

CS 1322 - Assessment PostTest

<p>Please fully bubble in your answers:</p> <p>Enter your 9 digit GTID</p> <table style="width: 100%; text-align: center; border-collapse: collapse;"> <tr> <td style="border: 1px solid black; width: 20px; height: 20px;"></td> <td style="border: 1px solid black; width: 20px; height: 20px;"></td> <td style="border: 1px solid black; width: 20px; height: 20px;"></td> <td style="border: 1px solid black; width: 20px; height: 20px;"></td> <td style="border: 1px solid black; width: 20px; height: 20px;"></td> <td style="border: 1px solid black; width: 20px; height: 20px;"></td> <td style="border: 1px solid black; width: 20px; height: 20px;"></td> <td style="border: 1px solid black; width: 20px; height: 20px;"></td> <td style="border: 1px solid black; width: 20px; height: 20px;"></td> <td style="border: 1px solid black; width: 20px; height: 20px;"></td> </tr> </table> <p>0 <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/></p> <p>1 <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/></p> <p>2 <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/></p> <p>3 <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/></p> <p>4 <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/></p> <p>5 <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/></p> <p>6 <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/></p> <p>7 <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/></p> <p>8 <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/></p> <p>9 <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/></p>											<p>Indicate your major:</p> <p><input type="radio"/> AE</p> <p><input type="radio"/> CM</p> <p><input type="checkbox"/> CMPE</p> <p><input type="radio"/> CS</p> <p><input type="radio"/> DM</p> <p><input type="radio"/> ECE</p> <p><input type="radio"/> EE</p> <p><input type="radio"/> ISYE</p> <p><input type="radio"/> MATH</p> <p><input type="radio"/> ME</p> <p><input type="radio"/> PHYS</p> <p><input type="radio"/> PSYC</p>																																																																																						
<p>Identify the prerequisite class you have taken, the grade you earned, and when you took the class:</p> <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">Class</th> <th style="text-align: left;">Grade</th> <th style="text-align: left;">Semester</th> <th style="text-align: left;">Year</th> </tr> </thead> <tbody> <tr> <td><input type="radio"/> CS1321</td> <td><input type="radio"/> A</td> <td><input type="radio"/> Spring</td> <td><input type="radio"/> 2004</td> </tr> <tr> <td><input type="radio"/> CS1371</td> <td><input type="radio"/> B</td> <td><input type="radio"/> Summer</td> <td><input type="radio"/> 2003</td> </tr> <tr> <td><input type="checkbox"/> Other GT class</td> <td><input type="checkbox"/> C</td> <td><input type="checkbox"/> Fall</td> <td><input type="checkbox"/> 2002</td> </tr> <tr> <td><input type="radio"/> Transfer Credit</td> <td><input type="radio"/> D</td> <td></td> <td><input type="radio"/> 2001</td> </tr> <tr> <td><input type="checkbox"/> AP Credit</td> <td><input type="checkbox"/> F</td> <td></td> <td><input type="checkbox"/> Other _____</td> </tr> </tbody> </table>		Class	Grade	Semester	Year	<input type="radio"/> CS1321	<input type="radio"/> A	<input type="radio"/> Spring	<input type="radio"/> 2004	<input type="radio"/> CS1371	<input type="radio"/> B	<input type="radio"/> Summer	<input type="radio"/> 2003	<input type="checkbox"/> Other GT class	<input type="checkbox"/> C	<input type="checkbox"/> Fall	<input type="checkbox"/> 2002	<input type="radio"/> Transfer Credit	<input type="radio"/> D		<input type="radio"/> 2001	<input type="checkbox"/> AP Credit	<input type="checkbox"/> F		<input type="checkbox"/> Other _____																																																																								
Class	Grade	Semester	Year																																																																																														
<input type="radio"/> CS1321	<input type="radio"/> A	<input type="radio"/> Spring	<input type="radio"/> 2004																																																																																														
<input type="radio"/> CS1371	<input type="radio"/> B	<input type="radio"/> Summer	<input type="radio"/> 2003																																																																																														
<input type="checkbox"/> Other GT class	<input type="checkbox"/> C	<input type="checkbox"/> Fall	<input type="checkbox"/> 2002																																																																																														
<input type="radio"/> Transfer Credit	<input type="radio"/> D		<input type="radio"/> 2001																																																																																														
<input type="checkbox"/> AP Credit	<input type="checkbox"/> F		<input type="checkbox"/> Other _____																																																																																														
<p>Have you written programs outside of class using a language and or techniques that you have learned in this course (CS2) or in previous course (CS1)?</p> <p><input type="radio"/> Yes If so, which language did you use?</p> <p><input type="radio"/> No</p> <p style="margin-left: 150px;"> <input type="radio"/> Java <input type="radio"/> Matlab <input type="checkbox"/> Python <input type="radio"/> Scheme <input type="radio"/> Other _____ </p>																																																																																																	
