Review Test Submission: CS5343 Fall20 Exam1

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Course	CS 5343.001 - Algorithm Analysis and Data Structures - F20
Test	CS5343 Fall20 Exam1
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Status	Completed
Attempt Score	100 out of 100 points
Time Elapsed	1 hour, 5 minutes out of 1 hour and 15 minutes
Results Displayed	All Answers, Submitted Answers, Correct Answers, Feedback

Question 1

6 out of 6 points

What will be output by the code below?

```
public class NestedRecursion
{

  public static void a(int i)
  {

    if (i == 0)
      return;
    else
    {
      System.out.print(i);
      b(i-1);
      a(i-1);
    }
  }

  public static void b(int i)
  {

    if (i == 0)
      return;
    else
    {
      System.out.print(i);
      a(i-1);
```

```
    }
  }


  public static void main(String args[])
  {
    a(3);
  }

}
```

Selected Answer: 321211

Correct Answer:

Evaluation Method	Correct Answer	Case Sensitivity
Exact Match	321211	

Question 2

6 out of 6 points

Write a main method that creates a Pair object using an Integer type, sets the Pair to contain 1 and 2, then gets and prints the Pair's two integers.

```
public class Pair<T>{

  private T first;
  private T second;

  public void setFirst(T first){
      this.first = first;
  }

 public void setSecond(T second) {
    this.second = second;
  }

  public T getFirst() {
    return this.first;
  }

  public T getSecond() {
    return this.second;
  }

}
```

Selected Answer:

```
public static void main(String[] args) {
    Pair<Integer> pair = new Pair<>();
    pair.setFirst(1);
    pair.setSecond(2);
    System.out.println(pair.getFirst());
    System.out.println(pair.getSecond());
}
```

Correct Answer: [None]

Response Feedback: [None Given]

Question 3

6 out of 6 points

For the code shown, what is the worst case running time?

```
for (i=0; i<n; i++)
    for (j=0; j<10; j++)
        k=i+j;
```

Selected Answer: ✓ O(N)

Answers:
- O(log N)
- ✓ O(N)
- O(N log N)
- O(N*N)

Question 4

6 out of 6 points

For the code shown, what is the worst case running time?

```
for (i=0; i<n; i++)
   if (i%2 == 0)
     for (j=0; j<n; j=j/2)
         k=i+j;
   else
     for (j=0; j<n; j=j+2)
         k=i+j;
```

Selected Answer: O(N*N)

Answers:
- ✓
- O(log N)
- O(N)
- O(N log N)

O(N*N)

Question 5

6 out of 6 points

For the code shown, what is the worst case running time?

```
public static boolean isPal(String s)
{

   if(s.length() == 0 || s.length() == 1)
      return true;

   if(s.charAt(0) == s.charAt(s.length()-1))
      return isPal(s.substring(1, s.length()-1));   // call excluding first and last characters

   return false;

}
```

Selected Answer: O(N)

Answers:
- O(log N)
- O(N)
- O(N log N)
- O(N*N)

Question 6

6 out of 6 points

For the code shown, what is the worst case running time if an ArrayList is passed?

```
public static void removeEvensVer1( List lst)
{
  int i=0;

  while ( i<lst.size())
    if ( lst.get( i ) % 2 == 0 )
      lst.remove( i );
    else
      i++;
}
```

Selected Answer: O(N*N)

Answers: O(log N)

O(N)

O(N log N)

O(N*N)

Question 7

6 out of 6 points

For the code shown, what is the worst case running time if a LinkedList is passed?

```
public static void removeEvensVer1( List lst)
{
 int i=0;

 while ( i<lst.size())
   if ( lst.get( i ) % 2 == 0 )
     lst.remove( i );
   else
     i++;
}
```

Selected Answer: O(N*N)

Answers: O(log N)

O(N)

O(N log N)

O(N*N)

Question 8

6 out of 6 points

Is the following code correct for removing a node from a linked list that has sentinel nodes?

```
private AnyType remove( Node<AnyType> p )
{
    p.next.prev = p.prev;
    p.prev.next = p;
    theSize--;
    modCount++;

    return p.data;
}
```

