Dasar-Dasar Pemrograman 2

Lab 7
Generics



Riwayat Versi

Versi	Timestamp	Keterangan	Warna
1	25-04-2024; 17.00 WIB	Rilis Pertama	-

BattleSim



Source: https://www.dota2.com/hero/ogremagi

Deskripsi

Pada kesempatan kali ini, Dek Depe mengajak kalian untuk berpartisipasi dalam pembuatan sebuah simulasi game X. Kali ini, kalian akan menciptakan sebuah arena tempur dimana berbagai petarung dari berbagai kelas akan bertarung dan menguji kekuatan masing - masing dalam sebuah pertarungan yang mendebarkan!

Classes

• Warrior (Abstract Class)

Attributes:

name: String

attack: int

defense: int

health: int

numRevived: int

Methods:

- + getName(): String
- + getHealth(): int
- + getDefense(): int
- + getNumRevived(): int
- + attack(target: Warrior): void
- + takeDamage(damage: int): void
- + displayStats(): void
- + isAlive(): boolean
- + revive(): void
- + compareTo(other: Warrior): int

• Tank (Subclass of Warrior)

Attributes:

shield: int

Methods:

- + takeDamage(damage: int): void
- + revive(): void
- + displayStats(): void

Archer (Subclass of Warrior)

Attributes:

criticalRate: double

criticalDamage: double

Methods:

- + attack(target: Warrior): void
- + revive(): void
- + displayStats(): void

Mage (Subclass of Warrior)

Attributes:

-

Methods:

+ attack(target: Warrior): void

+ revive(): void

+ displayStats(): void

WarriorList

Attributes:

warriors: List<Warrior>

fallenWarriors: Queue<Warrior>

Methods:

+ addWarrior(warrior: Warrior): void

+ removeWarrior(warrior: Warrior): void

+ getWarriors(): List<Warrior>

Penjelasan Program

- 1. Template dapat diakses di link berikut Template Lab 7 . Template tidak wajib digunakan, namun disarankan untuk digunakan. Apabila tidak menggunakan template, pastikan ada implementasi *Collections* dan *Generics*.
- Program memiliki 6 file dengan 1 file utama. File Archer.java, Tank.java, dan Mage.java tidak perlu diubah atau ditambah apapun apabila sudah menggunakan template. Berikut adalah penjelasan untuk file lainnya:

Warrior.java

Tujuan: Berfungsi sebagai kelas dasar untuk berbagai jenis warrior.

Task:

 Lengkapi definisi dari class Warrior agar Collections bisa digunakan untuk sort List.

WarriorList.java

Tujuan: Mengelola daftar Warrior serta Warrior yang sudah gugur dan menyediakan metode untuk menambahkan dan menghapus warrior dari daftar.

Task:

- Implementasi definisi class WarriorList.
- Implementasi addWarrior(Warrior warrior): Tambah Warrior ke List warriors.
- Implementasi removeWarrior(Warrior warrior): Hapus Warrior dari List jika ada.
- Implementasi **getWarriors()**: Mengembalikan daftar Warrior.
- Implementasi addFallenWarrior(Warrior warrior): Tambah Warrior ke Queue fallenWarriors.
- Implementasi getFallenWarriors(): Mengembalikan daftar Warrior yang sudah gugur.

Battlefield.java

Tujuan: Mengontrol alur permainan utama, termasuk menambahkan prajurit, menampilkan prajurit, mensimulasikan pertarungan, dan keluar dari permainan.

Task:

- Inisiasi Generics yang digunakan
- Implementasi opsi yang sesuai untuk tiap menu.
- Implementasikan metode addWarrior(): Menangani input dari pengguna untuk membuat Warrior baru sesuai dengan tipenya dan tambah ke WarriorList.
- Implementasikan metode displayWarriors(): Sort Warrior berdasarkan nama menggunakan Collections dan tampilkan menggunakan method displayStats() di setiap class.
- Implementasikan metode **simulateBattle()**: Simulasi *attacking and defending* antara dua warrior dan stat unik dari tiap *warrior*.
- Implementasikan metode reviveWarrior(): Membangkitkan seorang warrior yang telah tumbang sebelumnya selama atribut numRevived nya masih kurang dari 3. Setiap subclass memiliki

nilai *default* untuk seberapa banyak health yang akan mereka miliki setelah dibangkitkan.

