Level 2 Create software components using C++

(7266/7267-202)

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Assignment guide for Candidates
Assignment B

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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: four 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

Due to climate changes it is necessary to keep a watch on rising sea levels in order that sea defences can be adequately maintained. As an employee of Terrific Software Ltd you have been asked to write a demonstration program, which could be used by data collecting agencies to monitor this problem.

Several years ago a base height for sea levels was determined and is regarded as 'zero'. Tide height measurements are to be taken in centimetres.

Measurements are taken quarterly at high tide and recorded manually. Eventually, this process will form part of your program and be saved to disk. In the meantime, the purpose of your program is to produce a simple graph from the information given.

The graph should include labels stating the quarter (Spring, Summer, Autumn, Winter) with the tide height depicted as a bar or other representative output. At the end of the bar should be the actual tide height in centimetres.

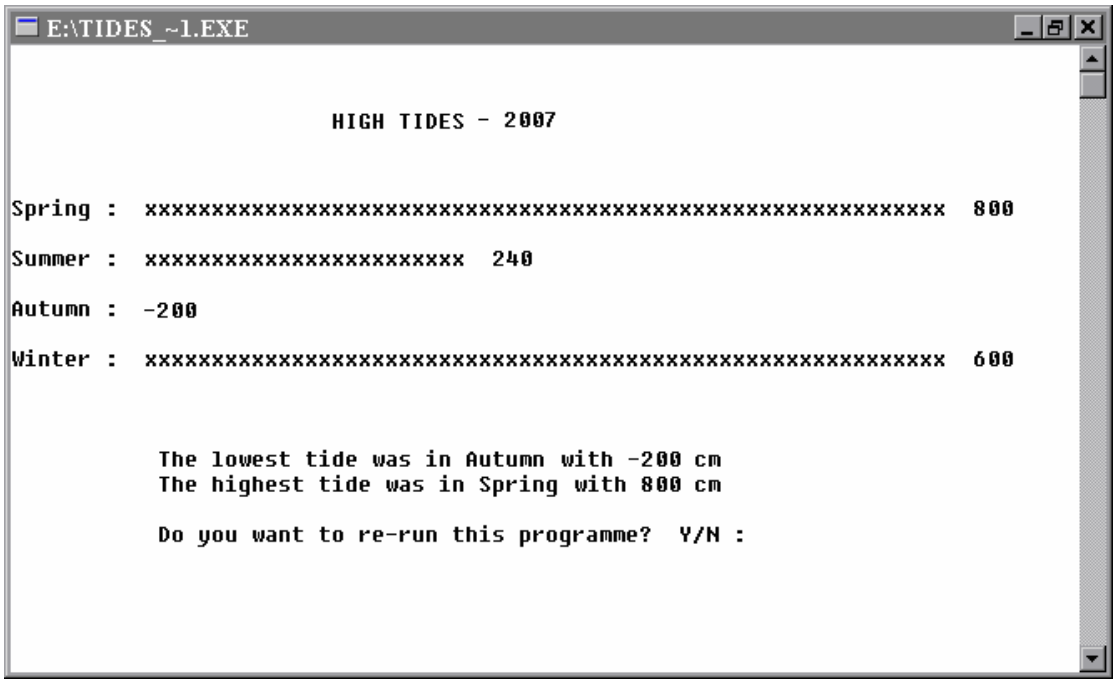
Terrific Software has stipulated in its design specification that user input should be validated as an integer number and input as a maximum of a 4-character string. A suitable function should be used to convert the string into an integer number.

In addition, in order to make the graph easier to read, it will be necessary to divide the user input by 10 in order to create the graph output ie an input of 500 will become 50 characters for screen output purposes.

Also to make the graph practical, any tide heights below 'zero' will be displayed with no bar and any tide heights above 600cm will be displayed with a bar of 60.

The table/graph must include a simple heading (to include the year) and an indication as to which season had the highest and which had the lowest tide height.

The final output should be similar to the following: -



Task A

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

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 Details of seasons and tide heights are to be stored in arrays.

3 On starting the program the screen must be cleared and a welcome screen displayed with relevant information, from which the operator can gain brief information about the program. A message must be displayed to tell the user to press any key in order to run the program.

4 On pressing any key the screen should clear and a message should be displayed for input of the current year. The screen message should be similar to: -

What is the current year?:

5 There must then follow a request for input for each of the **four** seasons. The name of the season is to be recovered from the array as part of output. The screen message should be similar to: -

Enter the maximum tide height for *season* in centimetres:

6 Each input must be validated as a maximum of a 4-character string. Each character input into the string is to be separately validated in the range of 0 to 9 except for the first character

which could also be a minus sign.

Note: You are not required to validate the input to the nearest 20 cm.

7 A suitable conversion function should be used to convert the string entered into an integer number.

8 Write code to determine the following:

- Highest tide.
- Lowest tide.
- Maximum length of graph line.
- Minimum length of graph line.

9 On entry of the last season, the screen must clear and the graph should be displayed. The following information must be displayed on the graph:

- A title to include the current year.
- Season labels.
- A simple horizontal bar graph within range of 0 to 60 (There should be no bar for a negative tide height and a tide height of over 600 should be displayed with a bar of 60).
- The actual tide height at the end of each horizontal bar.
- Details of the lowest tide height including the season and measurement.
- Details of the highest tide height including the season and measurement.

10 Below the graph should be a message offering the option to repeat the program. User input of 'Y' must cause the program to loop and repeat from 5 above.

11 Any other entry must clear the screen and terminate the program.

12 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.

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

14 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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