CSSE 220 – Object-Oriented Software Development
Rose-Hulman Institute of Technology

Review Practice Exam 2

Name (Print):_____ Section:_____

1. Time complexity is a measure of
   A) the total clock time taken by a program
   B) how many times a particular instruction set executes
   C) how much memory the program allocates
   D) how many input values the program can process

2. Selection Sort's worst-case running time grows as
   A) O(n)
   B) O(log n)
   C) O(n log n)
   D) $O(n^2)$

3. For the expression n/2 + n, the Big-O classification is
   A) O(1)
   B) O(log n)
   C) O(n)
   D) $O(n^2)$

4. T / F : Binary search requires the input array to be sorted

5. T / F : Selection Sort always makes the same number of comparisons, regardless of input order.

6. Polymorphic tracing

```
interface Animal {
    void speak();
    void move();
}
class Mammal implements Animal {
    public void speak() { System.out.print("growl "); }
    public void move()  { System.out.print("walk "); }
    public void feedYoung() { System.out.print("nurse "); }
}
class Dog extends Mammal {
    public void speak() { System.out.print("woof "); }
    public void move()  { super.move(); System.out.print("run "); }
    public void fetch() { System.out.print("fetch "); }
}
class Cat extends Mammal {
    public void speak()   { System.out.print("meow "); }
    public void scratch() { System.out.print("scratch "); }
}
```

```
Animal a = new Mammal();
Mammal  m = new Dog();
Animal  b = new Dog();
Mammal  c = new Cat();
Dog     d = new Dog();
Mammal  e = new Mammal();

```

#	Expression	Output / Error?
1	`a.speak();`	
2	`m.speak();`	
3	`b.move();`	
4	`c.scratch();`	
5	`((Cat) b).scratch();`	
6	`((Dog) b).fetch();`	
7	`d.feedYoung();`	
8	`((Animal) d).fetch();`	
9	`((Dog) c).fetch();`	
10	`Animal x = new Animal();`	

7. Which access level makes a class member accessible only within its own package?
   A) public B) protected C) private D) no keyword

   Which modifier allows a method to be overridden only by subclasses (in any package)?
   A) public B) protected C) no keyword D) private

   Which modifier makes a field constant at compile time?
   A) static B) final C) abstract D) private

8. Identify the relationship: IS-A, HAS-A, DEPENDS-ON)

   a. class Car extends Vehicle _____

   b. class Library { List<Book>books; } _____

   c. class Pilot { void fly(FlightSimulator sim) { ... }} _____

   d. class Cat implements Pet _____

   e. class Smartphone { void charge(Battery b) { ... }} _____

9. Draw recursion traces for sumTo(4) and identify the final result:

```
 /**
 * Returns 1 + 2 +     + n
 */
public int sumTo(int n) {
    if (n <= 0) {
        return 0;
    }
    return n + sumTo(n - 1);
}

```