

**King Fahd University of Petroleum and Minerals**  
 College of Computer Science and Engineering  
 Information and Computer Science Department

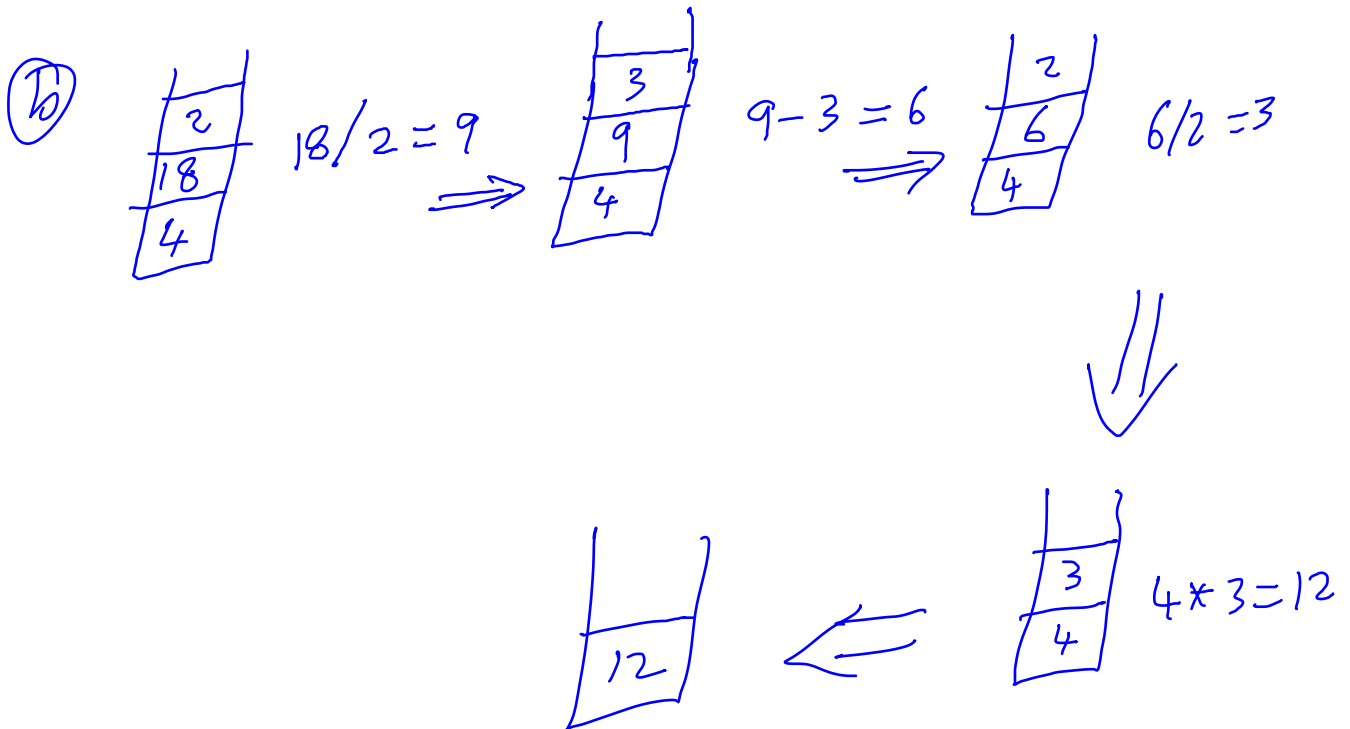
ICS 202-01: Data Structures  
 Spring Semester 2017-2018  
 Quiz#2, Thursday February 15<sup>th</sup> 2018

Name:

ID#:

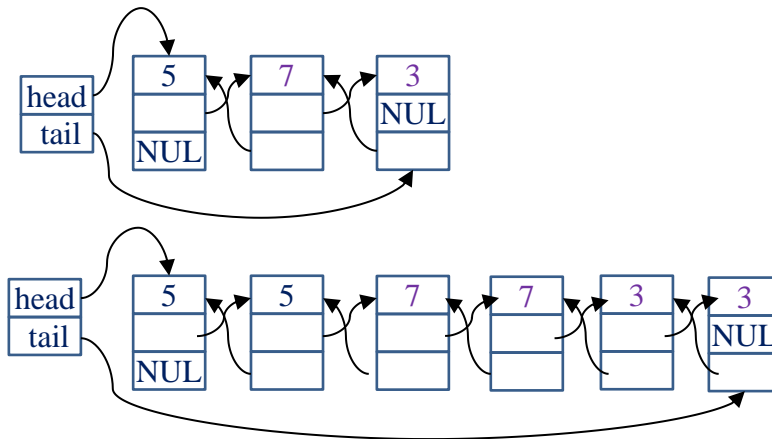
1. (8 points) In order to evaluate the postfix expression  $4\ 18\ 2\ /\ 3\ -\ 2\ /\ *$
- (1 points) Which data structure did we use?
  - (7 points) Evaluate the expression showing all your intermediate steps.

Ⓐ Stacks.



Result is 12.

2. (12 points) Write a method that takes as input a non-empty doubly linked list L of integers, and duplicates its nodes, as shown below.



```
public class DLLNode<T> {
    public T info;
    public DLLNode<T> next, prev;
    ....
}

public class DLL<T> {
    private DLLNode<T> head, tail;
    ...
}
```

```
void duplicate(DLL<T> L) {
    // here, we are assuming that the list is non-empty
    DLLNode temp=L.head;

    while (temp.next != NULL) {
        // duplicate temp and update the references of next and
        // prev DLL nodes.
        +1 DLLNode duplicate = new DLLNode(temp.info,temp.next, temp);
        +1 duplicate.next.prev=duplicate;      +1      +1      +1
        +1 temp.next=duplicate;

        // change the reference temp to the next node to be
        // duplicated
        +1 temp= duplicate.next;
    }
    // now, I need to duplicate the last node (tail)
    DLLNode lastDuplicate = new DLLNode(temp.info, NULL, temp); ] +2
    temp.next = lastDuplicate;
    // update the tail of the list ] +1
    L.tail=lastDuplicate;
}
}
```