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Question set1:

a) Genus is the parent class and Species is the child class that inherits from FFenus.
b) Specimen is an object of the class Species meaning that it can use all the methods and variables of Species.
c) C

Species
-speciesName: String
+Species(s: String, g: String) +setSpeciesName(s: String): Void +getSpeciesName(): String +toString(): String +equals(s: Species): Boolean

d) It is more readable allowing them to find and change code much easier. They can safe time as they can create objects and call methods anywhere in the code without rewriting code.
e) Because the tostring() method has been overrideden in child class Species.
    a) Because the tostring() method has been overrideden in child class Species.
    b) Overiding

Question set 2:

a) It is when data/varriables of class can only be accessed through member functions of that class and is hidden from all other classes.
b) B
    a) Protect an object from unauthorized access by client
    b) Reduce chance of code breaking or at least know where the code broke
c) getNAme()
d) cageNumber
e)

```
public class Genus {
private String geName;
public Genus(String name){
        this.geName = name;
}
public String getGenusName(){
        retrun geName;
}
public String changeGenusName(String name){
         this.geName = name;
}
public String tostring(){
         retrun “Genus Name:”+ this.geName;
}
public class Genus {
private String geName;
```

```
public Genus(String name){
        this.geName = name;
}
public String getGenusName(){
        retrun geName;
}
public String changeGenusName(String name){
         this.geName = name;
}
public String tostring(){
         return “Genus Name:”+ this.geName;
}
```

f) d

a) Advantage- All objects in Specimen will inthert the attributes of Species and thus use the methods in Species saving time rewriting code.
b) Disadvantage – You are unlikely that specimen will use all the methods in both Species and Genus, the super class, and that could cause a waste in memory space.

Question Set 3:

(a) We will need to add a private String variable named markings that would contain the markings of each animal in Specimen. We can add it as parameter in the constructor and make a getter and setter method for it as well.

(b) V

```
public int countSpecimens( Specimen[] animals, Species s ) {
        int count =0;
        for(Specimen animal: animals){
                if(s.getSpciesName.equals(animal.getTDA().getSpciesNAme())){
                        count++;
                }
        }
        return count:
}
```

(c)

declare method(Array)
declare linkedList
Go through all the animals in array
        Check if the animal species is in the list already(go though the linked list)
                if yes then break and contine with the loop
                If no then add to the list
return the list

Question Set 4:

(a) It main features are its variables and the methods in which data are added and exported. User can only acess the data through certain operations and can’t interact with the data in any other way.

(b)

```
LinkedList makeList( Specimen[] animals ) {
        LinkedList speciesList  = new LinkedList<species>();
        for (Speciemen animal : animals){
                speciesList.add(animal);
        }
        return  speciesList
}
```

(c)

```
LinkedList makeSpeciesList ( Specimen[] animals ) {
        LinkedList<Species> speciesList  = new LinkedList<Species>();
        for (Speciemen animal : animals){
                speciesList.add(animal.getTDA);
        }
        return SpeciesList;
}
```

(d)

```
LinkedList makeSpeciesListUnique( LinkedList allSpecies){
        LinkedList<Species> uniqueList  = new LinkedList<Species>();
        boolean ;
        for (Species species: allSpecies){
                if(!uniqueList.contains(species)){
                uniqueList.add(species);
                        }
        }
        return SpeciesList;
}
```