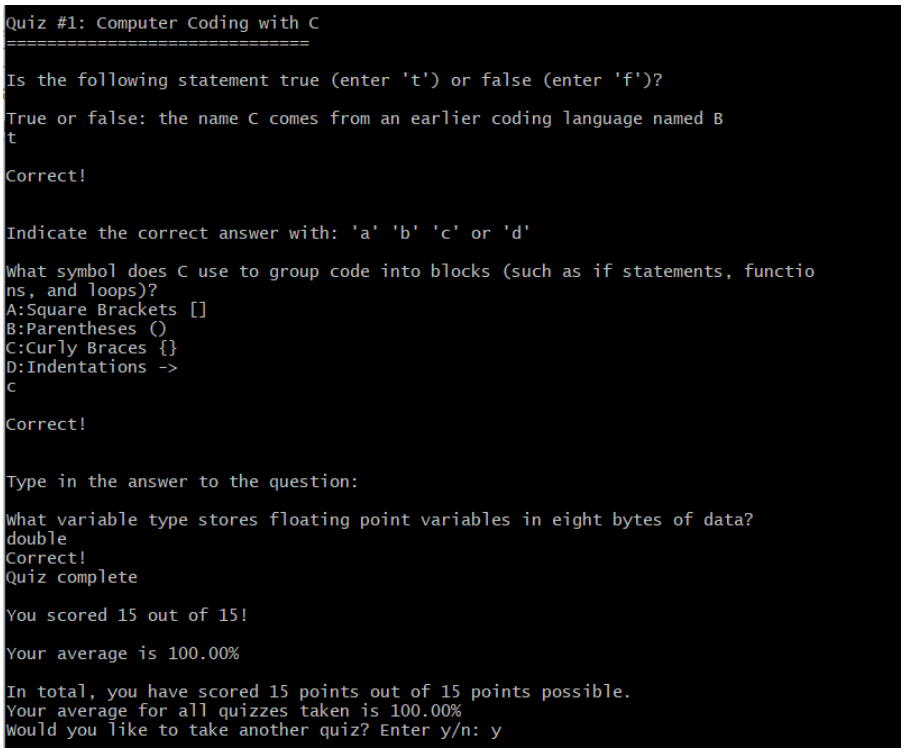
Comments

While I would have liked to work on a team for this project, a lot of other students were under the impression that it would be independent of the Friday lab, and thus had large portions of the assignment completed by that time.

I felt like the modular questions made the project go far smoother. Once I had the first quiz finished, I was able to simply copy the quizOne() function, rename it, and change the question text/answers.

Screen Shots

1. Quiz 1:



2. Quiz 2:

```
True or false: Coover Hall was constructed in 1999
f

Correct!


Indicate the correct answer with: 'a' 'b' 'c' or 'd'

Which statement is commonly displayed in a programming student's first code?
A:Hello World!
B:The Quick Brown Fox...
C:It is a period of civil wars in the galaxy...
D:Friends, Romans, Countrymen, lend me your ears...
a

Correct!


Type in the answer to the question:

what insect is displayed outside Coover Hall at ISU?
moth
Correct!
Quiz complete

You scored 15 out of 15!

Your average is 100.00%

In total, you have scored 30 points out of 30 points possible.
Your average for all quizzes taken is 100.00%
Would you like to take another quiz? Enter y/n: y
```

3. Quiz 3:

```
Quiz #3: Iowa State Campus
==========================

Is the following statement true (enter 't') or false (enter 'f')?

True or false: When build, the Marston water tower was the second steel water tower
 west of the Missippi
f

Correct!


Indicate the correct answer with: 'a' 'b' 'c' or 'd'

What year was Iowa State founded??
A: 1822
B: 1858
C: 1901
D: 1950
b

Correct!


Type in the answer to the question:

What is the last name of the Four Seasons Fountain's sculptor??
peterson
Correct!
Quiz complete

You scored 15 out of 15!

Your average is 83.33%
```

4. Incorrect Answer Retake:

```
Type in the answer to the question:

What is the last name of the Four Seasons Fountain's sculptor??
peterson
Correct!
Quiz complete

You scored 10 out of 15!

Your average is 66.67%

You'll have to take the quiz again



Quiz #3: Iowa State Campus
============================
```

5. Quiz percentage, overall percentage, and closing out of the program

```
You scored 15 out of 15!

Your average is 83.33%

In total, you have scored 55 points out of 60 points possible.
Your average for all quizzes taken is 91.67%
Would you like to take another quiz? Enter y/n: n


Your final average was 91.67%

Goodbye!
```

