

Practice Exercise #43: Warcraft

http://www.comp.nus.edu.sg/~cs1020/4_misc/practice.html

Objectives:

- Familiarizing with OOP style
- Problem solving

Task Statement:

In the famous game Warcraft III: The Frozen Throne, every unit has the following attributes: name, HP (Hit Points), attack, attack type, armor and armor type.

Damage Reduction for Armor

For positive Armor, damage reduction = $(\text{armor} \times 0.06) / (1 + 0.06 \times \text{armor})$.

For example, a Positive Armor of 1 reduces damage by about 5.7%. A unit with 20 armors basically has 55% extra hit points – 100 would effectively become 155.

Damage and Armor Class System

There are altogether seven **attack types** and six **armor types**:

Attack Types: Normal, Pierce, Siege, Magic, Chaos, Spells, Hero

Armor Types: Light, Medium, Heavy, Fort, Hero, Unarmored

Each attack type is better or worse versus other armor types. For example, a Grunt has a Normal attack, which does 150% damage versus “Medium” armor units like the Archer. The Archer has a Pierce attack, which does 100% extra damage versus “Light” armor units like the Gryphon Rider.

The chart below specifies all the attack types versus armor types.

	Light	Medium	Heavy	Fort	Hero	Unarmored
Normal	100%	150%	100%	70%	100%	100%
Pierce	200%	75%	100%	35%	50%	150%
Siege	100%	50%	100%	150%	50%	150%
Magic	125%	75%	200%	35%	50%	100%
Chaos	100%	100%	100%	100%	100%	100%
Spells	100%	100%	100%	100%	70%	100%
Hero	100%	100%	100%	50%	100%	100%

This system is in place to encourage unit counters and unit mixing in combat. If the opposing player builds ranged attackers, then the natural counter would be to build melee units, which have an attack bonus versus them. However, since ranged attackers have a high damage, you would benefit by building a mixed group of melee and ranged attackers since your ranged attackers will out-damage the opposing melee units if they are protected from direct melee damage themselves.

The actual damage a unit suffers from another unit's attack would be:

$$\text{attacker's attack} \times \text{attack coefficient (shown in the chart)} \times (1 - \text{damage reduction})$$

Your task is to complete the program **Warcraft.java** to:

1. Read in a list of attributes for two units. The order of attributes for each unit will be: name, HP, attack, attack type, armor, armor type.
2. Assume HP will always be an integer (20.1 and 20.999 will both be treated as 20) and actual damage will be double (if a unit with HP 40 suffers a damage of 19.9, the new HP after the attack will be 20). Also assume that the two units attack each other at the same time with the same frequency. Determine who will win the battle.
3. Print out the name of the winner and the HP remaining for him. If there is no winner in this battle (two units die simultaneously), print "Draw".

Note: You may assume that all inputs are valid.

Sample Input

Peasant 220 5.5 normal 0 medium

Acolyte 220 9.5 normal 0 medium

Sample Output

Winner is Acolyte with 85 HP remaining.