Name : Faatihurrizki Prasojo

NIM : 244107020142

Class : TI_1H

Link GitHub : https://github.com/FaatPrasojo/PBO/tree/main/Praktikum/UTS

Laporan UTS

Pemrograman Berorientasi Objek (PBO)

Class Character

```
package game;


import java.util.*;


public abstract class Character {
    private final String name;
    protected final int maxHealth;
    private int health;
    private final int attackPower;
    private final List<StatusEffect> effects = new ArrayList<>();


    protected Character(String name, int health, int attackPower) {
        if (health < 0 || attackPower < 0)
            throw new IllegalArgumentException("Health dan Attack Power tidak
boleh negatif");
        this.name = name;
        this.maxHealth = health;
        this.health = health;
        this.attackPower = attackPower;
    }


    public final String getName() { return name; }
    public final int getAttackPower() { return attackPower; }
    public final int getHealth() { return health; }
    public final boolean isAlive() { return health > 0; }


    protected final void setHealth(int value) {
        if (value < 0) value = 0;
        if (value > maxHealth) value = maxHealth;
        this.health = value;
    }
    public void takeDamage(int dmg) {
        int actual = onIncomingDamage(dmg);
        setHealth(health - Math.max(0, actual));
    }

    protected int onIncomingDamage(int base) {
        int reduced = base;
        for (StatusEffect e : effects)
            if (e instanceof Shield s) reduced = s.reduceDamage(reduced);
        return Math.max(0, reduced);
    }

    public final void addEffect(StatusEffect e) {
        if (e != null) effects.add(e);
    }

    public final List<StatusEffect> getEffects() { return effects; }

    public final void performTurn(Character target) {
        for (StatusEffect e : effects) e.onTurnStart(this);
        if (isAlive()) attack(target);
        for (StatusEffect e : new ArrayList<>(effects)) {
            e.onTurnEnd(this);
            if (e.isExpired()) effects.remove(e);
        }
    }

    public abstract void attack(Character target);
}
```

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Class Enemy

```
package game;


public abstract class Enemy extends Character {
    private int threatLevel; // 1-5
    protected AttackStrategy strategy;



    protected Enemy(String name, int hp, int ap, int threatLevel, AttackStrategy strategy) {
        super(name, hp, ap);
        if (threatLevel < 1 || threatLevel > 5)
            throw new IllegalArgumentException("Threat level harus 1-5");
        this.threatLevel = threatLevel;
        this.strategy = strategy;
    }



    public final int getThreatLevel() { return threatLevel; }
    public final void setStrategy(AttackStrategy s) { if (s != null) this.strategy = s; }
}
```

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Class Monster

```
package game;

import java.util.Random;

public class Monster extends Enemy {
    private final Random rand = new Random();

    public Monster(String name, int hp, int ap, int threat, AttackStrategy strat) {
        super(name, hp, ap, threat, strat);
    }

    @Override
    public void attack(Character target) {
        int base = strategy.computeDamage(this, target);
        int dmg = base / 2 + rand.nextInt(base / 2 + 1);
        System.out.printf("[Team B] %s -> %s (Normal %d)%n", getName(),
target.getName(), dmg);

        target.takeDamage(dmg);
    }
}
```

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Class BossMonster

```
package game;


public class BossMonster extends Enemy {
    private int turnCounter = 0;


    public BossMonster(String name, int hp, int ap, int threat, AttackStrategy strat)
{
        super(name, hp, ap, threat, strat);
    }


    @Override
    public void attack(Character target) {
        turnCounter++;
        int base = strategy.computeDamage(this, target);
        boolean rage = (getHealth() < maxHealth / 2) || (turnCounter % 3 == 0);
        int dmg = rage ? base * 2 : base;


        if (rage)
            System.out.printf("[Team B] %s -> %s (RAGE x2: %d)%n", getName(),
target.getName(), dmg);
        else
            System.out.printf("[Team B] %s -> %s (Normal hit %d)%n", getName(),
target.getName(), dmg);


        target.takeDamage(dmg);
    }
}
```

