Schedule:

Wed 9/30/2015 (morning) – Finish lecture #8

Wed 9/30/2015 (afternoon) – work on Lab #5; work through study guide

Mon 10/5/2015 (morning) – work on study guide

Wed 10/7/2015 (morning) – midterm

Wed 10/7/2015 (afternoon) – no lab

Lab exercises (to get ready for the mid-term; no need to hand this in).

implement comparable() in your RDP parser class so that the RdpAssignment has a natural order defined as:

alphabetical sorting by phylum

if the phylum are identical, sort by kingdom

if the kingdom are identical, sort by class

and so forth down to genus..

all taxa where phylum is not defined, should be at the bottom of the list.

Call Collections.sort(...) on your ArrayList to see if your sorting code worked.

**MIDTERM STUDY GUIDE**

The mid-term is based on Lectures 1 – 9.

The mid-term is closed book. Do not log into your computers. No calculators, iPods, iPads or notes.

The mid-term will be a mix of questions below and questions that you have not seen before.

Here is the schedule leading up to the mid-term..

Sep 22 - Lecture - RDP HW DUE

Sep 24 - Lecture ; Lab and study guide given out for midterm ;

Sep 29 - Lecture

Oct 1 - Lecture and lab - Review time with Malcolm (AF in DC)

Oct 6 - Fall break (optional study session with AF during lecture time )

Oct 8 - Midterm (closed book )

(1) Within an if statement what is the difference between || and &&

(2) Write a function called “numGCs” that takes as a parameter a String and returns an integer that is the number of times a G or a C is observed within the string

(3) Write a function “bothPositive” that takes two integers and returns an integer that is 1 if both integers are greater than 0, otherwise returns 0

(4) Write a function called skipEveryOther(String s) that prints out every other character in a string to the console.

(5) If x is an integer, what is the difference between x++ and ++x

(6) What does this code do?

**public** **void** swap(**float** f1, **float** f2)

{

**float** temp = f1;

f1 = f2;

f2 = temp;

}

(7) What is the difference between an Abstract class and an interface? When should you use one vs. the other?

(8) True or false: The code in a protected constructor in an abstract class can never be executed. Why or why not?

True of false: The code in a private constructor in an abstract class can never be executed. Why or why not?

(9) Given this code:

**public** **abstract** **class** Shape

{

**abstract** **public** **double** getArea();

**abstract** **public** **double** getShapeName();

}

**public** **class** Circle **extends** Shape

{

**private** **final** **double** radius;

**public** **double** getRadius()

{

**return** **this**.radius;

}

**public** Circle(**double** radius)

{

**this**.radius = radius;

}

@Override

**public** **double** getArea()

{

**return** Math.PI \* radius \* radius;

}

@Override

**public** String getShapeName()

{

**return** "Circle";

}

}

(A) The following does not compile. Why?

**public** **static** **void** main(String[] args)

{

Shape shape = **new** Shape();

}

(B) What are the advantages and disadvantages of making the instance variable radius final in the Circle class? What are the advantages and disadvantages of making it private?

(C) What does the “@Override” do?

(D) The following does not compile (the error is in the second line). Why?

**public** **static** **void** main(String[] args)

{

Shape shape = **new** Circle(5);

System.out.println(shape.getRadius());

}

(E) The following code works fine. Why does the code compile even though the constructor for Circle takes a double and not an integer?

**public** **static** **void** main(String[] args)

{

**int** aRadius = 5;

Shape shape = **new** Circle(aRadius);

System.out.println(shape.getShapeName());

}

(F) Change the code above so that Shape is an interface. Make Circle implement this new interface Shape.

(10) Given the following code;

**public** **static** **void** main(String[] args) **throws** Exception

{

**long** startTime = System.currentTimeMillis();

String s="";

**for**( **int** x=0; x < 10000; x++)

s += x;

**float** numSeconds = (System.currentTimeMillis() - startTime) / 1000f;

System.out.println( numSeconds + " seconds" );

System.out.println(s);

}

(A) This code runs very slowly. How can it be speeded up? Change it so that it runs faster.

(B) In the calculation of numSeconds, why is the difference in milliseconds divided by 1000f and not just 1000 ?

(11) Given this:

List<String> list = **new** ArrayList<String>();

// code that adds stuff to the list

Describe at least two ways to iterate through the list.

What is the advantage of having list be of type List and not of type ArrayList?

/\*

\* Reverses the order of the array. That is, for an array of size n, the 0th element becomes the n-1th element, the 1st element becomes the n-2th element and so forth

\*/

**public** **static** **void** reverseArray(**float**[] a)

{

}

(12) Implement the above method

**public** **class** Circle

{

**private** **double** radius;

**public** Circle( **double** radius )

{

**this**.radius = radius;

}

@Override

**public** **boolean** equals(Object obj)

{

Circle other = (Circle) obj;

**return** other.radius == **this**.radius;

}

**public** **static** **void** main(String[] args)

{

Set<Circle> set = **new** HashSet<Circle>();

Circle c1 = **new** Circle(5);

Circle c2 = **new** Circle(5);

System.out.println( c1.equals(c2) );

set.add(c1); set.add(c2);

System.out.println(set.size());

}

}

(13) A Set is not allowed to have two equal elements. The above code, however, prints out

true

2

Why? Fix the code so that the HashSet works properly.

(14) Here is a program to print out one dollar minus 9 dimes

**public** **static** **void** main(String[] args)

{

System.out.println( 1.00 - 9 \* .10);

}

It prints out 0.09999999999999998 not 0.10? Why? Write two different versions of the program that make the same calculation but print out the correct answer.

(15) Implement this method:

/\*Returns a List containing all the Integers in inList that are even. The order of Integers in the return List is the same as in inList\*/

**public** **static** List<Integer> getEvenNumbers( List<Integer> inList )

{

}

(16) How is a private method different from a protected method, a public method or a method with default visibility?

(17) What is the difference between ArrayList and LinkedList? What is the performance time of basic operations for ArrayList and LinkedList?

(18) This code doesn’t compile. Why?

**public** **int** aMethod(**int** anInt)

{

**return** anInt;

}

**public** **static** **void** main(String[] args)

{

System.out.println( aMethod(5) );

}