

Signature _____

Name _____

cs11e _____

Student ID _____

CSE 11 Final

Winter 2015

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Total _____ (X points) (100%)

This exam is to be taken by yourself with closed books, closed notes, no electronic devices. You are allowed both sides of an 8.5"x11" sheet of paper handwritten by you.

(Partial) Operator Precedence Table

Operators				Associativity
!	++	--	(pre & post inc/dec)	right to left
*	/	%		left to right
+	-			left to right
<	<=	>	>=	left to right
==		!=		left to right
&&				left to right
				left to right
=				right to left

1. Which of the following are not valid Java identifiers? (Circle your answer(s).)

pizza_party _pepperoni_ chee\$y implements
Round.Table. Private 1olive fiveToppings

2. Using the operator precedence table above, evaluate each expression and state what gets printed.

int a = 5, b = 6, c = 4, d = 3;

System.out.println (c <= d || b == a); _____

System.out.println (b != c && d > a); _____

System.out.println (! (b != a)); _____

System.out.println((! (c == d && b > a)) == (d <= c || b == a)); _____

3. What is printed by the following code?

```
int x = 3;
int y = x;
System.out.println(y == 3);      _____
x = 4;
System.out.println(y == 3);      _____
```

4. What values of **a** and **b** would result in the following code printing “D”?

```
if( (a > 0) || (b > 0) ) {
    if( a > b )
        System.out.println("A");
    else
        System.out.println("B");
}
else if( (a < 0) || (b < 0) )
    System.out.println("C");
else
    System.out.println("D");
```

int a =

int b =

5. What is the output produced by the following program?

```
public class Question5
{
    public static void main(String[] args)
    {
        final int MAX = 3, MIN = 2;
        int i = 4, j = 5;

        for ( i = 1; i < MAX; ++i )
        {
            j = 10 - i;
            while (j > MIN)
            {
                --j;
                System.out.println( i + " " + j );
                j -= 2;
            }
            System.out.println( i + " " + j );
        }
    }
}
```

Output:

6. What is the output produced by the following program? (Hint: draw stack frames)

```
public class Question6
{
    public static void main(String[] args)
    {
        mystery( 5 );
    }

    public static int mystery ( int x )
    {
        int y = x + 5;
        int z = x + 2;

        if ( y > 4 )
        {
            System.out.println( x + " " + y + " " + z );
            z = x + mystery( x - 3 );
            System.out.println( x + " " + y + " " + z );
        }
        else
        {
            y = z - x;
            System.out.println( "Stop!" );
            System.out.println( x + " " + y + " " + z );
        }

        return y;
    }
}
```

Output:

7. You type **java Driver** at the command line and you get the following:

```
Exception in thread "main" java.lang.ArrayIndexOutOfBoundsException: 5
    at Bar.method5(Bar.java:13)
    at Foo.method1(Foo.java:11)
    at Driver.main(Driver.java:7)
```

Is this a compile time or a run time error? _____

What is the index that was out of bounds? _____

What method in what class in what file and line number in your code did this occur? Assume that you have written the Bar, Foo, and Driver classes.

Method _____

Class _____

File _____

Line # _____

8. Assume a program had the following definitions:

```
int[] a1 = { 5, 6, 7, 8 };
int[] a2 = a1;
int[] a3 = { 5, 6, 7, 8 };
```

What are the results produced by evaluating the following expressions?

a1 == a2 _____ a1 == a3 _____ a2 == a3 _____

9. What is the default initial value of each array element in the following arrays? Only write answer of a single element of the created array:

```
int[] i = new int[5]; _____ boolean[] b = new boolean[1]; _____
double[] d = new double[3]; _____ Object[] o = new Object[2]; _____
```

10. True or False:

- a. A class can inherit from multiple superclasses using the extends keyword. _____
- b. In order to assign a value of type int to a variable of type double, you must use a typecast on the int.

- c. A class that declares an abstract method must be declared an abstract class. _____
- d. A class without an abstract method cannot be declared an abstract class. _____

11.

What gets printed by the following code? _____

```
int x = 15;
if (x > 11)
{
    x += 5;
}
else
{
    x += 7;
}
System.out.println( x );
```

What gets printed by the following code? _____

```
int x = 15;
if (x < 11)
{
    x += 5;
}
else
{
    x += 7;
}
System.out.println( x );
```

What gets printed by the following code? _____

```
int x = 15;
if (x > 7)
{
    x += 5;
}
else if (x <= 14)
{
    x += 7;
}
System.out.println( x );
```

What gets printed by the following code? _____

```
int x = 15;
if (x < 7)
{
    x += 5;
}
else if (x >= 14)
{
    x += 7;
}
System.out.println( x );
```

What gets printed by the following code? _____

```
int x = 15;
if (x > 7)
{
    x += 5;
}
if (x >= 14)
{
    x += 7;
}
System.out.println( x );
```

What gets printed by the following code? _____

```
int x = 15;
if (x < 7)
{
    x += 5;
}
if (x >= 17)
{
    x += 7;
}
System.out.println( x );
```