<p>Please bubble in final answers here:</p> <table style="width: 100%; text-align: center; border-collapse: collapse;"> <tr> <td style="width: 15%;"></td> <td style="width: 15%;">A</td> <td style="width: 15%;">B</td> <td style="width: 15%;">C</td> <td style="width: 15%;">D</td> <td style="width: 15%;">E</td> <td style="width: 15%;"></td> <td style="width: 15%;">A</td> <td style="width: 15%;">B</td> <td style="width: 15%;">C</td> <td style="width: 15%;">D</td> <td style="width: 15%;">E</td> </tr> <tr> <td>1</td> <td><input type="radio"/></td> <td><input type="radio"/></td> <td><input type="radio"/></td> <td><input type="radio"/></td> <td><input type="radio"/></td> <td>8</td> <td><input type="radio"/></td> <td><input type="radio"/></td> <td><input type="radio"/></td> <td><input type="radio"/></td> <td><input type="radio"/></td> </tr> <tr> <td>2</td> <td><input type="radio"/></td> <td><input type="radio"/></td> <td><input type="radio"/></td> <td><input type="radio"/></td> <td><input type="radio"/></td> <td>9</td> <td><input type="radio"/></td> <td><input type="radio"/></td> <td><input type="radio"/></td> <td><input type="radio"/></td> <td><input type="radio"/></td> </tr> <tr> <td>3</td> <td><input type="radio"/></td> <td><input type="radio"/></td> <td><input type="radio"/></td> <td><input type="radio"/></td> <td><input type="radio"/></td> <td>10</td> <td><input type="radio"/></td> <td><input type="radio"/></td> <td><input type="radio"/></td> <td><input type="radio"/></td> <td><input type="radio"/></td> </tr> <tr> <td>4</td> <td><input type="radio"/></td> <td><input type="radio"/></td> <td><input type="radio"/></td> <td><input type="radio"/></td> <td><input type="radio"/></td> <td>11</td> <td><input type="radio"/></td> <td><input type="radio"/></td> <td><input type="radio"/></td> <td><input type="radio"/></td> <td><input type="radio"/></td> </tr> <tr> <td>5</td> <td><input type="radio"/></td> <td><input type="radio"/></td> <td><input type="radio"/></td> <td><input type="radio"/></td> <td><input type="radio"/></td> <td>12</td> <td><input type="radio"/></td> <td><input type="radio"/></td> <td><input type="radio"/></td> <td><input type="radio"/></td> <td><input type="radio"/></td> </tr> <tr> <td>6</td> <td><input type="radio"/></td> <td><input type="radio"/></td> <td><input type="radio"/></td> <td><input type="radio"/></td> <td><input type="radio"/></td> <td>13</td> <td><input type="radio"/></td> <td><input type="radio"/></td> <td><input type="radio"/></td> <td><input type="radio"/></td> <td><input type="radio"/></td> </tr> <tr> <td>7</td> <td><input type="radio"/></td> <td><input type="radio"/></td> <td><input type="radio"/></td> <td><input type="radio"/></td> <td><input type="radio"/></td> <td>14</td> <td><input type="radio"/></td> <td><input type="radio"/></td> <td><input type="radio"/></td> <td><input type="radio"/></td> <td><input type="radio"/></td> </tr> </table>			A	B	C	D	E		A	B	C	D	E	1	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	8	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	2	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	9	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	3	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	10	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	4	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	11	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	5	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	12	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	6	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	13	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	7	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	14	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	A	B	C	D	E		A	B	C	D	E																																																																																						
1	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	8	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>																																																																																						
2	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	9	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>																																																																																						
3	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	10	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>																																																																																						
4	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	11	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>																																																																																						
5	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	12	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>																																																																																						
6	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	13	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>																																																																																						
7	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	14	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>																																																																																						

