

- b. Define a Class name “Animal” which will completely encapsulate its characteristics providing no direct access to them but providing accessors to get or set them. Your class should also provide the expected 05 behaviours you uncovered in the previous question.
 - c. Add 02 constructors to your Animal class. The first one would be a default constructor and the second should be able create an animal based on the name of its species. The constructors will use enumerations to identify how to set the appropriate characteristics of the animal before creating it.
 - d. Finally define an instance declare an instance of Animal for each species and for each animal run 02 of its most recognizable behaviour.
2. Let’s now be more specific. You have been able to define your animal class. But you now have to analyze your design and check whether your designs satisfy the principles of Object Oriented engineering or not.
 - a. Name and describe the principles of Object Oriented engineering
 - b. Which of these principles has been satisfied in your earlier design. Justify your answers
 - c. What do you need to do to satisfy the non-satisfied ones?
 - d. Let’s try to put in place inheritance in your design.
 - i. Name the advantages of inheritance in Object Oriented design
 - ii. What should be the nature of your “Animal” class to efficiently maximize extensibility of properties and behaviours in its subclasses?
 - iii. Implement your current design in C#
3. Let’s extend your design to a case study. You are requested to use your design to produce a virtual environment that will simulate a farm on your PC. The purpose of such an environment is to study the spread of some diseases in a farming environment. Let’s start your virtual farm with chickens. The disease to simulate is the “Newcastle disease”
 - a. Look for facts about the NewCastle disease on internet and produce a short summary about its symptoms, infection and transmission mode, incubation period, direct and future consequences on a particular animal in the population

- b. Provide an Object Oriented design of the “Disease” Class. Provide also a design for the chicken class in order to simulate a chickens in your actual population. Your “Chicken” class should be able to count the number of individuals that has been instantiated through direct instantiation or through reproduction. The class should also reproduce behaviours of healthy, ill and recovery health status.
- c. Design a “Poultry” class to compute statistics about your chickens’ population. We should be able to get stats about the total population (age repartition, sex repartition, healthy, ill, recovering, dead, etc..).
- d. Provide a C# implementation of your classes