What gets printed by the following code? _____

```
int x = 15;
if (x > 7)
{
    x += 5;
}
if (x < 13)
{
    x += 7;
}
System.out.println( x );
```

What gets printed by the following code? _____

```
int x = 15;
if (x < 7)
{
    x += 5;
}
if (x >= 14)
{
    x += 7;
}
System.out.println( x );
```

12. Consider the following program:

```
public class Test12
{
    private static int a;
    private int b;
    private int c = 3;
    public Test12( int b )
    {
        this.b = b;
    }
    public void method1( int x )
    {
        int a = x;
        int c;
        c = a;
        a = b;
        System.out.println( "Test12.a = " + Test12.a );
        System.out.println( "this.b = " + this.b );
        System.out.println( "this.c = " + this.c );
        System.out.println( "c = " + c );
        System.out.println( "b = " + b );
        System.out.println( "a = " + a );
    }
    public void method2( int b, int c )
    {
        this.b = b;
        this.c = c;
        c = a+1;
        a = b-1;
        System.out.println( "Test12.a = " + Test12.a );
        System.out.println( "this.b = " + this.b );
        System.out.println( "this.c = " + this.c );
        System.out.println( "c = " + c );
        System.out.println( "b = " + b );
        System.out.println( "a = " + a );
    }
}

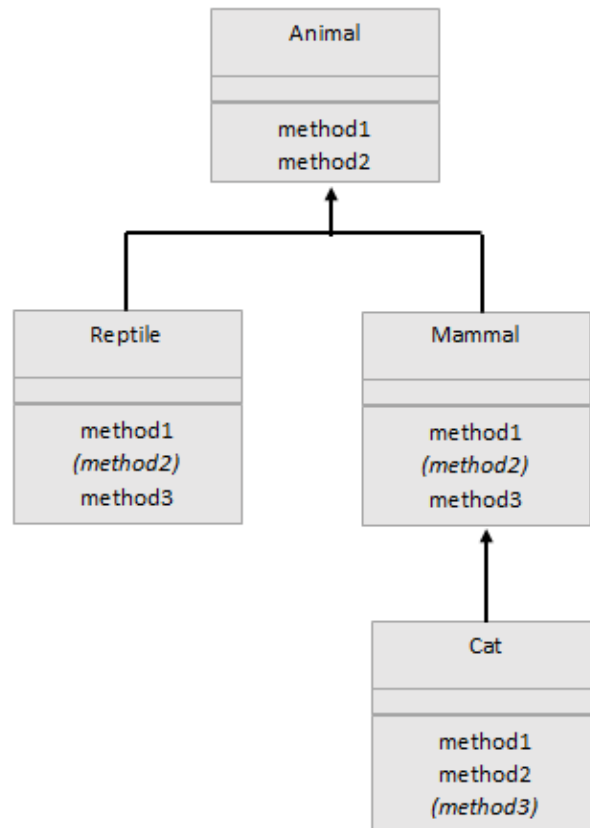
public class Driver
{
    public static void main( String[] args )
    {
        Test12 ref = new Test12( 8 );
        ref.method1( 2 );
        ref.method2( 1, 0 );
    }
}
```

Output

```
Test12.a = _____
this.b = _____
this.c = _____
c = _____
b = _____
a = _____
Test12.a = _____
this.b = _____
this.c = _____
c = _____
b = _____
a = _____
```

13. Given the following class definitions and hierarchy:

```
public class Animal {
    public void method1() {
        System.out.println("Animal 1");
    }
    public void method2() {
        System.out.println("Animal 2");
    }
}
public class Reptile extends Animal {
    public void method1() {
        method2();
        System.out.println("Reptile 1");
    }
    public void method3() {
        System.out.println("Reptile 3");
        super.method1();
    }
}
public class Mammal extends Animal {
    public void method1() {
        System.out.println("Mammal 1");
    }
    public void method3() {
        System.out.println("Mammal 3");
    }
}
public class Cat extends Mammal {
    public void method1() {
        System.out.println("Cat 1");
    }
    public void method2() {
        super.method2();
        System.out.println("Cat 2");
        method1();
    }
}
```



What is the output of the following code:

```
Animal var2;
var2 = new Reptile();
var2.method1();
System.out.println("-----");
var2.method2();
System.out.println("-----");
((Reptile) var2).method3();
```

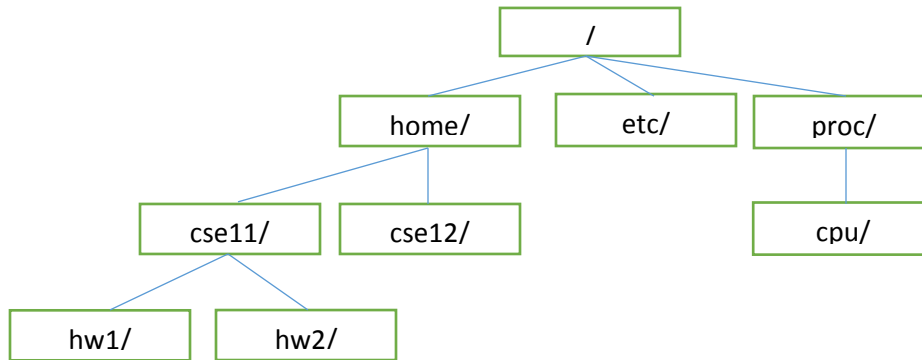
What is the output of the following code:

```
Animal var1;
var1 = new Cat();
var1.method1();
System.out.println("-----");
var1.method2();
System.out.println("-----");
((Cat) var1).method3();
```