1) ITERATION

```
public void createTriangle(int n)
{
    for ( XXX1XXX )
    {
        for ( XXX2XXX )
        {
            System.out.print( XXX3XXX );
        }
        System.out.print(\n);
    }
}
```

The code XXX1XXX, XXX2XXX, XXX3XXX represents pieces of code that are missing from the method that are needed to make it work properly.

Which code fragments complete the method such that the output for createTriangle(4) is:

```
4444
333
22
1
```

- a) XXX1XXX = int i = n; i > 0 ; i-- //correct choice
XXX2XXX = int j = i; j >= 1 ; j--
XXX3XXX = i
- b) XXX1XXX = int i = n; i > 0 ; i--
XXX2XXX = int j = i; j >= 1 ; j--
XXX3XXX = j //wrong line
- c) XXX1XXX = int i = n; i => 0 ; i-- //wrong line
XXX2XXX = int j = i; j => 0 ; j-- //wrong line
XXX3XXX = i
- d) XXX1XXX = int i = n; i > 1 ; i-- //wrong line
XXX2XXX = int j = i; j >= 1 ; j--
XXX3XXX = i
- e) XXX1XXX = int i = n; i > 1 ; i-- //wrong line
XXX2XXX = int j = i; j >= 1 ; j--
XXX3XXX = j //wrong line

Explanations:

Choice b) prints the wrong integer variable.

c) prints a triangle as follows: 44444
3333
222
11
0

d) does not print last line of required output

e) does not print last line and uses incorrect integer variable

2) CONDITIONAL

```
int x = 2;
int y = 4;

if ( false || true )           // statement 1
{
    if ( x < y )               // statement 2
        x = x * x;
    else
        x = x + y;
}
if ( ( true && false) || true ) //statement 3
{
    if( x <= y)                //statement 4

        y = y * y;
    else
        y = x + y;
}
if ( x <= y )                  //statement 5
    x = x + y;

System.out.println("x = " + x);
System.out.println("y = " + y);
```

What is the output of this code fragment?

- a) x = 18 //mess up statement 1
y = 16
- b) x = 6 //mess up statements 1 and 3
y = 4
- c) x = 8 //mess up statement 3
y = 4
- d) x = 16 //mess up statement 2
y = 10
- e) x = 20 //correct
y = 16

Explanations:

- a) (false || true) evaluates to true.
- b) And c) ((true && false) || true) evaluates to true
- d) x is greater than y

3) BST

```

Public class Node
{
    private Node left;    //left child node
    private Node right;  //right child node
    private int data;

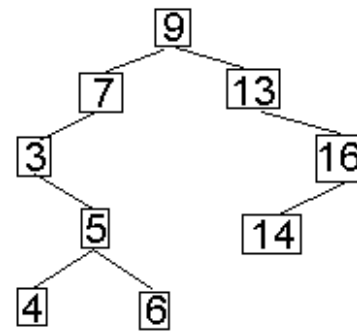
    public Node getLeft() {
        return left; }
    public Node getRight() {
        return right; }
    public int getData() {
        return data; }
    ...
    ...
}

public void Traverse(Node root)
{
    if ( root.getLeft() != null )
        Traverse ( root.getLeft() );

    if ( root.getRight() != null )
        Traverse ( root.getRight() );

    if ( root.getData() != null )
        System.out.println(
            root.getData() );
}

```



What is the output of this Traversal method on the above BST, where 9 is passed as the root?

- | | | | | |
|-----------|------------|----------|------------|-------------|
| a) 4 | b) 3 | c) 9 | d) 9 | e) 9 |
| 6 | 4 | 7 | 7 | 13 |
| 5 | 5 | 13 | 3 | 16 |
| 3 | 6 | 3 | 5 | 14 |
| 7 | 7 | 16 | 4 | 7 |
| 14 | 9 | 5 | 6 | 3 |
| 16 | 13 | 14 | 13 | 5 |
| 13 | 14 | 4 | 16 | 6 |
| 9 | 16 | 6 | 14 | 4 |
| //correct | //in order | //random | //preorder | //backwards |

Explanations:

Choice a is the correct post-order traversal of the graph

4) ARRAY

```
int array1 = { 3, 5, 4, 8, 2, 6, 7 };
int array2 = { 2, 1, 3, 4 };

array1[ 3 ] = array2[ 2 ];           //1
array1[ 2 ] = array2[ 1 ] + 4;     //2
array1[ 5 ] += array2[ 1 ] * 2;    //3
if ( array1[ 2 ] > array2[ 3 ] )
array1[ 2 ] += 3;                   //4
array1[ 4 ] = array1[ 6 ];          //5
```

What is the value of array1 after this code is executed?

