Level 3 Develop software using C++ (7266/7267-302)

e-Quals
Assignment guide for Candidates
Assignment C

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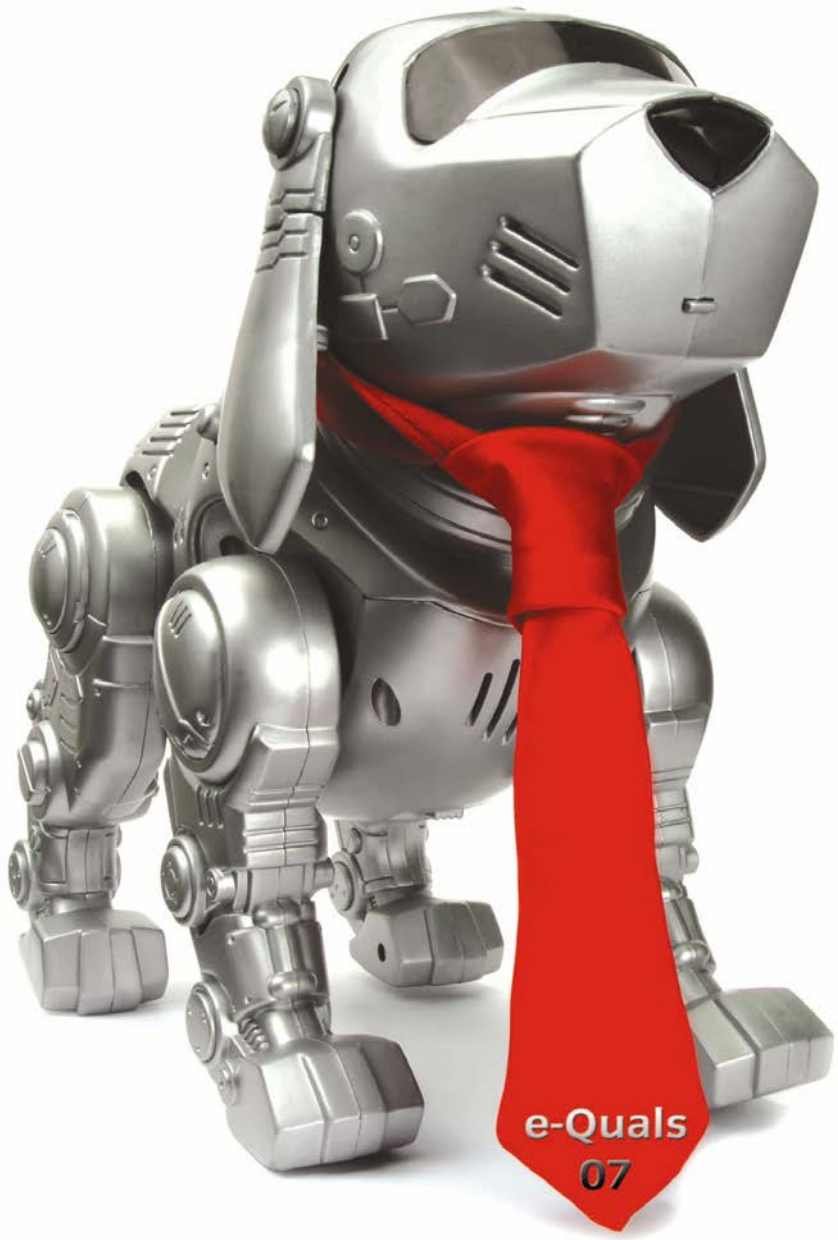

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City & Guilds
1 Giltspur Street
London EC1A 9DD
T +44 (0)20 7294 2800
F +44 (0)20 7294 2400
www.cityandguilds.com
learnersupport@cityandguilds.com

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Assignment C

Introduction – Information for Candidates

About this document

This assignment comprises part of the assessment for Level 3 Develop software using C++ (7266/7267-302).

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**.

Level 3 Develop software using C++ (7266/7267-302)
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 **five** tasks

- **Task A** - requires the candidate to design the program on paper and collect information prior to coding.
- **Task B** - requires the candidate to implement the design and to annotate the code.
- **Task C** - requires the candidate to produce screen prints of the program.
- **Task D** - requires the candidate to maintain a test log and to complete Technical Documentation about the program.
- **Task E** - requires the candidate to print the program listing and save the code to removable media.

Scenario

A local computer company Terrific Software Ltd, has been contracted to supply a demonstration program for Guilds Electronics, who make small electronic components. It is hoped that computerisation which will solve a manufacturing problem for them.

