Data Structure Homework 2

Note

- A file should be .pdf or .doc.
- A file's name starts with your student ID followed by an underscore then your name. ex: 410521213_陳姿吟.pdf
- Questions must be answered in English.
- A scanned version is acceptable as long as it is legible; however, it's not recommended.

Submission and Deadline

- NDHU e-learning
- Monday, 28th October 2019 before midnight

Questions

1. Consider Stack and Queue data structures discussed in the lectures. For the following pseudocode, please describe program output.

a) Stack operations

```
Stack s;
s.push(1);
write s.pop();
s.push(2);
s.push(3);
write s.pop();
s.push(4);
s.push(5);
write s.pop();
write s.pop();
write s.pop();
```

b) Queue operations

```
Queue q;
q.enqueue(1);
write s.dequeue();
q.enqueue(2);
q.enqueue(3);
write s.dequeue();
q.enqueue(4);
q.enqueue(5);
write s.dequeue();
write s.dequeue();
write s.dequeue();
```

2. Simulating an Array

Arrays let us access an element on an arbitrary index (within its range) using the subscript operator [ ]. With this syntax, we can easily get or set the value of a specific index (random access).

Imagine that on some platform, the Array data structure is not available. Alternatively, you can consider that you have to perform some Array-like operation in an implementation that uses different data structures.

Using strictly the abovementioned interface of Stacks and Queues, please describe how you could implement the subscript operator, i.e. get and set an element on a certain index, using:

a) A Queue

b) Two Stacks