- a) { 3, 9, 1, 6, 6, 6, 7 } // messed up array indexing
- b) { 3, 5, 4, 3, 7, 8, 7 } //miss 2
- c) { 3, 5, 8, 3, 7, 8, 7 } //correct
- d) { 3, 5, 5, 3, 7, 8, 7 } // missed if statement
- e) { 3, 5, 8, 8, 7, 8, 7 } // miss 1

Explanations:

- a) array indexing begins at 0. array[0] is first element.
- b) if you skipped statement 2 you would wind up with this choice
- d) at this point array1[2] holds '5' and array2[3] holds 4 so the if statement is true and statement 4 must be evaluated
- e) if you skipped the first statement you would get this choice

5) HASH TABLES

Consider the resulting Hash Table that is made when the following < key , data> pairs are added. The hash code form of the key is given in the parenthesis after the pair. The HashTable is of size 5 and uses external chaining. Which is the correct representation of the data stored in the Hash Table?

- < "Red" , "Apple" > (54)
- < "Yellow" , "Banana" > (33)
- < "Green" , "Pear" > (79)
- < "Orange" , "Tangerine" > (12)
- < "Pink" , "Grapefruit" > (10)
- < "Blue" , "Berry" > (25)
- < "Purple" , "Raisin" > (31)

a) //no hashtable understanding

Red
Yellow
Green
Orange
Pink

d) // doesnt understand hash code

Grapefruit ->	Apple
Berry ->	Pear
Raisin	
Tangerine	
Banana	

b) //correct choice

Grapefruit ->	Berry
Raisin	
Tangerine	
Banana	
Apple ->	Pear

e) // Put in order

Apple ->	Berry
Banana ->	Raisin
Pear	
Tangerine	
Grapefruit	

c) // wrong data object

Pink ->	Blue
Purple	
Orange	
Yellow	
Red ->	Green

Explanations:

This hashtable is of size 5. You must mod the hash code key with the size of the hash table. For "Apple" 54 mod 5 is 4. Therefore "apple" is put in the slot with index 4. When a conflict occurs because the hashtable is full, the new object is externally linked like a linked list to the object already stored in the hashtable.

- a) this choice does not insert all the values, and the hash key is being inserted instead of the data.
- c) the key is inserted instead of the data.
- d) The elements are inserted in incorrect order.
- e) These elements were in incorrect order. They appear in the order they were inserted in.

6) SORTING

The following method "isSorted" should return true if the array " x " is sorted in descending order. Otherwise, method should return false:

```
public static Boolean isSorted( int[] x )
{
    //missing code
}
```

Which of the following code fragments is the missing code?

```
a) boolean b = true; //last two elements
for ( int i = 0; i < x.length - 1; i++ )
{ //incorrect
    if ( x[ i ] < x[ i + 1 ] )
        b = false;
    else
        b = true;
} return b;

b) for (int i = 0; i < x.length - 1; i++ ) //correct
{
    if ( x[ i ] < x[ i + 1 ] )
        return false;
} return true;

c) boolean b = false; // always returns
for ( int i = 0; i < x.length - 1; i++ ) //false
{ //incorrect
    if ( x[ i ] < x[ i + 1 ] )
        b = false;
} return b;

d) boolean b = false; //will return true
for ( int i = 0; i < x.length - 1; i++ ) //if any two
{ // are sorted
    if ( x[ i ] < x[ i + 1 ] ) //incorrect
        b = true;
} return b;

e) for ( int i = 0; i < x.length - 1; i++ )
{ //will return true
    if ( x[ i ] < x[ i + 1 ] ) //before checking
        return true; //whole array
} return false; //incorrect
```

Explanations:

- a) this choice will return results for the last two elements only. It will ignore the rest of the array
- c) always returns false
- d) this will return true if any two elements are sorted.
- e) this will return true before checking the entire array.

