Vietnam National University, Ho Chi Minh City
Ho Chi Minh City University of Technology
268 Ly Thuong Kiet Street, District 10, Ho Chi Minh City, Viet Nam

Subject: Advanced Programming

Assignment 1
Let the Battle Commence

Requirement

You are given a class diagram as presented in the Appendix. There are three parts.

Part A consists of initial classes, most of which are abstract classes or interfaces. Initial classes will be given to you as well as bytecode form (*class* files).

Part B consists fixed classes that you need to implement, which include the following classes.

- `Knight` and `Warrior`: Normally, when battle's `ground` is regular numbber, the `CombatScore` of a `Knight` or `Warrior` is based on his `WP` and `baseHP`. If `WP` is `1`, the `CombatScore` is the `baseHP`. Otherwise, the `CombatScore` is `baseHP / 10`.
    - There are 2 special cases of `ground` number. If `ground` is a *prime* number, the `CombatScore` of `Warriors` will be double of their `baseHP`. If `ground` is a *square* number, the `CombatScore` of `Knights` will be double of their `baseHP`.
- `Paladin`: When a `Paladin` does battle, his `CombatScore` would be *triple* of his `baseHP` on any `ground`. Since `Paladin` is from Heaven, his `CombatScore` can exceed 999. Especially, if `baseHP` of a `Paladin` is a Fibonacci number F_n with `n > 2`, his `CombatScore` will be `1000 + n`.
    - For example, if a `Paladin` has `baseHP` is 34 (=F_9), his `CombatScore` will be 1009.
- `DeathEater`: A `Death Eater` is a monster, who has no `HP` but only `MP` being a complex number C = (*real*, *imaginary*). When combatting, `CombatScore` of a Death Eater would be $\sqrt{real^2 + imaginary^2}$

Part C consists classes which you are free to change.

<u>Note: The game setting (i.e the `TeamMaker` class) will be changed based on test-cases. You do not need to implement this class.</u>

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Appendix

Initial Class Diagram

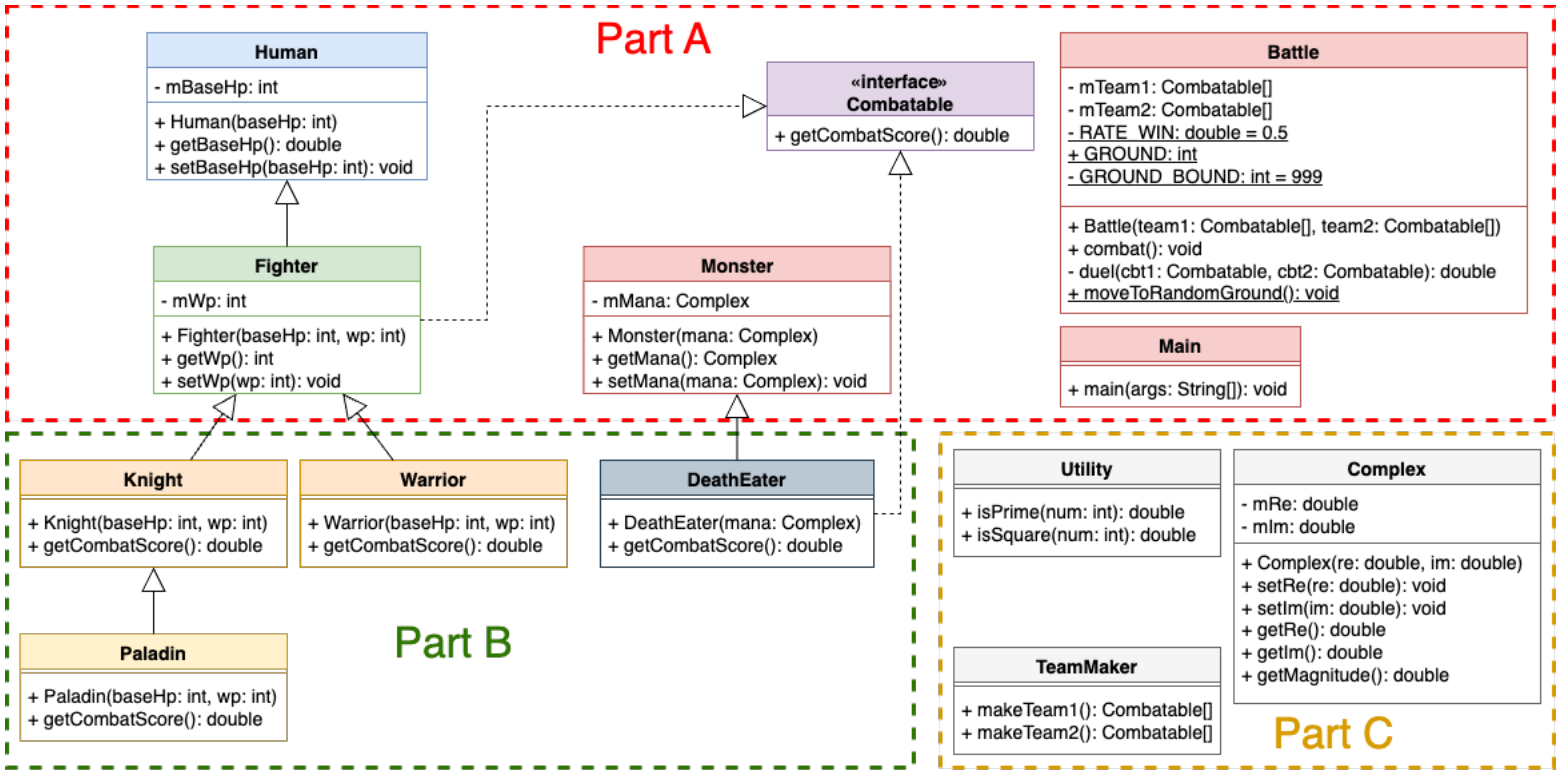

Figure 1. Initial class diagram

Part A includes following classes in bytecode form.

- The interface `Combatable.class`
- 3 abstract classes, which are `Human.class`, `Fighter.class`, `Monster.class`
- `Main.class` contains the `main` method.
- `Battle.class` contains the `Battle` class which simulates a battle, calculates the fighting results.

Part B includes classes that you must create by yourself. These classes are fixed as the diagram in Figure 1.

Part C is the "free-to-change" part as long as there is a `Complex` class.
Note that both `TeamMaker.java` and `Complex.java` are given with dummy code. You can change the source to adapt the requirement. The `TeamMaker.java` will also be replaced when we are grading your work.

Submission

Your initial code is provided as below structure.

```
/
└─── Initial Code
    ├─── class
    │   ├─── Battle.class
    │   ├─── Combatable.class
    │   ├─── Fighter.class
    │   ├─── Human.class
    │   ├─── Main.class
    │   └─── Monster.class
    ├─── source
    │   ├─── DeathEater.java
    │   ├─── Knight.java
    │   ├─── Paladin.java
    │   └─── Warrior.java
    └─── util
        ├─── Complex.java
        └─── TeamMaker.java
        └─── Utility.java
```

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You will complete the assignment individually and submit your code as a ZIP file via LMS. When you submit, rename the folder `Initial Code` to the following format `YourName_StudentID` (e.g., `NguyenVanA_1952968`)

Note: All classes must be placed in *default (root)* package.