Level 3 Develop software using Java (7266/7267-305)

e-Quals
Assignment guide for Candidates
Assignment D

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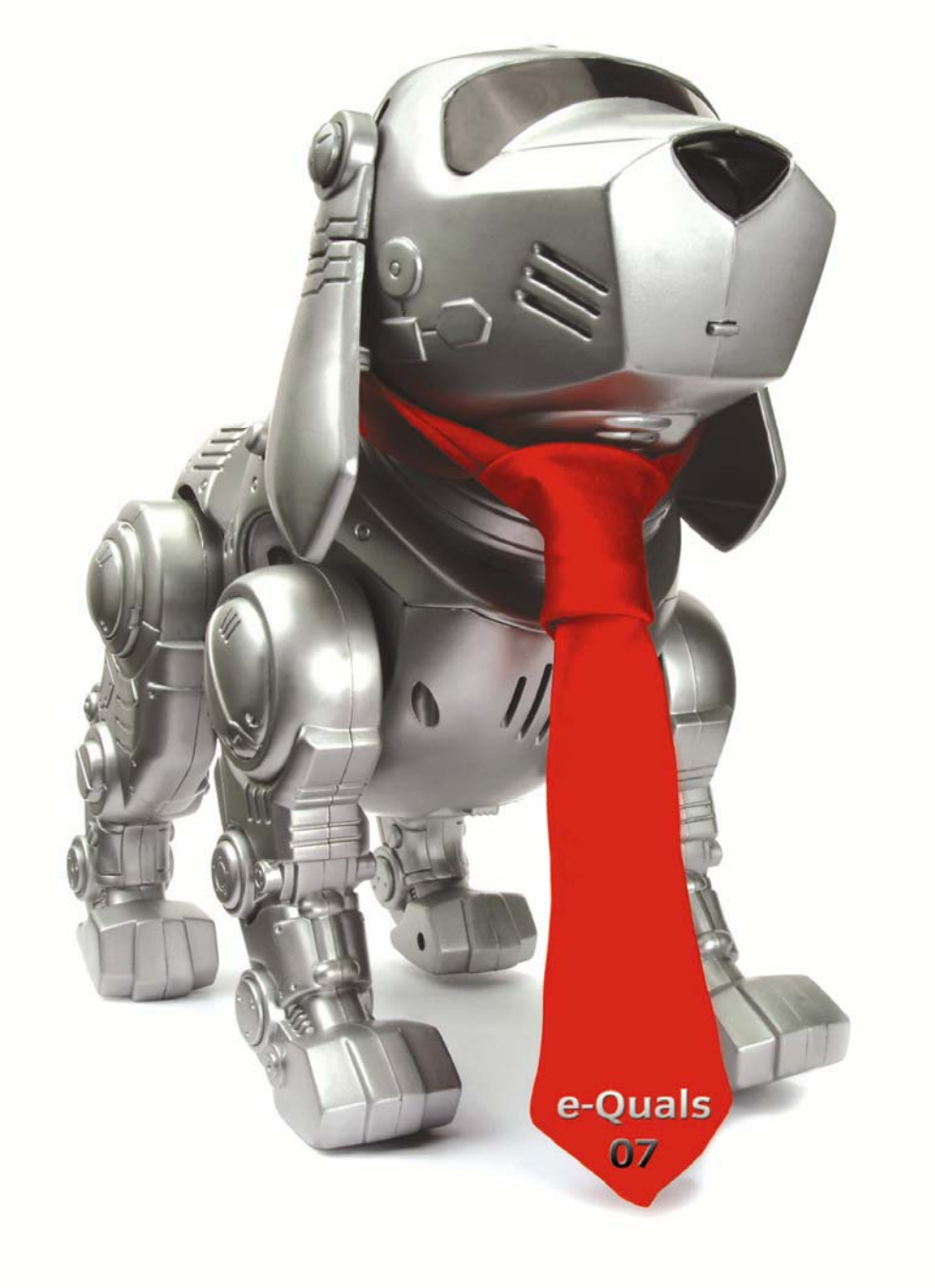

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Assignment D

Introduction – Information for Candidates

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**.

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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: 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.

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