WIA1002/WIB1002 Data Structure

Tutorial: Queue

1. Name **four** everyday examples of a queue other than those discussed during lecture.

2. What is the difference between a queue and stack?

3. Use the following code segment to answer parts (a) through (c):

```
Queue<Integer> q = new Queue<Integer>();
Scanner keyIn = new Scanner(System.in);
for (int i = 1; i <= 5; i++)
{
      if (keyIn.nextBoolean())
            System.out.print(i + " ");
      else
            q.enqueue(i);
      }
}
while (!q.isEmpty())
      System.out.print(q.dequeue() + " ");
System.out.println();
```

   (a) What is the output for the following input sequence?

```
true  false  false  true  true
```

   (b) Is it possible to have output: 1 3 5 4 2? If yes, give an input sequence that produces the output; or else, provide justification to your answer.

   (c) Give at least **three** input sequences that produce the output: 1 2 3 4 5

4. Hand trace a queue X through the following operations:

```
X.enqueue(new Integer(14));
X.enqueue(new Integer(3));
X.enqueue(new Integer(5));

Object Y = X.dequeue();
X.enqueue(new Integer(7));
X.enqueue(new Integer(9));
Y = X.dequeue();
X.enqueue(new Integer(2));
X.enqueue(new Integer(4));
```

   Given the resulting queue X above, what would be the result of each of the following?

```
a) X.front();

b) Y = X.dequeue();
   X.enqueue(new Integer(10));
   X.front();

c) Y = X.dequeue();

d) X.front();
```

5. Provide and explain three operations / functions of Linked List based Queue that you can add to the GenericQueue class, other than those discussed in the lecture (i.e., enqueue, dequeue and getSize – from Slide 10 in the lecture slide).