CSCE146 - Practice Exam (Midterm 1)

CSCE146 F2017 SI | Midterm #1 | For JJ Sheppherd’s Class

Java Review

1. What does this Java Code Print out?

```
public static void main() {
  int a = 6;
  String s = "";
  for (int i = 0; i < a; i++) {
    for (int j = 0; j <= i; j++) {
      if (j == 0 || j == i) {
        s += "*";
      } else {
        s += " ";
      }
    }
    System.out.print(s + "\n");
    s = "";
  }
}
```

```
*
**
* *
*  *
*   *
*    *
```

2. What error if any will this code segment give? What will it print out if there’s no error?

```
int[] a = {1,2,3,4,5,6,7,8,9,10};
for (int i = 0; i < a.length / 2; i++) {
 System.out.println((a[i + 2] + a[i]));
}
```

```
4
6
8
10
12
```

3. Write a Method that finds the Minimum integer in an array.

```
public static int findMin(int[] a) {
int check = a[0];
for (int I = 0; i < a.length; i++) {
      if (check > a[i]) check = a[i];
}
Return check;
```

Data Structures

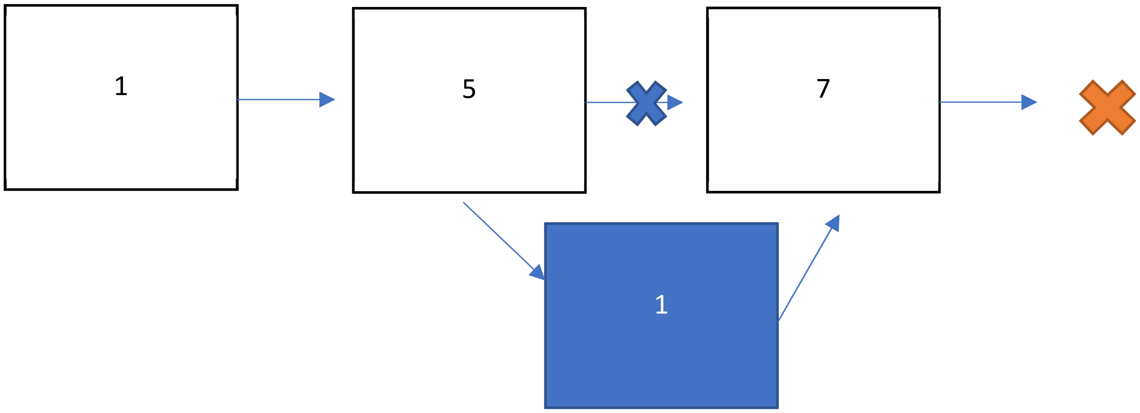
Linked Lists

Know how to write code to find, delete, and insert Nodes

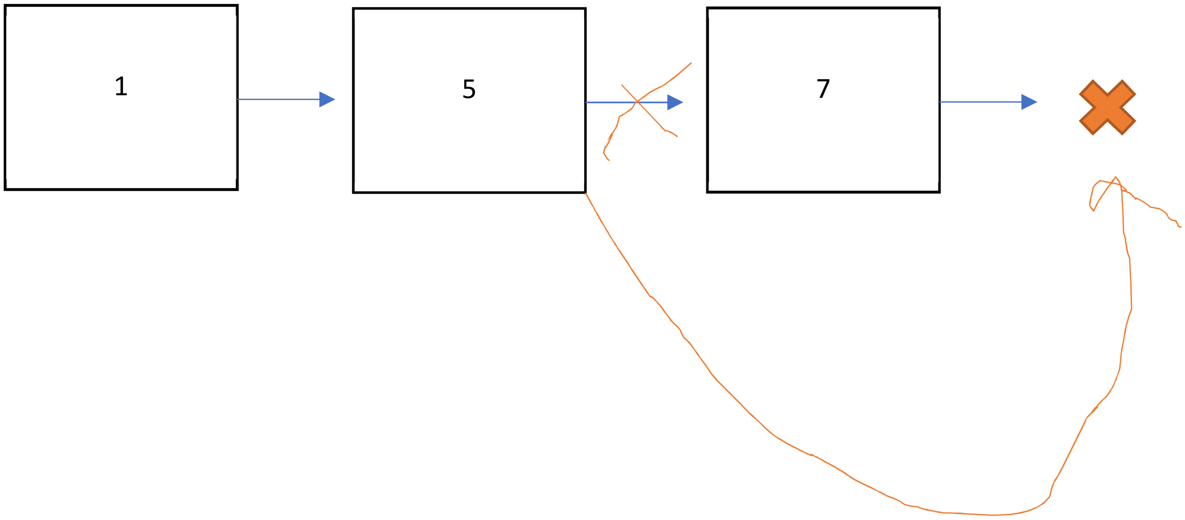
4. List a few Advantages and Disadvantages of using a Linked List over an Array.

