Level 2 Create software components using C++

(7266-202)

www.cityandguilds.com/e-quals07
March 2007
Version 1.0

e-Quals
Assignment guide for Candidates
Assignment C

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Introduction – Information for Candidates

About this document

This assignment comprises part of the assessment for Level 2 Create software components using C++ (7266-202).

Health and safety

You are asked to consider the importance of safe working practices at all times.

You are responsible for maintaining the safety of others as well as your own. Anyone behaving in an unsafe fashion will be stopped and a suitable warning given. You will **not** be allowed to continue with an assignment if you compromise any of the Health and Safety requirements. This may seem rather strict but, apart from the potentially unpleasant consequences, you must acquire the habits required for the workplace.

Time allowance

The recommended time allowance for this assignment is **4 hours**.

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Candidate instructions

Candidates are advised to read **all instructions** carefully before starting work and to check with your Assessor, if necessary, to ensure that you have fully understood what is required.

Time allowance: 4 hours

Assignment set up: A scenario is provided below for this assignment.

This assignment is made up of **three** tasks

- **Task A** - provides a detailed design specification that should be followed by candidates when developing their program.
- **Task B** - provides additions to the initial design that should be followed by candidates, once the initial program is working.
- **Task C** - lists what the candidate should produce for their Assessor.

Scenario

A recent educational review implies that the level of competence in applying mental arithmetic may be in decline, especially when applying the rules of algebra. In order to investigate this, a local computer company specialising in survey software, Total Objective Multi-Surveys (TOMS), has been asked to prototype an on-line program to test this theory.

In their outline specification, Total Objective Multi-Surveys have stated that their software should:

- generate a list of hard-coded mental arithmetic questions
- calculate the number of questions answered correctly
- calculate the number of correct answers as a percentage
- indicate which questions were answered incorrectly.

In addition, TOMS have stated that the software should:

- give the interviewee an opportunity to repeat the whole test again
- allow the interviewee an opportunity to repeat only those questions incorrectly answered
- allow the interviewee to exit the program if questions or the test are not to be repeated
- not take into consideration any repeated questions in the final scoring.

As a contracted employee of Total Objective Multi-Surveys, you have been asked to design and develop a demonstration program for the test. This demonstration program will operate only from keyboard entry and will only indicate its actions on-screen.

To assist in the development of the test a sample list of 10 questions have been provided at Appendix 'A'. There must be a total of 10 questions in the survey program.

Task A

Candidates should use the following detailed specification to fulfil the company's requirements:

1 The program **must** be written using functions. Global variables may be declared, but as far as possible, local variables should be used.

2 The program shall be in wait state, which consists of a welcome screen and an invitation for the user to press ANY key in order to continue.

3 On depression of any key, the program shall display the first test question. The question(s) must be laid out towards the centre of the display screen. The display must consist of one question and four possible answers, only one of which is correct. Each answer must be preceded with a number (1, 2, 3 and 4). At the bottom of the display there shall be a request for the candidate to enter the selected answer.

4 The candidate entry **must** be in the form of the letters 1, 2, 3 or 4. These entries must be validated. Incorrect entry shall cause an error message to appear on screen and a request for re-entry of the selection letter.

5 The candidate's response to the questions shall be tested against the correct answer letter and the number of correctly answered questions recorded.

6 Any incorrect question shall be identified for later use in the program.

7 Between each question the screen **must** clear.

8 On completion of all 10 questions the screen must clear and following information **must** be displayed on screen:

Your total score is: *Number of correct questions* / 10
Your percentage is: *Score calculated as percent %*

9 Below the above there shall be displayed a list of the questions that were incorrectly answered in a format similar to:

The questions incorrectly answered were: *Question 1*
Question 3
Question 7

10 At the bottom of the screen there shall be an option to repeat the test or exit the program. Response should be in the format of a Y / N answer which **must** be validated.

11 Selection of 'Y' shall cause the screen to clear and the program repeat from item 2 above.

12 Selection of 'N' shall cause the screen to clear and an indication that the program is terminating output to the screen.

13 After a suitable delay routine the screen **must** clear and the program end.

14 At this point the program **must** work correctly before continuing.

15 Now modify the program slightly to allow the candidate to answer only those questions that were incorrectly answered. Prior to item 10 above there shall be an additional question:

Do you want to re-take those questions incorrectly answered again? Y / N :

16 The candidates response should be in the format of a Y / N answer which should be validated.

17 Selection of 'Y' shall cause the screen to clear and only those questions that were incorrectly answered repeated. At the conclusion of the repeated questions the question at 10 above shall be repeated.

18 Selection of 'N' shall cause the message at 10 to appear underneath along with the repeat/end process.

Task B

Candidates should follow the criteria below when producing their work:

1 The program conforms to the design specification.

2 The program uses the most appropriate data type(s).

3 Meaningful names are used when declaring variables.

4 The most appropriate method is used to read from the keyboard.

5 The program syntax is consistently indented to aid readability.

6 The program includes suitable comments to aid understanding of the program.

Task C

Candidates should produce the following for their Assessor:

1 A printed program listing.

Note

- At the conclusion of this assignment, hand all paperwork and removable media to the test supervisor.
- Ensure that your name is on the removable media and all documentation.
- If the assignment is taken over more than one period, all removable media and paperwork must be returned to the test supervisor at the end of each sitting.

APPENDIX 'A'

Any of these sample questions may be used in the assignment, or the Candidate can write his/her own.

Question 1 123 – 39 = 1 64 2 44 3 74 4 84 Answer = 4	Question 2 123 + 39 = 1 162 2 166 3 62 4 66 Answer = 1
Question 3 123 * 9 = 1 1007 2 1107 3 1106 4 1116 Answer = 2	Question 4 135 / 15 = 1 8 2 8.5 3 9 4 9.5 Answer = 3
Question 5 12 * (12 / 2) = 1 144 2 6 3 72 4 36 Answer = 3	Question 6 130 / 2 + 8 = 1 13 2 14 3 75 4 73 Answer = 4
Question 7 10 + 12 + 13 * 6 / 2 = 1 105 2 44 3 61 4 84 Answer = 3	Question 8 (10 + 12 + 13 * 6) / 2 = 1 50 2 44 3 61 4 84 Answer = 1
Question 9 8(12 + 6 / 3 * 2) - 1 = 1 127 2 103 3 95 4 135 Answer = 1	Question 10 1 / 1 * 1 – 1 + 1 = 1 1 2 -1 3 0 4 -2 Answer = 1

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