NATIONAL UNIVERSITY OF COMPUTER & EMERGING SCIENCES
ISLAMABAD CAMPUS
OBJECT ORIENTED PROGRAMMING (CS103) - SPRING 2019
ASSIGNMENT-5 Part-II

Due Date: April 22, 2019 (10:00 pm)
Instructions:

1. *Make sure that you read and understand each and every instruction. If you have any questions or comments you are encouraged to discuss with your colleagues and instructors on piazza.*
2. *Plagiarism is strongly forbidden and will be very strongly punished. If we find that you have copied from someone else or someone else has copied from you (with or without your knowledge) both of you will be punished. You will be awarded straight zero in this assignment or all assignments.*
3. *Note: We will be running your code against our test cases, and a test case failure or a segmentation fault/incorrect result will result in loss of marks.*

Question 1: Clash of the Titans

In this exercise, you are going to have dragons and hydras fight each other.

Hydra

Dragon

The provided main program simulates a Fight between a dragon and a hydra. The hierarchies of classes that model the creatures of this game are missing and you are asked to provide them.

***The class Creature*:**

A creature is characterized by;

- its **name** (a constant string);
- its **level** (an integer);
- its number of health **points** (health status; an integer);
- its **force** (an integer);
- its **position** (position , also an integer; for simplicity, our game takes place in 1D; Can be 2D as well an object of Point class).

- a **constructor** allowing the initialization of the name, level, health points, force and position of the creature using the values passed as parameters, in this order; the constructor accepts **zero** as **default value** for the position;
- a method **bool alive( )** returning true if the creature is alive (number of health points greater than zero) or false otherwise;
- a method **int AttackPoints** returning the number of attack points that can be incited by the creature to others; the value is computed as the level multiplied by the force if the creature is alive, or zero otherwise;
- a method **void Move(int),** which does not return anything and adds the integer passed as parameter to the position of the creature;
- a method **void GoodBye( )** which does not return anything and displays the message **(<name> is no more!)**: using strictly this format. Here **<name>** is the name of the creature;
- a method **void Weak (int x)**, which does not return anything and subtracts the number of points passed as parameter from the number of health points of the creature, if it is alive; and if the creature dies, its number of health points is set to zero and the method **GoodBye** is called;
- a method **void Display( )**, which does not return anything and displays information about the creature, using strictly the following format:

  **<name>, level: <level>, health_status: <points>, force: <force>, **

  Attacking Points: <attack>, position: <position>

<name> is the name of the creature, **<level>** is its level, **<points>** is its number of health points, **<force>** is its force, **<attack>** is its number of attack points and **<position>** is its position.

The class Dragon:

A Dragon is a Creature. It has a specific characteristic the range of its flame (**flamerange** an integer). Its specific methods are:

- a **constructor** which initializes its name, level, number of health points, the force, the range of the flame and the position of the dragon using the values passed as parameters, in this order; the constructor accepts **zero** as **default value** for the position
- a method **void Fly(int pos)** which does not return anything and allows the dragon to move to the given position.
- a method **void BlowFlame(Creature&)** which does not return anything and simulates what happens when the dragon blows its flame towards another Creature:
  1. if the dragon and the creature are both alive and if the creature is in range of its flame, the dragon inflicts its attack points as damage to the creature; the creature weakens by the number of attack points; The dragon also weakens; it loses \of ' health points, with \of ' being the distance between the dragon and the creature (the further the dragon has to blow, the more it weakens, *the function to calculate the distance will be provided to you);*
  2. if after this epic fight the dragon is still alive and the creature dies, the dragon increases in level by one unit;
- The creature is in the range of the flame of the dragon if the distance between them is smaller or equal to the range of the flame (*you should use the function distance we provide*).

The class Hydra:

A Hydra is a Creature. It has special characteristics the length of its neck (**neckLength,** an integer) and the dose of poison it can inject in an attack (**poisonDose,** an integer).
Its special methods are:

- a **constructor** which initializes its name, level, number of health points, force, the length of its neck, the poison dose and the position using the values passed as parameters, in this order; the constructor accepts **zero** as **default value** for the position;
- a method **void InjectPoison(Creature&)** which does not return anything and simulates what happens when the hydra poisons another Creature:
    1. if the hydra and the creature are alive and the creature is in range of the head of the hydra, then the hydra inflicts damage to the creature; the creature weakens by the number of attack points of the hydra plus its dose of poison;
    2. if at the end of the fight the creature is no longer alive, the hydra increases in level by one unit;

** The creature is in range of the head of the hydra" if the distance the creature and the hydra is smaller or equal to the length of the neck of the hydra.*

The function **void Fight (fight)** takes as parameters a dragon and a hydra. It allows:

- The hydra to poison the dragon
- The dragon to blow on the hydra.

Execution examples
The example of output below corresponds to the provided program.

Dragon red, level: 2, health_status: 10, force: 3, points of attack: 6, position: 0

is preparing for fight with:

Hydra evil, level: 2, health_status: 10, force: 1, points of attack: 2, position: 42

1st Fight:

The creatures are not within range, so cannot Attack.

After the Fight:

Dragon red, level: 2, health_status: 10, force: 3, points of attack: 6, position: 0

Hydra evil, level: 2, health_status: 10, force: 1, points of attack: 2, position: 42

Dragon has flown close to Hydra:

Dragon red, level: 2, health_status: 10, force: 3, points of attack: 6, position: 41

Hydra moves :

Hydra evil, level: 2, health_status: 10, force: 1, points of attack: 2, position: 43

2nd Fight :

+ **Hydra** inflicts a 3-point attack on dragon

[level (2) * force (1) + poison (1) = 3] ;

+ **Dragon** inflicts a 6-point attack on Hydra

[level (2) * force (3) = 6] ;

+ during his attack, dragon loses two additional points

[Corresponding to the distance between dragon and hydra: 43 - 41 = 2].

After the Fight:

Dragon red, level: 2, health_status: 5, force: 3, points of attack: 6, position: 41

Hydra evil, level: 2, health_status: 4, force: 1, points of attack: 2, position: 43