Source Code:

```
/*-------------------------------------------------------------------------
-
-                     SE 185: Midterm Project                     -
- List the names of all team members, their roles, and their participation
1- Student 1 - James Gaul Role: Quiz Creator and debugger - Participation:
100%
-
-------------------------------------------------------------------------
*/

/*-------------------------------------------------------------------------
-
-                                                 Includes
                                                                  -
-------------------------------------------------------------------------
*/
#include <stdio.h>
#include <stdlib.h>
#include <ctype.h>
#include <string.h>

#define questionPoints 5
#define numQuestions 3
```

```
/*-------------------------------------------------------------------------
-
-                                Functions Prototypes
-
-------------------------------------------------------------------------
*/
int quizNumber(void);
int takeQuiz(int quizNum);

int quizOne(void);
int quizTwo(void);
int quizThree(void);

int trueFalseQuestion(char questionText[200], int correctAnswer);
int multipleChoiceQuestion(char questionText[200], char correctAnswer, char
answerArray[4][100]);
int fillBlankQuestion(char questionText[200], char correctAnswer[20]);

/*-------------------------------------------------------------------------
-
-                                    Notes
-
-------------------------------------------------------------------------
*/

// Compile with gcc midtermProject.c -o proj

/*-------------------------------------------------------------------------
-
-                                              Implementation
                                                          -
-------------------------------------------------------------------------
*/
int main()
{
      int quizTotal, quizScore, quizAttempts, selectedQuiz, pointsPossible;
      int overallScore = 0, overallAttempts = 0, overallPoints = 0;

      double avgScore, overallAverage;
      char quizAgain;

      while (1){
            quizTotal = 0;
            quizAttempts = 0;
            avgScore = 0.0;
            selectedQuiz = quizNumber();
            while (1){
                  quizScore = takeQuiz(selectedQuiz);
                  quizAttempts++;
                  quizTotal += quizScore;
                  printf("\nYou scored %d out of %d!\n\n", quizScore,
questionPoints*numQuestions);

                  pointsPossible = quizAttempts * questionPoints *
numQuestions;
                  avgScore = ((double)quizTotal / pointsPossible)*100.0;
                  /*
```

```
                  printf("Total score: %d\n", quizTotal);
                  printf("Possible Points: %d\n", pointsPossible);
                  */
                  printf("Your average is %.2f%%\n\n", avgScore);

                  if (quizScore == questionPoints*numQuestions){
                        overallScore += quizTotal;
                        overallAttempts += quizAttempts;
                        break;
                  }
                  printf("You'll have to take the quiz again\n\n");
            }

            overallPoints = overallAttempts * questionPoints * numQuestions;
            overallAverage = (((double) overallScore) / overallPoints)*
100.0;

            printf("In total, you have scored %d points out of %d points
possible.\n", overallScore, overallPoints);
            printf("Your average for all quizzes taken is %.2f%%\n",
overallAverage);
            printf("Would you like to take another quiz? Enter y/n: ");
            scanf(" %c", &quizAgain);
            printf("\n");

            if (quizAgain == 'n'){
                  break;
            }
      }
      printf("\nYour final average was %.2f%%\n", overallAverage);

      printf("\nGoodbye!");
    return 0;
}

/* Put your functions here, and be sure to put prototypes above. */
int quizNumber(){
      int userInput;
      int randomOutput;
      printf("Enter a lucky number between 1 and 9! ");
      scanf(" %d", &userInput);

      srand(userInput * 3);
      randomOutput = rand() % 3;
      printf("The random output is %d\n", randomOutput);
      return randomOutput;
}
int takeQuiz(int quizNum){
      int score = 0;
      switch (quizNum){
            case 0:
                  score = quizOne();
                  break;

            case 1:
                  score = quizTwo();
                  break;
```

```
            case 2:
                  score = quizThree();
                  break;

            default:
                  printf("Error: quiz number %d does not exist.\n", quizNum);
                  break;
      }
      return score;
}

int quizOne(void){
      int score = 0;
      char answerArray[4][100];

      //set the quiz name/number here:
      int quizNum = 1;
      char quizName[] = "Computer Coding with C";

      //Set the true/false question here
      char question1[200] = "the name C comes from an earlier coding language
named B";

      int trueFalseAnswer = 1;

