TCP1201 Objected-Oriented Programming and Data Structures

Assignment 2 (20%)

Trimester 2, Session 2021/2022
Faculty of Computing and Informatics
Multimedia University

DUE DATE: 24 April 2020 (Sunday), 11:59pm

1. GROUPING

1) This is a group assignment with 3-4 students per group. You may keep your group from Assignment 1 or form a new group. All members must come under the same tutor for labs.
    - TT3V and TT5V are under Dr. Wong.
    - TT1V, TT2V, TT3L and TT6L are under Mr. Neoh.
2) Check with your lab tutor on the place to register your group.
3) Start forming group and do the assignment as early as possible. To detect sleeping member early, your group shall meetings 2-3 times per week, and every member shall present his/her work to the group. This is particularly important if you have a new groupmate that you have never worked with. A group may split from sleeping or non- contributing members.
4) No late work will be accepted, and no deadline will be extended.
5) Do not share your code with any other group. If detected all parties involved will get zero marks.

2. TASKS

Assignment 2 (A2) is an extension to your Assignment 1 (A1) with the following changes:

1) NGO and DC must keep track whether an aid item has been collected by the NGO. An aid item shall have the following 3 possible status:
    a) Available – the aim item is still available
    b) Reserved – the aim item has been reserved by the NGO
    c) Collected - the aim item has been collected by the NGO

2) You need to implement Collection Simulation whereby NGOs queue at a DC to collect their aid items. There are two modes of queueing:
    a) FIFO (first-in-first-out)
    b) Priority – an NGO with higher manpower will have higher priority.

FIFO Mode Sample Simulation

```
DC RECORDS
Donor Phone          Aids      Quantity   NGO   Manpower   Status
D1    011-1111111    Rice      10         N1    10         Reserved
D2    012-2222222    Rice      5          N2    20         Reserved
D3    013-3333333    Rice      15         N2    20         Reserved
D4    014-4444444    Rice      25         N3    30         Reserved
D4    014-4444444    Rice      10         N4    4          Reserved
```

```
D5    015-5555555     Rice       5          N5    6          Reserved
D5    015-5555555     Rice       10         -     -          Available

FIFO queue: []
Option
1 – Enqueue an NGO
2 – Dequeue an NGO
0 - Exit
Command > 1 N2

FIFO queue: [N2]
Option
1 – Enqueue an NGO
2 – Dequeue an NGO
0 - Exit
Command > 1 N3

FIFO queue: [N2, N3]
Option
1 – Enqueue an NGO
2 – Dequeue an NGO
0 - Exit
Command > 2
N2

DC RECORDS
Donor Phone           Aids       Quantity   NGO   Manpower   Status
D1    011-1111111     Rice       10         N1    10         Reserved
D2    012-2222222     Rice       5          N2    20         Collected
D3    013-3333333     Rice       15         N2    20         Collected
D4    014-4444444     Rice       25         N3    30         Reserved
D4    014-4444444     Rice       10         N4    4          Reserved
D5    015-5555555     Rice       5          N5    6          Reserved
D5    015-5555555     Rice       10         -     -          Available

FIFO queue: [N3]
Option
1 – Enqueue an NGO
2 – Dequeue an NGO
0 - Exit
Command > 1 N1

FIFO queue: [N3, N1]
Option
1 – Enqueue an NGO
2 – Dequeue an NGO
0 - Exit
Command > 2
N3
```

```
DC RECORDS
Donor Phone           Aids       Quantity   NGO   Manpower   Status
D1    011-1111111     Rice       10         N1    10         Reserved
D2    012-2222222     Rice       5          N2    20         Collected
D3    013-3333333     Rice       15         N2    20         Collected
D4    014-4444444     Rice       25         N3    30         Collected
D4    014-4444444     Rice       10         N4    4          Reserved
D5    015-5555555     Rice       5          N5    6          Reserved
D5    015-5555555     Rice       10         -     -          Available

FIFO queue: [N1]
Option
1 – Enqueue an NGO
2 – Dequeue an NGO
0 - Exit
Command > 2
N1

DC RECORDS
Donor Phone           Aids       Quantity   NGO   Manpower   Status
D1    011-1111111     Rice       10         N1    10         Collected
D2    012-2222222     Rice       5          N2    20         Collected
D3    013-3333333     Rice       15         N2    20         Collected
D4    014-4444444     Rice       25         N3    30         Collected
D4    014-4444444     Rice       10         N4    4          Reserved
D5    015-5555555     Rice       5          N5    6          Reserved
D5    015-5555555     Rice       10         -     -          Available

FIFO queue: []
Option
1 – Enqueue an NGO
2 – Dequeue an NGO
0 - Exit
Command > 0
```

