Data Structures – ITCS 2214

Homework #2 Answers

**Short Answer (5 pts each)**

1. In regards to fields and methods, what happens when one class inherits from another?

It gets to use the parent/super class methods. Fields are not accessible in the sub class (usually). See Employee -> Supervisor/LineWorker class relationship

1. If a reference variable is polymorphic, what types of objects can it refer to?

Objects of its own class and any class that extends from its own class.

1. What does the super reference refer to?

The parent class, or the class from which the current class extends.

1. If a class overrides a method that it inherited, and an object is created from that child class, which version of the method is called when that object calls it (child or parent)?

child

1. How does the “is-a” relationship relate to inheritance?

Child class is a parent class

**Interpret / Write Code (8 pts each)**

1. public class Freshman extends Student

In the code above, which is the parent class?

Student

1. Place the following classes in a logical hierarchy. Draw boxes with the class name to represent the class, and lines connecting the classes to represent inheritance. You will use this hierarchy to answer questions #3 – 5.

Animal, Dog, Cat, Husky, Bird, Cardinal

1. Write class headers for each of the six classes.

Public class Animal

Public class Dog extends Animal

Public class Cat extends Animal

Public class Husky extends Dog

Public class Bird extends Animal

Public class Cardinal extends Bird

1. Which class would be referenced if the super reference was used in the constructor for the Cat class?

Animal

1. If an object was created from the Dog class, what types of objects could that reference variable point to?

Dog, Husky

1. Write constructors for the Animal, Bird, and Cardinal classes. You must make all fields private, and assume that all of the information is initially passed to the Cardinal constructor.

Animal – typeOfMovement(Str), moveSpeed(double)

Bird – canFly(bool), wingSpan(int)

Cardinal – shadeOfRed(Str)

Public Animal (String t, double m){

typeOfMovement = t;

moveSpeed = m;

}

Public Bird (String t, double m, bool c, int w){

Super(t, m);

canFly = c;

wingspan = w;

}

Public Cardinal (String t, double m, bool c, int w, Str sr){

Super(t, m, c, w);

shadeOfRed = sr;

}

1. Given the following toString() method of the Animal class, write a toString() method for the Dog class. Assume that all fields are private, and that the Dog class has the following fields: pureBlood(bool), furColor(Str), age(int).

public String toString()

{

return moveType + “ “ + moveSpeed;

}

Public String toString(){

Return super.toString() + pureblood + “ “ + furColor + “ “ + age;

}