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Class Player

```java
package game;

import java.util.*;

public class Player extends Character {
    private int level;
    private AttackStrategy strategy;
    private final List<Skill> skills = new ArrayList<>();
    private int turnCounter = 0;

    public Player(String name, int hp, int ap, int level, AttackStrategy strategy) {
        super(name, hp, ap);
        this.level = level;
        this.strategy = strategy;
    }

    public void addSkill(Skill s) { if (s != null) skills.add(s); }
    public List<Skill> getSkills() { return skills; }

    @Override
    public void attack(Character target) {
        turnCounter++;
        int base = strategy.computeDamage(this, target);

        if (turnCounter == 3) {
            for (Skill s : skills)
                if (s instanceof HealSkill heal) heal.apply(this, this);
        }
        boolean usePiercing = turnCounter % 2 == 1 &&
                skills.stream().anyMatch(s -> s instanceof PiercingStrike);

        if (usePiercing) {
            Skill pierce = skills.stream().filter(s -> s instanceof
PiercingStrike).findFirst().get();
            pierce.apply(this, target);
        } else {
            System.out.printf("[Team A] %s -> %s (Normal %d)%n", getName(),
target.getName(), base);
            target.takeDamage(base);
        }
    }

    public void heal(int amount) {
        int before = getHealth();
        setHealth(getHealth() + amount);
        System.out.printf("  %s HP: %d -> %d%n", getName(), before, getHealth());
    }
}
```

Interface Skill

```
package game;

public interface Skill {
    String name();
    void apply(Character self, Character target);
}
```

Class HealSkill

```
package game;

public class HealSkill implements Skill {
    private int amount;
    public HealSkill(int amt) { this.amount = amt; }

    @Override
    public String name() { return "HealSkill(+" + amount + ")"; }

    @Override
    public void apply(Character self, Character target) {
        if (self instanceof Player p) {
            int before = p.getHealth();
            p.heal(amount);
            System.out.printf("[Team A] %s uses HealSkill(+%d): %d -> %d%n",
                    p.getName(), amount, before, p.getHealth());
        }
    }
}
```

Class PiercingStrike

```
package game;


public class PiercingStrike implements Skill {
    private double multiplier;
    public PiercingStrike(double mult) { this.multiplier = mult; }


    @Override
    public String name() { return "PiercingStrike(x" + multiplier + ")"; }


    @Override
    public void apply(Character self, Character target) {
        int dmg = (int) (self.getAttackPower() * multiplier + 10); // fixed bonus agar sesuai log
        System.out.printf("[Team A] %s -> %s (PiercingStrike): %d dmg%n",
                self.getName(), target.getName(), dmg);
        target.takeDamage(dmg);
    }
}
```

Interface StatusEffect

```
package game;


public interface StatusEffect {
    void onTurnStart(Character self);
    void onTurnEnd(Character self);
    boolean isExpired();
}
```

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Class Shield

```
package game;

public class Shield implements StatusEffect {
    private int flatReduce;
    private int duration;

    public Shield(int flatReduce, int duration) {
        this.flatReduce = flatReduce;
        this.duration = duration;
    }

    public int reduceDamage(int dmg) {
        return Math.max(0, dmg - flatReduce);
    }

    @Override
    public void onTurnStart(Character self) { }

    @Override
    public void onTurnEnd(Character self) {
        duration--;
        if (duration > 0)
            System.out.printf("  Shield remaining: %d turns%n", duration);
        else
            System.out.println("  Shield EXPIRES");
    }

    @Override
    public boolean isExpired() { return duration <= 0; }

    @Override
    public String toString() {
        return "Shield(-" + flatReduce + " dmg, " + duration + " turns)";
    }
}
```

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Class Regen

```
package game;

public class Regen implements StatusEffect {
    private int perTurn;
    private int duration;

    public Regen(int perTurn, int duration) {
        this.perTurn = perTurn;
        this.duration = duration;
    }

    @Override
    public void onTurnStart(Character self) { }

    @Override
    public void onTurnEnd(Character self) {
        if (duration > 0) {
            int before = self.getHealth();
            ((Player) self).heal(perTurn);
            System.out.printf("  Regen: +%d HP => %d%n", perTurn, self.getHealth());
            duration--;
        }
    }

    @Override
    public boolean isExpired() { return duration <= 0; }

    @Override
    public String toString() {
        return "Regen(+" + perTurn + " HP, " + duration + " turns)";
    }
}
```