After the simulation, N2 should see their records as follows:

```
N2 RECORDS
Donor Phone           Aids       Quantity   NGO   Manpower   Status
D2    012-2222222     Rice       5          N2    20         Collected
D3    013-3333333     Rice       15         N2    20         Collected
```

After the simulation, D4 should see their records as follows:

```
D4 RECORDS
Donor Phone           Aids       Quantity   NGO   Manpower   Status
D4    014-4444444     Rice       25         N3    30         Collected
D4    014-4444444     Rice       10         N4    4          Reserved
```

Priority Mode Sample Simulation

```
DC RECORDS
Donor Phone           Aids       Quantity   NGO   Manpower   Status
D1    011-1111111     Rice       10         N1    10         Reserved
D2    012-2222222     Rice       5          N2    20         Reserved
D3    013-3333333     Rice       15         N2    20         Reserved
D4    014-4444444     Rice       25         N3    30         Reserved
D4    014-4444444     Rice       10         N4    4          Reserved
D5    015-5555555     Rice       5          N5    6          Reserved
D5    015-5555555     Rice       10         -     -          Available

Priority queue: []
Option
1 – Enqueue an NGO
2 – Dequeue an NGO
0 - Exit
Command > 1 N5

Priority queue: [N5]
Option
1 – Enqueue an NGO
2 – Dequeue an NGO
0 - Exit
Command > 1 N2

Priority queue: [N2, N5] (N2 has highest priority)
Option
1 – Enqueue an NGO
2 – Dequeue an NGO
0 - Exit
Command > 1 N1

Priority queue: [N2, N5, N1]
Option
1 – Enqueue an NGO
2 – Dequeue an NGO
0 - Exit
Command > 2
N2

DC RECORDS
Donor Phone           Aids       Quantity   NGO   Manpower   Status
D1    011-1111111     Rice       10         N1    10         Reserved
D2    012-2222222     Rice       5          N2    20         Collected
D3    013-3333333     Rice       15         N2    20         Collected
D4    014-4444444     Rice       25         N3    30         Reserved
D4    014-4444444     Rice       10         N4    4          Reserved
D5    015-5555555     Rice       5          N5    6          Reserved
```

```
D5    015-5555555     Rice       10         -     -          Available

Priority queue: [N1, N5] (N1 has highest priority)
Option
1 – Enqueue an NGO
2 – Dequeue an NGO
0 - Exit
Command > 1 N4

Priority queue: [N1, N5, N4]
Option
1 – Enqueue an NGO
2 – Dequeue an NGO
0 - Exit
Command > 2
N1

DC RECORDS
Donor Phone           Aids       Quantity   NGO   Manpower   Status
D1    011-1111111     Rice       10         N1    10         Collected
D2    012-2222222     Rice       5          N2    20         Collected
D3    013-3333333     Rice       15         N2    20         Collected
D4    014-4444444     Rice       25         N3    30         Reserved
D4    014-4444444     Rice       10         N4    4          Reserved
D5    015-5555555     Rice       5          N5    6          Reserved
D5    015-5555555     Rice       10         -     -          Available

Priority queue: [N5, N4]
Option
1 – Enqueue an NGO
2 – Dequeue an NGO
0 - Exit
Command > 1 N3

Priority queue: [N3, N4, N5] (N3 has highest priority)
Option
1 – Enqueue an NGO
2 – Dequeue an NGO
0 - Exit
Command > 2
N3

DC RECORDS
Donor Phone           Aids       Quantity   NGO   Manpower   Status
D1    011-1111111     Rice       10         N1    10         Collected
D2    012-2222222     Rice       5          N2    20         Collected
D3    013-3333333     Rice       15         N2    20         Collected
D4    014-4444444     Rice       25         N3    30         Collected
D4    014-4444444     Rice       10         N4    4          Reserved
```

```
D5    015-5555555     Rice       5          N5    6          Reserved
D5    015-5555555     Rice       10         -     -          Available

Priority queue: [N5, N4] (N5 has highest priority)
Option
1 – Enqueue an NGO
2 – Dequeue an NGO
0 - Exit
Command >
```