- 3. Warrior sebagai dasar memiliki variabel name, attack, health, dan defense. Berikut adalah konsep dari setiap *stat*.
 - Attack

Jumlah bilangan yang dimiliki sebuah Warrior untuk mengurangi Health warrior yang diserang.

Health

Jumlah nyawa yang dimiliki sebuah Warrior, apabila mencapai 0, warrior itu akan dikeluarkan dari WarriorList.

Defense

Jumlah bilangan yang digunakan untuk mengurangi jumlah serangan yang diterima.

Contoh:

Health = 100

Defense = 25

Diserang dengan Warrior yang memiliki Attack = 50

Health tersisa = 100 - (50 - 25)

= 75

Pastikan apabila Defense lebih tinggi daripada Attack yang diterima, maka Health tidak bertambah

Contoh:

Health = 100

Defense = 50

Diserang dengan Warrior yang memiliki Attack = 25

Health tersisa = 100 - (25 - 50)

= 100 (bukan 125)

Warrior juga memiliki method dasar *attack()* dan *takeDamage()*. Berdasarkan dasar tersebut, terdapat tiga *subclass* yang sudah didefinisikan di template sebagai berikut:

Tank

- Memiliki *shield* yang berperan seperti nyawa kedua atau Health kedua.

Contoh:

Health = 100

Shield = 50

Serangan 1 = 40

Health tersisa = 100

Shield tersisa = 10 (50-40)

Serangan 2 = 20

Health tersisa = 90

Shield tersisa = 0

- Ketika dibangkitkan, health seorang Tank akan menjadi 1500. Tetapi *shield* tetap akan 0.

Mage:

Serangan dari Class Mage tidak dipengaruhi oleh Defense.

Contoh:

Health = 100

Defense = 50

Serangan dari Mage = 50

Health tersisa = 100 - 50

= 50

- Ketika dibangkitkan, health seorang Mage akan menjadi 500.
- Archer:

- Serangan dari Class Archer terkadang bisa lebih banyak atau *critical* tergantung dari *critical* rate dari Archer.

Contoh:

Serangan normal Archer = 40

Critical damage = 2.0

Serangan *critical* Archer = 40×2.0

Total serangan = 80

- Ketika dibangkitkan, health seorang Archer akan menjadi 1000.

4. Keterangan tambahan

- Harus mengimplementasikan Collections dan Generics. Apabila tidak ada implementasi Collections dan Generics, komponen fungsionalitas program akan bernilai 0.
- Penambahan dan pengurangan method di template diperbolehkan.
 Penggunaan template itu sendiri juga opsional asalkan luaran dari program sesuai.
- Penambahan atau pengubahan validasi diperbolehkan asal tidak mengganggu inti luaran dari program

Contoh Interaksi



Bagian berwarna merah adalah input pengguna.

Contoh Interaksi 1

Welcome to the Battlefield Simulator!

- 1. Add Warrior
- 2. Display Warriors
- Simulate Battle
- 4. Revive Warrior
- 5. Exit

Choose an option: 1

```
Select type of warrior:
1. Tank
2. Archer
3. Mage
Choose an option: 1
Enter Warrior name: Mars
Enter Warrior health (500 to 5000): 250
Please enter a value between 500 and 5000.
Enter Warrior health (500 to 5000): 2000
Enter Warrior attack (30 to 1000): 150
Enter Warrior defense (0 to 250): 200
Enter shield strength (0 to 500): 500
Mars has been added to the battle.
Welcome to the Battlefield Simulator!
1. Add Warrior
2. Display Warriors
3. Simulate Battle
4. Revive Warrior
5. Exit
Choose an option: 1
Select type of warrior:
1. Tank
2. Archer
3. Mage
Choose an option: 2
Enter Warrior name: Drow
Enter Warrior health (500 to 5000): 1000
Enter Warrior attack (30 to 1000): 500
Enter Warrior defense (0 to 250): 50
Enter critical rate (0.0 to 1.0): 0.5
Enter critical damage multiplier (1.0 to 5.0): 2.5
Drow has been added to the battle.
Welcome to the Battlefield Simulator!
1. Add Warrior
2. Display Warriors
3. Simulate Battle
4. Revive Warrior
5. Exit
Choose an option: 2
Current warriors in the battlefield:
```