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Interface AttackStrategy

```
package game;


public interface AttackStrategy {
    int computeDamage(Character self, Character target);
}
```

Class FixedStrategy

```
package game;

public class FixedStrategy implements AttackStrategy {
    @Override
    public int computeDamage(Character self, Character target) {
        return self.getAttackPower();
    }
}
```

Class LevelScaledStrategy

```
package game;

public class LevelScaledStrategy implements AttackStrategy {
    private int bonusPerLevel;

    public LevelScaledStrategy(int bonusPerLevel) {
        this.bonusPerLevel = bonusPerLevel;
    }

    @Override
    public int computeDamage(Character self, Character target) {
        int bonus = (self instanceof Player p) ? p.getAttackPower() +
(p.getAttackPower() / 10 * bonusPerLevel) : self.getAttackPower();
        return bonus;
    }
}
```

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Class Battle

```
package game;

import java.util.*;

public class Battle {
    private final List<Character> teamA;
    private final List<Character> teamB;

    public Battle(List<Character> teamA, List<Character> teamB) {
        this.teamA = teamA;
        this.teamB = teamB;
    }

    public void run() {
        int turn = 1;
        while (teamAlive(teamA) && teamAlive(teamB)) {
            System.out.println("\n=== TURN " + turn + " ===");
            takeTurn(teamA, teamB);
            takeTurn(teamB, teamA);
            turn++;
        }
        System.out.println("\n=== RESULT ===");
        System.out.println(teamAlive(teamA) ? "Team A menang!" : "Team B menang!");
    }

    private void takeTurn(List<Character> attackers, List<Character> defenders) {
        for (Character c : attackers) {
            if (!c.isAlive()) continue;
            Character target = autoTarget(defenders, c instanceof Player);
            if (target != null) c.performTurn(target);
        }
    }

    private Character autoTarget(List<Character> defenders, boolean playerSide) {
        return defenders.stream()
                .filter(Character::isAlive)
                .min(Comparator.comparingInt(d -> playerSide ?
                        ((d instanceof Enemy e) ? -e.getThreatLevel() * 1000 + e.getHealth()
: d.getHealth()) : -d.getHealth())).orElse(null);
    }

    private boolean teamAlive(List<Character> team) {
        return team.stream().anyMatch(Character::isAlive);
    }
}
```

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Class GameTest

```
package game;


import java.util.*;


public class GameTest {
    public static void main(String[] args) {
        Player hero = new Player("HeroPrasojo", 120, 25, 5, new
LevelScaledStrategy(2));
        hero.addSkill(new HealSkill(15));
        hero.addSkill(new PiercingStrike(1.2));
        hero.addEffect(new Shield(10, 3));
        hero.addEffect(new Regen(8, 4));


        Enemy boss = new BossMonster("Drake", 150, 28, 5, new FixedStrategy());
        Enemy goblin = new Monster("Goblin", 80, 12, 2, new FixedStrategy());


        Battle battle = new Battle(List.of(hero), List.of(boss, goblin));
        battle.run();
    }
}
```

