Level 3 Develop software using Java (7266/7267-305)
e-Quals
Assignment guide for Candidates
Assignment D
About City & Guilds
City & Guilds is the UK’s leading provider of vocational qualifications, offering over 500 awards across a wide range of industries, and progressing from entry level to the highest levels of professional achievement. With over 8500 centres in 100 countries, City & Guilds is recognised by employers worldwide for providing qualifications that offer proof of the skills they need to get the job done.

City & Guilds Group
The City & Guilds Group includes City & Guilds, ILM (the Institute of Leadership & Management) which provides management qualifications, learning materials and membership services, NPTC which offers land-based qualifications and membership services, and HAB (the Hospitality Awarding Body). City & Guilds also manages the Engineering Council Examinations on behalf of the Engineering Council.

Equal opportunities
City & Guilds fully supports the principle of equal opportunities and we are committed to satisfying this principle in all our activities and published material. A copy of our equal opportunities policy statement is available on the City & Guilds website.

Copyright
The content of this document is, unless otherwise indicated, © The City and Guilds of London Institute 2007 and may not be copied, reproduced or distributed without prior written consent.

However, approved City & Guilds centres and learners studying for City & Guilds qualifications may photocopy this document free of charge and/or include a locked PDF version of it on centre intranets on the following conditions:

- centre staff may copy the material only for the purpose of teaching learners working towards a City & Guilds qualification, or for internal administration purposes
- learners may copy the material only for their own use when working towards a City & Guilds qualification

The Standard Copying Conditions on the City & Guilds website also apply.

Please note: National Occupational Standards are not © The City and Guilds of London Institute. Please check the conditions upon which they may be copied with the relevant Sector Skills Council.

Publications
City & Guilds publications are available on the City & Guilds website or from our Publications Sales department at the address below or by telephoning +44 (0)20 7294 2850 or faxing +44 (0)20 7294 3387.

Every effort has been made to ensure that the information contained in this publication is true and correct at the time of going to press. However, City & Guilds’ products and services are subject to continuous development and improvement and the right is reserved to change products and services from time to time. City & Guilds cannot accept liability for loss or damage arising from the use of information in this publication.

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
## Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction – Information for Candidates</td>
<td>2</td>
</tr>
<tr>
<td>Level 3 Develop software using Java (7266/7267-305)</td>
<td>3</td>
</tr>
<tr>
<td>Candidate instructions</td>
<td>3</td>
</tr>
</tbody>
</table>
About this document
This assignment comprises part of the assessment for Level 3 Develop software using Java (7266/7267-305).

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 6 hours.
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: 6 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** - requires the candidate to test and document the program.
- **Task C** - provides presentation criteria that should be followed by candidates when producing their work.

**Scenario**

A software development company, Premier Software, is developing software for handling data in a queue. As an employee of Premier Software, you have been asked to design, create and test the software. The software is initially to be used to manage job numbers for jobs queued to be printed. Jobs to be printed will be removed from the front of the queue and jobs received for printing will be added at the rear of the queue.

The software must perform the following functions:
- add a job number to the rear of the queue
- remove a job number from the front of the queue
- test if the queue is full
- test if the queue is empty
- display all the job numbers on the queue.

Job numbers must be in the range 1-30. Job numbers only will be stored in the queue.

**Task A**

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

In this task you are required to design, create and test a new class called QueueNum.

1. The queue must be stored in an integer array with a maximum number of entries. After the last element in the array is used, if there is an empty element at the start, the queue must wrap around to the front.

2. Design a solution for the software. Document the following methods in a program description language (pseudocode, flowchart or structured English):
a. public void AddQueue(int jobnum)
   The job number will be passed to this method and must be added to the end of the queue.
b. public int RemoveQueue()
   The job number at the front of the queue must be removed and returned by the method.
c. public boolean QueueFull()
   A test must be made for queue full. If the queue is full, true must be returned otherwise false.
d. public boolean QueueEmpty()
   A test must be made for queue empty. If the queue is empty, true must be returned otherwise false.
e. public void QueueDisplay()
   All the job numbers held on the queue must be displayed on the screen.
f. public void ErrorMessage(int messagenum)
   An integer is passed which represents the message number of the error message to be displayed on the screen. The appropriate error message must be displayed.

3 Document the layout of any input and output screens used.

4 Write the code for the software.

5 Write a main function which tests the methods in the QueueNum class.
   a. A menu must be displayed on the screen with the following options:
      MENU
      0. Add Job Number
      0. Remove Job Number
      0. Display Queue
      0. Quit
      Enter the menu option required
   b. If option 1 is selected a prompt must be displayed requesting a job number between 1 and 30. The job number must be validated.
      If the queue is full an error message must be displayed otherwise the job number must be added to the rear of the queue.
   c. If option 2 is selected, if the queue is empty an error message must be displayed otherwise the job number must be removed from the front of the queue and the message “jobnumber to be printed next” displayed on the screen where jobnumber is the number of the job removed from the queue.
   d. If option 3 is selected, if the queue is empty an error message must be displayed otherwise all the job numbers in the queue must be displayed.
   e. If option 4 is selected the program must terminate.
   f. The option number must be in the range 1-4.

**Task B**
_In this task you are required to test and document the software._

1 Create test data to test the software and determine the expected results.

2 Prepare a test plan.
3 Test the software, compare the actual results to the expected results keeping a log for each test which identifies any discrepancies between actual and expected results and records any amendments made to correct errors.

5 Produce a printed program listing.

**Task C**

*Candidates should follow the criteria below when producing their work:*

1 The program conforms to the design specification.

2 The code is structured.

3 Meaningful names are used for classes, methods and attributes using consistent naming conventions.

**Note**

- Candidates should produce the following for their assessor:
  - Program description language algorithms for each method in the class.
  - Screen layouts.
  - A printed program listing.
  - Test data, test plan, expected results, actual results and the log of testing.
- 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.
Published by City & Guilds
1 Giltspur Street
London
EC1A 9DD
T +44 (0)20 7294 2468
F +44 (0)20 7294 2400
www.cityandguilds.com

City & Guilds is a registered charity established to promote education and training