Level 2 Create software components using C++

(7266/7267-202)

www.cityandguilds.com/e-quals07
November 2008
Version 1.0

e-Quals
Assignment guide for Candidates
Assignment A

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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++ (7266/7267-202).

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 **four** 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 for candidates in the form of a company specification for a new product.

This assignment is made up of two tasks:

- **Task A** - provides a detailed design specification that should be followed by candidates when developing their program.
- **Task B** - provides presentation criteria that should be followed by candidates when producing their work.

Scenario

THE CALCULATOR

Your company has been contracted by The Guilds Primary School to develop a small calculator type computer program to assist pupils in promoting their mathematical skills. In principle, the program will take the format of both a calculator and a simple multiplication program.

All entries will be via the keyboard, be validated and the program menu driven. The main menu will give the pupils an option to create a Multiplication Table or to perform a Calculation.

If a Multiplication Table is selected then any positive value table up to the number 20 with up to 15 lines may be displayed.

If a Calculation is selected then entry of two positive numbers, the first up to 1000 and the second up to 999 is requested. The pupil will be given the option to enter the following operators: + , - , * , / or % (modulus). Entry of any one of these keys will cause the result of the calculation to be displayed.

The program must on completion of a Multiplication Table or a Calculation, loop back to the main menu awaiting the next command.

As an employee of the company you have been asked to create a demonstration program which could later be used for this purpose.

Task A

1 As part of the specification, the program must be written using functions. Global variables may be declared, but as far as possible, local variables should be used.

2 On starting the program the screen must be cleared and a menu displayed with relevant information, from which the pupil or other user can make a selection. The main menu should be similar to: -

" Do you want to create a Multiplication Table (M)
or perform a Calculation (C) ?

Enter M or C only: "

3 User selection must be validated to be either **C** or **M** (uppercase characters) only. The selection of either letter must cause the screen to clear prior to displaying any information.

4 An entry of **M** must cause the screen to be cleared and a request for a Multiplication Table number to be displayed such as: -

"Please enter the Multiplication Table number
Note: The number must be between 1 and 20 only: "

5 This entry must be validated to be in the range of 1 to 20

6 If the entry is outside the range 1 to 20 then a suitable message should be displayed and the number re-entered. The message should be similar to: -

"Number not between 1 and 20. Press any key to continue:… "

7 On acceptance of a valid number the screen must be cleared and a message requesting the number of lines in the table displayed. The message should be similar to: -

"Please enter the number of lines to be displayed
Note: The number must be between 1 and 15 only: "

8 This entry must be validated to be in the range of 1 to 15.

9 If the entry is outside the range 1 to 15 then a suitable message should be displayed and the number re-entered. The message should be similar to: -

"Number not between 1 and 15. Press any key to continue:… "

10 When the number of lines has been accepted, the screen should be cleared and the multiplication table displayed with a suitable heading to indicate which table it represents. At the bottom of the screen should be displayed a message similar to: -

" Type 'E' to exit or any other key to continue "

11 Depression of the letter 'E' should cause the screen to be cleared and the program to

terminate. Any other key should cause the screen to be cleared and the main menu at 2 above to be displayed awaiting further selection.

12 On selection of **C** the screen must be cleared and a request for a number displayed such as: -

"Please enter your first number (0 - 1000): "

13 This entry must be validated to be in the range of 0 to 1000 and be an integer. An invalid entry should cause the first number entry screen to be repeated.

14 On successful entry, there should be a request for entry of the second number with a message such as: -

"Please enter your second number (0 - 999): "

15 This second calculation number must be validated to be in the range of 0 to 999 and be an integer. An invalid entry should cause the second number entry screen to be repeated.

16 After the second number has been accepted, the screen should be cleared and the following message displayed: -

"Please make your operator selection (+ , - , * , / or %) : "

17 User entry must be validated to accept one of these operators by a single keystroke.

18 On entry of a valid arithmetic operator, the screen should be cleared and the expression displayed with the result. The output should be similar to:-

number1 operator number2 = result

19 At the bottom of the screen should be displayed an Exit/Continue message as at 10 above with the same result as 11 above.

20 Prepare test data and expected results. Test the program, check the expected results against the actual results and resolve any logical or run-time errors.

21 Provide evidence that the program complies with the specification eg screen prints.

22 Print a listing of the code.

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 program syntax is consistently indented to aid readability.

5 The program is commented.

Note

- Candidates should produce the following for their assessor:
  - A printed program listing.
  - Test data and expected results.
  - Evidence that the program works correctly eg screen prints.
- 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.

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