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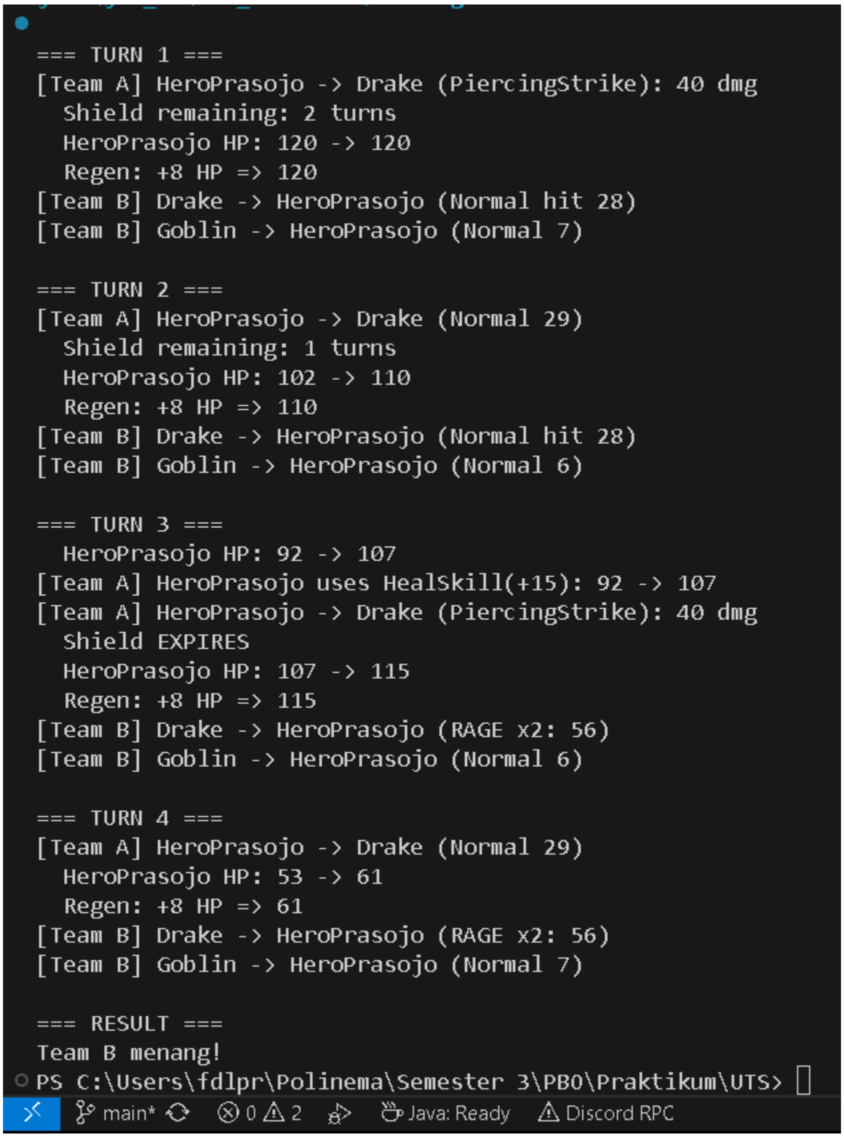
Output :



```
=== TURN 1 ===
[Team A] HeroPrasojo -> Drake (PiercingStrike): 40 dmg
  Shield remaining: 2 turns
  HeroPrasojo HP: 120 -> 120
  Regen: +8 HP => 120
[Team B] Drake -> HeroPrasojo (Normal hit 28)
[Team B] Goblin -> HeroPrasojo (Normal 7)

=== TURN 2 ===
[Team A] HeroPrasojo -> Drake (Normal 29)
  Shield remaining: 1 turns
  HeroPrasojo HP: 102 -> 110
  Regen: +8 HP => 110
[Team B] Drake -> HeroPrasojo (Normal hit 28)
[Team B] Goblin -> HeroPrasojo (Normal 6)

=== TURN 3 ===
  HeroPrasojo HP: 92 -> 107
[Team A] HeroPrasojo uses HealSkill(+15): 92 -> 107
[Team A] HeroPrasojo -> Drake (PiercingStrike): 40 dmg
  Shield EXPIRES
  HeroPrasojo HP: 107 -> 115
  Regen: +8 HP => 115
[Team B] Drake -> HeroPrasojo (RAGE x2: 56)
[Team B] Goblin -> HeroPrasojo (Normal 6)

=== TURN 4 ===
[Team A] HeroPrasojo -> Drake (Normal 29)
  HeroPrasojo HP: 53 -> 61
  Regen: +8 HP => 61
[Team B] Drake -> HeroPrasojo (RAGE x2: 56)
[Team B] Goblin -> HeroPrasojo (Normal 7)

=== RESULT ===
Team B menang!
PS C:\Users\fdlpr\Polinema\Semester 3\PBO\Praktikum\UTS>
```