Lab 03 Specification – Implementing Queue ADT and its applications.  
Due Friday, 16th Feb 2018 1PM (1PM)  
Please refer to the syllabus for information about late submission policy.  
Total - 50 points.

Lab Goals

- Proposing solutions to highly regarded algorithmic problems.
- Implementing Java programming solutions.

Assignment Details

This lab exercise is going to be a team based lab. So you are allowed to collaborate with your team members and do the lab work together as a team. You are expected to submit your lab work on or before the due date by sending an email to the Instructor. See more details about submission in the last section. There is also an option for teams to collaborate through discussions and do individual implementations.

Preliminary Requirement:

1. You should implement the task using Java programming.
2. You should create a folder called cmpsc250-lab02-YOURFirstInitialLastName. So for example cmpsc250-lab03-amohan
3. You should create two sub folders namely: src and classes. All your source code ”.java” needs to be inside the src folder. All your classes files ”.class” needs to be in your classes folder.
   A simple technique to do this organization is by using the following command during compilation: javac -d ../classes -cp ./*.*
4. We adhere to the group assignment that was done in our earlier class and the group sheet is provided in the course webpage. This lab work will be done within your group and all the team members are going to contribute to the lab in a fair manner.

If you fail to adhere to the requirements, your lab work will not be evaluated and thereby you and your team will not receive any points for the lab.

The Hot Potato Childrens Game Simulator

Problem Definition: Children line up in a circle and pass an item from neighbour to neighbour as fast as they can. At a certain point in the game, the action is stopped and the child who has the item (the potato) is removed from the circle. Play continues until only one child is left. How do you find the winning position for a child, if there are N number of childrens?

Approach: We discussed this in detail during our lecture through a classic problem. You should take the similar approach for implementing this simulator.

Requirement:
1. You should create a class called HotPotato and provide the implementation of your algorithmic solution to the problem above.

2. You are required to implement the efficient solution.

3. You need to use the custom Queue ADT that we discussed during lecture session. You can recreate your own Queue ADT from scratch. But you cannot use the Java builtin Queue ADT.

4. The child removal process from the game is done through a configurable variable (number of steps) the potato is passed before getting to the child who will be removed.

5. The game can be played using two modes: player and admin mode. You need to separate through console input from the user and direct them to the right place. Simulation can be done based on traversing through the array and removing elements from the array.

6. Player Mode Input: The list of children names, who are going to participate in the game is user provided.

7. Player Mode Output: The name of the child who wins the game.

8. Admin Mode Input: The list of children names, who are going to participate in the game is user provided.

9. Admin Mode Output: The name of the child who is going to win using our Winning equation. Note - here the game is not played, prediction needs to be done beforehand. So that the Admin can prepare the winner prize (custom based on gender and so on), before the game is being played.

10. A validation criteria to check the correctness of your program is: if the admin received output is same as the player output.

Submission Details

1. You are required to submit this lab by sending an email with a zipped version of your cmpsc250-lab03-YOURFirstInitialLastName folder.

2. Subject of your email should say "CMPSC250: Team X Lab 03 Submission". Here X needs to be replaced with your group number. Refer the group sheet in the course webpage.

3. One email should be sent for your teams lab submission.

4. Send the email to amohan@allegheny.edu // CC the email to all your team members.

5. You should add the following statement in the body of your email
   By doing this submission, I understand that I and my team members are subject to the Honor Code policy.
   Lab submitted by: X1, X2, and X3 (Here X1, X2, and X3 are the name of your team members)

6. Shifting team members is not ideal and not allowed, unless there is an extreme situation which is discussed with the instructor prior to your submission.