7) OO BASICS

```
public class Trace
{
    private int myNumber;

    public Trace ( int n )
    {
        this.myNumber = n;
    }
    public int getMyNumber()
    {
        return myNumber;
    }
    public void setMyNumber( int n )
    {
        this.myNumber = n;
    }
    public String toString()
    {
        return "My number is " + getMyNumber();
    }
    public static void main(String[] args)
    {
        Trace a = new Trace( 4 );
        Trace b = new Trace( 7 );
        Trace c = new Trace( 2 );

        Trace[] myArray = new Trace[3];
        myArray[0] = c;
        myArray[1] = a;
        myArray[2] = b;

        for( int i = 0; i < myArray.length ;i++ )
        {
            System.out.println( myArray[i].getMyNumber() );
        }

        b.setMyNumber( a.getMyNumber() );
        a.setMyNumber( c.getMyNumber() );

        System.out.println( b );
        System.out.println( myArray[ 0 ] );
    }
}
```

What is the output of the Trace class on the preceding page?

- a) 4 //order is incorrect
7
2
4 //order and format incorrect
4
- b) 4 //order incorrect
7
2
My number is 4
My number is 2
- c) 2
4
7
My number is 4 //incorrect data
My number is 4
- d) 2 //correct choice
4
7
My number is 4
My number is 2
- e) My number is 2 //incorrect format
My number is 4
My number is 7
4 //incorrect format
2

Explanations:

`System.out.println(myArray[i].getMyNumber());` will print the contents of the array. By using the `.getMyNumber()` accessor method, only the integer values are printed. Pay attention to what order the objects are inserted into the array.

```
System.out.println( b );  
System.out.println( myArray[ 0 ] );
```

These statements will call the `toString` function of the object that is to be printed. This is why they print "My number is"

8) LOOPS

```
int[] x = { 3 ,2, 5, 6, 8, 4 };
int limit = 11;
int i = 0;

while ( ( 0 < limit ) && ( i < x.length ) )
{
    limit -= x[ i ];
    i++;
}
```

What is the value of the variable " i " after the code is executed?

- a) 0 //loop isnt evaluated
- b) 3 // forget last iteration
- c) 4 // correct choice
- d) 5 // miss eval while loop
- e) -5 // confused limit and index

Explanations:

a) since 0 is less than limit, and I is less than the length of the array, the while statement should be evaluated true.

This while loop is evaluated 4 times. The while loop evaluates to false after the 4th iteration. Then the value of limit is -5, which is less than 0.

9) RECURSION

```
public int Eval( String s , char c , int value)
{
    if ( s.length == 0 )
        return value;

    else if( (s.charAt( 0 ).equals( c ) )
    {
        value = value++;
        return Eval( s.substring( 1 ) , c , value );
    }
    else
    {
        value = value * 2;
        return Eval( s.substring(1 ) , c , value );
    }
}
```

What is the value returned by this method call?

```
Eval( "remember" , 'e' , 1 );
```

- a) 58 // correct choice
- b) 25 // opposite operations
- c) 26 // use 0 as value or miss first iteration
- d) 9 // all get incremented
- e) 29 //miss last letter

Explanations:

This recursive function asks you to evaluate the string one letter at a time. `s.substring(1)` returns everything but the first character of the string. You are asked to track "value" as the string is recursed over. If the current first character of the string matches 'e' then we should increment value by 1. If it does not match "value" should be multiplied by two. When the string is done, value is returned.

10) POLYMORPHISM

Given the following class hierarchy:

```
public abstract class Student
    has: public void goesToGT()

public interface Graduate
    has: public void do()

public class GettingOut extends Student implements Graduate
    has: public void happy()
    has: public void do()

public class Alumni extends GettingOut
    has: public void newDo()

public class GradStudent extends Student
    has: public void something()
```

Determine whether the following statements will compile and run without errors.

If no errors write OK.

If compile error write COMP

If run time error write RUN

- 1) Student t = new Student();
- 2) Student t = new GettingOut();
- 3) Student t = new GradStudent();
t.something();
- 4) Student t = new Alumni();
((GradStudent)t.something());
- 5) Alumni t = new GettingOut();

a) OK	b) COMP	c) COMP	d) OK	e) COMP
OK	OK	OK	OK	COMP
COMP	COMP	RUN	RUN	OK
RUN	RUN	OK	COMP	OK
OK	COMP	OK	OK	COMP
//absract	//correct	//interfa ce	//abstrac t	//runtime

Explanations:

- 1) Student is an abstract class and cannot be instantiated
- 2) This statement is fine.
- 3) This is a type this statement is fine.
- 4) Since 't' is actually an Alumni, calling the method "something" will cause a runtime error.
- 5) An Alumni cannot be instantiated as a GettingOut because GettingOut is the parent of Alumni.