Printing PriorityQueue

Note that whenever you print all elements in an PriorityQueue object, the highest priority element is always at the front of the queue while other elements seem to be in random order, this is normal because PriorityQueue is implemented using a type of binary tree known as heap.

3. RECOMMENDED TASK DISTRIBUTION

To maximum separation of work:

- Every group member handles a specific role. For a group of 4 members, the 2 weakest members may co-develop a role.
- Develop each role separately and store the data in csv/json files. The format of the csv/json files should be agreed by members so that it can be read/write from programs developed by different members.

Design your classes, data fields, and methods wisely. You may add classes and data fields to support the new features.

To make testing easier and save time during interview, your program should never clear screen.

4. SUBMISSION

- Submit your assignment to your tutor. Check with your tutor on the submission channel.
- One group submit one zip file named **A2_*GroupID.zip*** where:

  GroupID – your registered group number

  The zip should contain the following structures:

  i. A code folder which stores all Java code files and data files. Make sure the code can be compiled and executed.

  ii. A html folder which stores the Java documentation for Donor, NGO, and DC classes.

  iii. A file named Members.txt that lists down the group members' id, name, and the role he/she developed.

```
TASK DISTRIBUTION
Member1 Id Name - Role
Member2 Id Name - Role
Member3 Id Name - Role
Member4 Id Name - Role
```

Mark Sheet (20%)

Criteria	Items (Mark for an item is awarded if it works and student can explain)
1. Program Execution (12 marks)	**1.1. Correct program features and output (10m)** All output must be adequate. Collection Simulation a) NGOs are removed correctly in FIFO mode (1m) b) Has step-by-step removal of NGO in FIFO mode (1m) c) NGOs are removed correctly in priority mode (1m) d) Has step-by-step removal of NGO in priority mode (1m) Distribution Center (DC) e) Status updated correctly (1m) f) Integrated with Collection Simulation (1m) NGO g) Status updated correctly (1m) h) Integrated with Collection Simulation (1m) Donor i) Status updated correctly (1m) j) Integrated with Collection Simulation (1m)
	1.2. User friendliness (2m) Collection Simulation in JavaFX (1m). Input and Output (I/O) 1.0m – I/O are clear. Input errors are handled. 0.5m – I/O are ambiguous, or input errors are not handled. 0.0m – The program is unusable.
2. Data Structures (4 marks)	**2.1. Data Structures (4m)** Correct use of data structures I. Queue class (2m) – FIFO mode. II. PriorityQueue class (2m) – Priority mode, high priority for NGO with higher manpower. Implement Comparable/Comparator interface.
3. Bonus (2 marks)	1 mark per item: i. An NGO can collect more than one item in a one queue. ii. Features required in Assignment 1 but not implemented during Assignment 1. iii. Any other significant feature agreeable by your tutor.
4. Design (2 marks)	2m – Good design of classes and methods and use informative identifiers. 1m – Poor design of classes or methods or use non-informative identifiers. 0m – Poor design of classes, methods, and use non-informative identifiers.
5. Presentation & Interview (2 marks)	2.0m – Very well presented and Q&A 1.5m – Overall fine with minor issues 1.0m – Average 0.5m – Poorly prepared or has major issues
6. Sleeping member, late submission, not attending interview, or plagiarism	0 mark for this assignment