      //Set the multiple choice questions/answers here:
      char question2[200] = "What symbol does C use to group code into blocks
(such as if statements, functions, and loops)";
      strcpy(answerArray[0], "A:Square Brackets []");
      strcpy(answerArray[1], "B:Parentheses ()");
      strcpy(answerArray[2], "C:Curly Braces {}");
      strcpy(answerArray[3], "D:Indentations ->");
      char multChoiceAnswer = 'c';

      //set the fill in the blank question here:
      char question3[200] = "What variable type stores floating point
variables in eight bytes of data";
      char fillBlankAnswer[] = "double";


      printf("\n\nQuiz #%d: %s\n============================\n\n", quizNum,
quizName);

      //ask the true/false question
      score += trueFalseQuestion(question1, trueFalseAnswer) *
questionPoints;
      printf("\n\n");
      //ask the multiple choice question
      score += multipleChoiceQuestion(question2, multChoiceAnswer,
answerArray) * questionPoints;
      printf("\n\n");
      score += fillBlankQuestion(question3, fillBlankAnswer) *
questionPoints;


      printf("\nQuiz complete\n");
```

```
	return score;
}

int quizTwo(void){
	int score = 0;
	char answerArray[4][100];

	//set the quiz name/number here:
	int quizNum = 2;
	char quizName[] = "Iowa State CprE";

	//Set the true/false question here
	char question1[200] = "Coover Hall was constructed in 1999";
	int trueFalseAnswer = 0;

	//Set the multiple choice questions/answers here:
	char question2[200] = "Which statement is commonly displayed in a
programming student's first code";
	strcpy(answerArray[0], "A:Hello World!");
	strcpy(answerArray[1], "B:The Quick Brown Fox...");
	strcpy(answerArray[2], "C:It is a period of civil wars in the
galaxy...");
	strcpy(answerArray[3], "D:Friends, Romans, Countrymen, lend me your
ears...");
	char multChoiceAnswer = 'a';

	//set the fill in the blank question here:
	char question3[200] = "what insect is displayed outside Coover Hall at
ISU";
	char fillBlankAnswer[] = "moth";


	printf("\n\nQuiz #%d: %s\n==============================\n\n", quizNum,
quizName);

	//ask the true/false question
	score += trueFalseQuestion(question1, trueFalseAnswer)*5;
	printf("\n\n");
	//ask the multiple choice question
	score += multipleChoiceQuestion(question2, multChoiceAnswer,
answerArray)*5;
	printf("\n\n");
	score += fillBlankQuestion(question3, fillBlankAnswer)*5;

	printf("\nQuiz complete\n");
	return score;
}

int quizThree(void){
	int score = 0;
	char answerArray[4][100];

	//set the quiz name/number here:
	int quizNum = 3;
	char quizName[] = "Iowa State Campus";

	//Set the true/false question here
```

```
	char question1[200] = "When build, the Marston water tower was the
second steel water tower west of the Missippi";
	int trueFalseAnswer = 0;

	//Set the multiple choice questions/answers here:
	char question2[200] = "What year was Iowa State founded?";
	strcpy(answerArray[0], "A: 1822");
	strcpy(answerArray[1], "B: 1858");
	strcpy(answerArray[2], "C: 1901");
	strcpy(answerArray[3], "D: 1950");
	char multChoiceAnswer = 'b';

	//set the fill in the blank question here:
	char question3[200] = "What is the last name of the Four Seasons
Fountain's sculptor?";
	char fillBlankAnswer[] = "peterson";


	printf("\n\nQuiz #%d: %s\n==============================\n\n", quizNum,
quizName);

	//ask the true/false question
	score += trueFalseQuestion(question1, trueFalseAnswer)*5;
	printf("\n\n");
	//ask the multiple choice question
	score += multipleChoiceQuestion(question2, multChoiceAnswer,
answerArray)*5;
	printf("\n\n");
	score += fillBlankQuestion(question3, fillBlankAnswer)*5;

	printf("\nQuiz complete\n");
	return score;
}

int trueFalseQuestion(char questionText[200], int correctAnswer){
	char userInput;
	printf("Is the following statement true (enter 't') or false (enter
'f')?\n\n");
	printf("True or false: %s\n", questionText);
	scanf(" %c", &userInput);
	printf("\n");
	if((correctAnswer == 0) && ((userInput == 'f') || (userInput == 'F'))){
		printf("Correct!\n");
		return 1;
	}
	else if((correctAnswer == 1) && ((userInput == 't') || (userInput ==
'T'))){
		printf("Correct!\n");
		return 1;
	}
	else{
		printf("Incorrect.\n");
		return 0;
	}

}
```

```c
int multipleChoiceQuestion(char questionText[200], char correctAnswer, char
answerArray[4][100]){
	char userAnswer;

	printf("Indicate the correct answer with: 'a' 'b' 'c' or 'd'\n\n");
	printf("%s?\n", questionText);

	for(int i = 0; i < 4; i++){
		printf("%s\n", answerArray[i]);
	}

	scanf(" %c", &userAnswer);
	printf("\n");
	userAnswer = tolower(userAnswer);

	if (userAnswer == correctAnswer){
		printf("Correct!\n");
		return 1;
	}
	else{
		printf("Incorrect.\n");
		return 0;
	}
}

int fillBlankQuestion(char questionText[200], char correctAnswer[20]){
	char userAnswer[20];
	printf("Type in the answer to the question:\n\n");
	printf("%s?\n", questionText);

	scanf(" %s", userAnswer);

	for (int i = 0; i < strlen(userAnswer); i++){
		userAnswer[i] = tolower(userAnswer[i]);
	}

	if (strcmp(userAnswer, correctAnswer) == 0){
		printf("Correct!");
		return 1;
	}
	else{
		printf("Incorrect.");
		return 0;
	}
}
```