There exists a production line of 10 workstations. As each team complete the assembly of a component a porter is called to the workstation to collect the finished item. From there it is taken to Quality Control for inspection. This is very labour intensive and at times unproductive.

To solve this problem it has been decided to re-design the workshop floor and install a conveyor belt. The conveyor belt will have a safety cage fitted to it in which the finished item can be placed. To save time it will start at quality control and move in one direction only until it reaches workstation number 10, when it will return to Quality Control. From there the process will repeat again always stopping at Quality Control on the return.

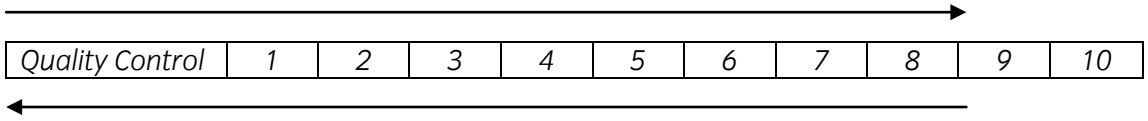
The conveyor belt will be called by a workstation by pressing a button (this is not part of your task). The conveyor belt will only stop at workstations in front of its direction of movement. Any requests from workstations behind it will wait until the return journey.

Example 1. Belt currently at Quality Control.
Workstations 4, 9, 6, 8 and 3 all call for the conveyor belt.
The belt will move towards workstation 10 stopping at workstations 3,4,6,8 and 9, returning to Quality Control.

While the conveyor belt is moving the following occurs:

Example 2. Belt currently at workstation number 6.
Workstations 4, 10 and 5 call for the belt.
The belt will continue to move forward stopping at the following workstations on route. Stopping at 8, 9, 10 (direction of belt reverses), 5 and 4, again returning to Quality Control.

The belt therefore has a one-way directional flow until it reaches an end. Only then will it move in the opposite direction.



As an employee of Terrific Software you have been tasked with designing the software.

To assist you in your design, the following design criteria which must be followed, has been defined by Terrific Software:

1. The program **must** be written using classes and functions.

2. Global variables may be declared, but as far as possible, local variables should be used.

3. There **must** be a maximum of 10 workstations only and the Quality Control adjacent to workstation number 1.

4. At the start of the working day, the belt **must** be at Quality Control and there shall be no requests by workstations for the conveyor belt.

5. The conveyor belt **must** move in one direction only at a time (see the scenario).

6. The conveyor belt **must** always stop at Quality Control on its return.

7. Calls from workstations **must** be flagged (i.e. using Boolean values), so that the belt knows where to stop next.

8. Suitable screen messages where applicable are to be used throughout the program.

9. There shall be two commands only available to the user:
   - Call the belt
   - Move the belt

   Quality Control has the additional option to:
   - Stop the belt

10. Selection of Call, Move or Stop can be numeric or a character, but user entry **must** be validated.

11. When the conveyor belt stops at a workstation there shall be a screen message similar to:

    "Conveyor belt now at Workstation number < number of workstation >"

12. If the conveyor belt is at Quality Control then there shall be a message similar to:

"Conveyor belt now at Quality Control"

13. The program runs continuously throughout the day.

14. At the end of the working day, there **must** be the option for Quality Control to stop the belt. The Stop command must only be capable of selection when the belt is at Quality Control. This should be validated to ensure that it cannot be selected by a workstation.

15. On stopping the belt, all requests for the belt by workstations **must** be cancelled.

Task A

Use a word processor or paper to design your program. In designing the program, the criteria set out by Terrific Software must be followed and implemented to an acceptable standard.

Task B

Having designed the program on paper, implement that design into a C++ program. Your source code must be fully commented so as to aid understanding.

Task C

In order to provide supportive evidence that the program runs to the design criteria, screen prints should be produced.

Note: If for any reason your system will not allow screen prints to be produced, screen output must be demonstrated to your test supervisor and your documentation noted accordingly.

Task D

1 Produce a test plan.

2 Fully test the program against expected and actual output of the program, and complete a log of testing.

3 Provide supporting evidence by means of screen prints wherever possible to support your findings especially where error messages are concerned.

4 Produce Technical Documentation for this program as this will be required should the demonstration prove successful. The evidence requested for Tasks A, C, D and E may be used to compile this documentation.

Task E

Print a fully annotated listing of the program.

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.

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1 Giltspur Street
London
EC1A 9DD
T +44 (0)20 7294 2468
F +44 (0)20 7294 2400
www.cityandguilds.com

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