Advantage: Resizable. Disadvantage: Slow Access

5. Draw the Insertion Procedure for adding a node containing 6 after the node containing 5



6. Draw the Removal Procedure for the node after 5.



7. Write a Function to find if a value is in the LinkedList using a linear search.

```
public boolean linearSearch(int toFind) {
Node temp = head;
While (temp != null) {
      If (temp.data == toFind) return true;
      Temp = temp.next;
}
Return false;
```

Queues

Know how to write code to Enqueue, Dequeue and Peek in a Queue

8. Draw the Queue after each Operation

Head		tail				
5	4	8				

Enqueue 3

Head			tail			
5	4	8	3			

Dequeue 3 times

Head						
3						

Enqueue 6 and 24

Head						
3	6	24				

Dequeue 2 times

Head						
24						

9. What will the code snippet print out?

```
Queue<Integer> q = new
LinkedQueue<Integer>();
//Assume that this Queue uses
enqueue(), dequeue(), and peek()

for (int i = 5; i >= -5; i--) {
```

5
4
3
2
1
…

```
  q.enqueue(i);                     -4
}                                   -5
for (int i = 3; i < 6; i++) {

System.out.println(q.dequeue());
}
for (int i : q) {
  System.out.println(q);
}
```

Stacks

Know how to code Push, Pop, and Peek

10. What will the Code Snippet Print out?

```
Stack<Integer> s = new              -5
LinkedStack<Integer>();             -4
//Assume that this Stack uses       -3
pop(), push(), and peek()           -2
                                    …
for (int i = 5; i >= -5; i--) {     4
  s.enqueue(i);                     5
}
for (int i = 3; i < 6; i++) {

System.out.println(s.dequeue());
}
for (int i : s) {
  System.out.println(s);
}
```

11. Draw the Stack after each Operation.

Head		tail				
5	4	8				

Push 3

Head						
3	5	4	8			

Pop 3 times

Head						
8						

Push 6 and 24

Head						
24	6	8				

Pop 2 times

Head						
8						

Recursion

12. What data Structure can be used to illustrate Recursion?

Stacks

13. What does this code do?

```
public static int f(int a) {
  if (a <= 1) return 1;
  return f(a - 1) + a;
}
```

Returns the Triangular Number of f(a) {a + (a-1) + … + 2 + 1}

Searching and Sorting

Array: {45,23,12,79,36,42,10}

14. Perform Mergesort on the Given Array

{45, 23, 12, 79} {36, 42, 10}

{45, 23} {12, 79} {36, 42} {10}

{45} {23} {12} {79} {36} {42} {10}

{23, 45} {12, 79} {36, 42} {10}

{12, 23, 45, 79} {10, 36, 42}

{10, 12, 23, 36, 42, 45, 79}

15. Perform Quicksort on the Given Array

16. Perform a Binary Search for 45 for the given array (After it has been sorted)

{10, 12, 23, 36, 42, 45, 79}

{10, 12, 23, **36**, 42, 45, 79}

{10, 12, 23, 36} {42, **45**, 79}

Asymptotics

Know how to sort them

Know what Complexity the Algorithms in class have