



Implement a simulation of Avengers: Endgame as follows:

0. implement a base class called Superhero that has a purely virtual method called:

void attack(Superhero&)

1. Superheroes have a unique id, a name (std::string), and float or double values for:

- a. initial life
- b. damage
- c. Shield
- d. energy

create getters and setters for all attributes that can be modified (

you'll be needing this )

2. Superheroes can either be Human or Deity. Deities have an extra behaviour to Humans in the sense that they can roll back time (just like Thanos did in the movie). In order for this to be implemented you need a Timeline which is in fact a stack ( you can either use std::stack or just a std::vector for the implementation) containing all the information required to rollback all the past k actions done in the battle up until that moment. The stack contains elements of type TimelineEvent which contain the following information:

- a. Reference to the object that made the attack
- b. Reference to the object that was under attack
- c. Information about the prior initial life, damage and shield values such that we can rollback the damage inflicted by the attack on the opponent

Deities have an extra function called turnBackTime(Timeline&,int k) that is virtual but not purely virtual [twenty one pilots: Stressed Out \[OFFICIAL VIDEO\] \(youtube.com\)](#).

3. Any attack consumes part of the energy of the attacker and gives damage to the life of the opponent if it can penetrate their shield. Invent plausible rules for this implementation so that Superheroes don't become too O.P. ( Just like Thanos, we think that balance is of utmost importance )
4. The Battle object will be composed of a vector of polymorphic entities all descending from the Superhero class. The use of smart pointers is appreciated but not imposed here.
5. Create a comprehensive test scenario ( use cassert ) in which you create a lot of Superhero instances both Human and Deity and simulate a battle scenario with attacks and rollbacks of time .