11) SEARCHING

```
int array[] = { 13, 11, 10, 8, 5, 7, 3};
int i = 0;

while( ( i < array.length - 1 ) && ( array[ i + 1 ] < array[ i ] ) )
{
    i++;
}
System.out.println[ i ];
```

What is the output of the code above?

- a) 5 // incorrect index interpretation
- b) 4 // correct choice
- c) 6 // iterated through
- d) 8 // distractor
- e) 7 // value in index

Explanations:

This question ask for the value of 'i' after the while loop is finished. The while loop checks for the array to be in descending order. When two elements are found out of order, the while loop breaks, and 'i' is returned. Array[0] is the first element of the array.

12) DYNAMIC BINDING

```
public class Object
{
    public void printer()
    {
        System.out.println("Printer method in Object class" );
    }
}

public class myObject extends Object
{
    public void printer()
    {
        System.out.println("Printer method in myObject class" );
    }
}

public class aObject extends myObject
{
    public void printer()
    {
        System.out.println("Printer method in aObject class" );
    }

    public static void main( String[] args )
    {
        Object temp = new Object ();
        temp.printer();
        aObject hTemp = new aObject ();

        temp = hTemp;
        temp.printer();

        myObject mTemp = new myObject();
        mTemp.printer();

        mTemp = (aObject)temp;
        mTemp.printer();
    }
}
```

What is the output of the preceding code?

- a) Printer method in Object class
Printer method in Object class //wrong line
Printer method in myObject class
Printer method in myObject class //wrong line
- b) Printer method in Object class
Printer method in aObject class
Printer method in Object class //wrong line
Printer method in aObject class
- c) Printer method in aObject class //wrong line
Printer method in Object class //wrong line
Printer method in Object class //wrong line
Printer method in aObject class
- d) Printer method in aObject class //wrong line
Printer method in aObject class
Printer method in myObject class
Printer method in myObject class //wrong line
- e) Printer method in Object class //correct choice
Printer method in aObject class
Printer method in myObject class
Printer method in aObject class

Explanations:

This question asks you to identify the correct four "printer" output statements.

```
Object temp = new Object ();  
temp.printer(); - Prints Object class because temp is an object.  
aObject hTemp = new aObject ();  
  
temp = hTemp;  
temp.printer(); - Prints aObject class because temp is  
referencing htemp which is an aObject.  
  
myObject mTemp = new myObject();  
mTemp.printer(); - Prints myObject class because mtemp is a  
myObject.  
  
mTemp = (aObject)temp;  
mTemp.printer(); - Prints aObject class because mtemp is  
referencing temp, holding htemp, which is an  
aObject.
```

13) GUI

```
public class myFrame extends Frame
{
    public static void main(String argv[])
    {
        myFrame f = new myFrame();
        f.setSize(300,200);
        f.setVisible(true);
    }
}
```

How would you set the frame surface color to blue?

- a) f.setBackground(Color.blue); //correct choice
- b) f.setColor(BLUE); //BLUE is not a constant
- c) f.Background(blue); //background() incorrect
- d) f.color=Color.blue; //ineffective and //incorrect assignment
- e) f.setColor(Color.blue); //ineffective assignment

Explanations:

- b) BLUE is not a constant in java. Color.blue is.
- c) .Background is not a method that sets background color.
- d) This will try to set the inherited component variable of the frame to blue, but .color is not a method
- e) This will set the inherited component variable of the frame to blue, but will not change anything visually

14) LINKED LIST

```
public class ListNode
{
    private ListNode next;
    private String data;
    ...
}
```

Assume that a linked list exists and that the variable "head" is used to maintain the beginning of the list. Also assume that the variable "position" and "head" are objects of the class ListNode.

```
Listnode head = new ListNode();
Listnode position = new ListNode();
```

Which of the following code segments correctly adds "position" to the beginning of the list? The code must maintain the "head" variable as the beginning of the list.

- a) `position = head;` //incorrectly sets position
`head = position;`
- b) `position.next = head.next;` //incorrectly sets position
`head = position.next;` //incorrectly sets head
- c) `position.next = head;` //correct choice
`head = position;`
- d) `position = head.next;`
`head = position.next;` //incorrectly sets head
- e) `position = head.next;` //incorrectly sets position
`head = position;`

Explanations:

- a) this will set the position as the head deleting the new object to be stored.
- b) This will set the object after position as the second object and make the head the second object, deleting the first element from the list.
- d) This will not add the correct element in position to the list and will set head as the third element in the list.
- e) this will set position as the second element in the list and then set head as position removing the first element.