Selected Answer: ✓ False

Answers: True

✓ False

Question 9

10 out of 10 points

Match on worst-case running time for a “find” operation on each tree (choose amortized O(log N) instead of O(N) if it applies):

Question	Correct Match	Selected Match
Binary Search Tree	✓ B. O(N)	✓ B. O(N)
AVL Tree	✓ A. O(log N)	✓ A. O(log N)
Splay Tree	✓ C. Amortized O(log N)	✓ C. Amortized O(log N)
B+-Tree	✓ A. O(log N)	✓ A. O(log N)
Red Black Tree	✓ A. O(log N)	✓ A. O(log N)

All Answer Choices

A. O(log N)

B. O(N)

C. Amortized O(log N)

Question 10

6 out of 6 points

If the following values are inserted into an empty AVL Tree, which node is the root in the final tree: 30 10 20 25 35 23

Selected Answer: ✓ 25

Answers: 30

20

✓ 25

35

23

Question 11

6 out of 6 points

A splay tree already exists with values 10,20,30,40,50 such that each value is the right child of the previous value. If 50 is accessed in this tree, what will 40's final position be?

Selected Answer: Right of 20

Answers:
- Left of 50
- Right of 20
- Right of 10
- Right of 30

Question 12

6 out of 6 points

The expression (a+b)*(c+d) is represented by an expression tree. What would a postorder traversal of this tree be? Type your answer with no spaces between symbols.

Selected Answer: ab+cd+*

Correct Answer:

Evaluation Method	Correct Answer	Case Sensitivity
Exact Match	ab+cd+*	

Question 13

6 out of 6 points

The code for an insert on a Binary Search Tree has a print statement added. Suppose the tree is empty and three insert calls are made to insert A, then B, then C. What gets printed? Type your answer with no spaces between characters. If nothing gets printed, leave it blank.

```
private BinaryNode<AnyType> insert( AnyType x, BinaryNode<AnyType> t )
{
    if( t == null )
        return new BinaryNode<AnyType>( x, null, null );

    int compareResult = x.compareTo( t.element );
    if( compareResult < 0 )
        t.left = insert( x, t.left );
     else if( compareResult > 0 )
        t.right = insert( x, t.right );
     else
        ;  // Duplicate; do nothing
      System.out.print(t.element);
      return t;
}
```

Selected Answer: ABA

Correct Answer:

Evaluation Method	Correct Answer	Case Sensitivity
Exact Match	ABA	

Question 14

6 out of 6 points

A linear probing hash table has size=7. The following values are inserted: 10, 21, 38, 52. Suppose the hash value of each one is 4. List the inserted position of each value. For example, 10=1 21=2 38=5 52=6.

Selected Answer: 10=4 21=5 38=6 52=0

Correct Answer:

Evaluation Method	Correct Answer	Case Sensitivity
Exact Match	10=4 21=5 38=6 52=0	

Question 15

6 out of 6 points

A quadratic probing hash table has size=7. The following values are inserted: 10, 21, 38, 52. Suppose the hash value of each one is 3, except 21 is 0. List the inserted position of each value. For example, 10=1 21=2 38=5 52=6.

Selected Answer: 10=3 21=0 38=4 52=5

Correct Answer:

Evaluation Method	Correct Answer	Case Sensitivity
Exact Match	10=3 21=0 38=4 52=5	

Question 16

6 out of 6 points

A portion of a hopscotch hash table is shown below. Suppose a new value, zeta, is to be inserted with a hash value of 5. Where will it finally be placed?

```
--------------------
5| alpha   | 1001 |
--------------------
6| delta   | 1100 |
--------------------
7| beta    | 0000 |
--------------------
8| epsilon | 0000 |
--------------------
9| gamma   | 1000 |
--------------------
```

Selected Answer: 6

Answers:

- 5
- 6
- 7
- 8
- 9

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← **OK**