

Sheet 6: Inheritance , Polymorphism

1. Write a program represent a Mouse, Cat, Dog game simulation where its move in two dimension square (50 steps * 50 steps) called **Border**.
 - 1.1. the game will follow the following rules:
 - a) each animal has its own no. of steps
 - b) the Dog will kill Cat when meet in same place
 - c) the Cat will kill Mouse when meet in same place
 - d) when animal meet same animal type in same place its change direction twice either left or right
 - e) when animal dead, it will not move anymore
 - f) the dead animal in a specific place will be consider as nothing in this place
 - g) the object name should be sequence as mouse1, mouse2, cat1, cat2,...
 - 1.2. Draw the class hierarchy of the game
 - 1.3. implement the Animal class should contains
 - a) the following attributes:
 - name
 - live: boolean (where true is live and false is dead)
 - position as point (x,y)
 - direction: North, South, West, East
 - b) and the following methods:
 - constructor which take name and position and direction
 - forward method which move animal forward one step, and if reached any of border sides, he should turn left
 - turnRight method which turn animal to right direction
 - turnLeft method which turn animal to left direction
 - Kill method: which take another animal as parameter and change its status to dead
 - 1.4. The Mouse class extends animal class and should contains the following
 - a) methods:

- forward method its same as parent method except it forward **three** steps instead of one
- Notes: each time mouse move its check the following:
 - ✓ if meet another mouse in same position it tun right twice

1.5. The Cat class extends animal class and should contains the following

a) methods:

- forward method its same as parent method except it forward **two** steps instead of one
- Notes: each time cat move its check the following:
 - ✓ if meet mouse in same position it Kill mouse
 - ✓ if meet another Cat in same position it tun left twice

1.6. The Dog class extends animal class

- Notes: each time dog move its check the following:
 - ✓ if meet cat in same position it Kill cat
 - ✓ if meet another Dog in same position it tun right twice

1.7. Game class that perform the following:

- will start with 10 mouse object, 7 cat object, 5 dog objects (use static method in game class to create animal objects)
- start each object in different place randomly, with different direction
- move all animals steps by step according to its move behavior 200 times
- end of game print all animal objects in the game with define its state, position and name