Put your answer here:

Put your answer here:

14. Given the following directory structure:



Typing `pwd` into the terminal returns `/home/cse11/hw1`

- a) What is the command, using *relative paths*, to change directory into `hw2` _____
- b) What is the command, using *absolute paths*, to change directory into `cpu` _____
- c) What is the command to list all files in the current directory _____
- d) You just ran `pwd` and you're in `/home/cse11/hw2` and you have the files `Question14.java` and `apache.jar`. `Question14.java` makes use of class definitions in `apache.jar`. What is the command to compile `Question14.java`? _____
- e) What is the command to run the Java program created from (d) _____

15. Given the following code:

```
import java.util.Scanner;

public class DogYears {
    public static void main(String[] args) {
        Scanner scnr = new Scanner(System.in);
        int dogAgeYears = 0;
        System.out.print("Enter dog's age (in years): ");
        dogAgeYears = scnr.nextInt();
        switch (dogAgeYears) {
            case 0:
                System.out.println("0..14 human years.");
            case 1:
                System.out.println("15 human years.");
                break;
            case 2:
                System.out.println("24 human years.");
                break;
            default:
                System.out.println("Unknown");
        }
        return;
    }
}
```

- a) What gets printed when the user enters 0?

- b) What gets printed when the user enters 3?

16. What is the output of the following code:

```
public class Question16 {
    public static void main(String[] args) {
        int[] array = {3, 2, 1};
        method1(array, array[2]);
        System.out.println(array[0]);
        System.out.println(array[1]);
        System.out.println(array[2]);
    }
    public static void method1(int[] a, int i) {
        a[0] = 1;
        i = 3;
        return;
    }
}
```

Output

17. Determine the output of the following code segments. If there is a runtime or compiler error, write that instead of the output.

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

Output

```
int i, j;
int [][] array = { {1, 3, 5}, {2, 4, 6, 8} };
for ( i = array.length; i >= 0; i--)
{
    for(j = 0; j <= array[i].length; j++)
    {
        System.out.println( array[i][j] );
    }
}
```

Output

18. Give a brief explanation of why Java makes use of buffers for file I/O:

19. Given the following code:

```
import java.util.Scanner;

public class DogYears {
    final static int AGE_FACTOR = 7;
    public static void main(String[] args) {
        Scanner scnr = new Scanner(System.in);
        String name = "Scruffy";
        int dogAgeYears = 0;
        double result = 0;
        System.out.print("Enter dog's age (in years): ");
        dogAgeYears = scnr.nextInt();
        result = dogAgeYears * AGE_FACTOR;
        System.out.println(result);
    }
}
```

In which part of memory are the contents of the following variables stored (static, stack, or heap)

- a) AGE_FACTOR _____
- b) scnr _____
- c) name _____
- d) dogAgeYears _____
- e) result _____

20. What is the output from the following code:

```
public class Question20 {
    public static void main(String[] args) {
        Chalk c1 = new Chalk("white");
        Chalk c2 = new Chalk("green");
        Chalk c3 = c1;
        c1.write("final");
        c2.write("test");
        c3.write("Q20");
    }
}
```

Output

```
public class Chalk {

    private static int numPieces = 0;
    private String color;
    public Chalk(String color) {
        this.numPieces++;
        this.color = color;
    }

    public static int getNumPieces() {
        return numPieces;
    }

    public void write(String word) {
        System.out.println(numPieces + "/" + color + " " + word);
    }
}
```

21. Write a Java class Question21.java that implements Q21.java. The method runMe(String) should print “hello world” to the terminal:

```
Q21.java
-----
public interface Q21 {
    public void runMe(String s);
}
```

```
Driver.java
-----
public class Driver {
    public static void main(String[] args) {
        Question21 q = new Question21();
        q.runMe("");
    }
}
```

```
Question21.java
-----
```

22. True/False

- a) Run Time Exceptions require try/catch statements in order to get the code to compile _____
- b) GUIs need to use a Layout Manager in order to view multiple elements in a frame _____
- c) When performing file I/O, you must have a try/catch (IOException) or throws IOException in your code _____
- d) If you add an element to the end of an ArrayList, you'll get an ArrayIndexOutOfBoundsException _____
- e) All classes inherit methods from the Object class _____

23. Write an abstract class Question23.java that has the following fields/methods:

- Protected fields: String name, int grade
- Public field: char letterGrade
- Public method: void setGrade(int grade)
- Public abstract method: String getName()

Question23.java

24. List a job title that you found on LinkedIn that's of interest to you:

25. Name 3 of your classmates:

- a.
- b.
- c.

Scratch Paper