+----+ --+-----| Type | Name | Attack | Defense | Health | Shield | Crit Rate | Crit Dmg | +----+ --+----| 500 | 50 | 1000 | +-------+----| Mars | 150 | 200 | 2000 | 500 +-------+-----Welcome to the Battlefield Simulator! 1. Add Warrior 2. Display Warriors 3. Simulate Battle 4. Revive Warrior 5. Exit Choose an option: 3 Select the attacking warrior: 1. Drow 2. Mars Choose a warrior: 2 Select the defending warrior: 1. Drow Choose a warrior: 1 Mars is attacking Drow Mars attacks Drow for 150 damage. Drow takes 100 damage, remaining health: 900 Drow survived the attack with 900 health remaining. Welcome to the Battlefield Simulator! 1. Add Warrior 2. Display Warriors 3. Simulate Battle 4. Revive Warrior 5. Exit Choose an option: 3 Select the attacking warrior: 1. Drow 2. Mars

```
Choose a warrior: 1
Select the defending warrior:
2. Mars
Choose a warrior: 2
Drow is attacking Mars
Mars uses shield! Takes 0 damage, remaining health: 2000
Mars survived the attack with 2000 health remaining.
Welcome to the Battlefield Simulator!
1. Add Warrior
2. Display Warriors
3. Simulate Battle
4. Revive Warrior
5. Exit
Choose an option: 2
Current warriors in the battlefield:
+----+
. - . . . | Name | Attack | Defense | Health | Shield | Crit Rate | Crit Dmg | +------
+-----+----+-----
--+----+
                     | 500 | 50 | 900 |
| Archer | Drow
               1
1 0.5
        | 2.5
+----
--+----+
| 150 | 200 | 2000 | 200
+-----+----+-----
--+----+
Welcome to the Battlefield Simulator!
1. Add Warrior
2. Display Warriors
3. Simulate Battle
4. Revive Warrior
5. Exit
Choose an option: 3
Select the attacking warrior:
1. Drow
2. Mars
Choose a warrior: 0
Please enter a value between 1 and 2.
Choose a warrior: 1
```

```
Select the defending warrior:
2. Mars
Choose a warrior: 1
Please enter a value between 2 and 2.
Choose a warrior: 3
Please enter a value between 2 and 2.
Choose a warrior: 2
Drow is attacking Mars
Mars uses shield! Takes 100 damage, remaining health: 1900
Mars survived the attack with 1900 health remaining.
Welcome to the Battlefield Simulator!
1. Add Warrior
2. Display Warriors
3. Simulate Battle
4. Revive Warrior
5. Exit
Choose an option: 3
Select the attacking warrior:
1. Drow
2. Mars
Choose a warrior: 1
Select the defending warrior:
2. Mars
Choose a warrior: 2
Drow is attacking Mars
Drow lands a CRITICAL HIT!
Mars takes 1050 damage, remaining health: 850
Mars survived the attack with 850 health remaining.
Welcome to the Battlefield Simulator!
1. Add Warrior
2. Display Warriors
3. Simulate Battle
4. Revive Warrior
5. Exit
Choose an option: 2
Current warriors in the battlefield:
+----+
--+----+
| Type
           | Name
                           | Attack | Defense | Health | Shield
| Crit Rate | Crit Dmg |
+-----
```

--+----+ | 500 | 50 | 900 | | Archer | Drow | 2.5 1 0.5 | 150 | 200 | 850 | 0 | Mars +------+----+ Welcome to the Battlefield Simulator! 1. Add Warrior 2. Display Warriors 3. Simulate Battle 4. Revive Warrior 5. Exit Choose an option: 5 -----Game Over-

Contoh Interaksi 2

Welcome to the Battlefield Simulator!

- 1. Add Warrior
- 2. Display Warriors
- 3. Simulate Battle
- 4. Revive Warrior
- 5. Exit

Choose an option: 3

Not enough warriors for a battle. Please add more warriors.

Welcome to the Battlefield Simulator!

- 1. Add Warrior
- 2. Display Warriors

```
3. Simulate Battle
4. Revive Warrior
5. Exit
Choose an option: 1
Select type of warrior:
1. Tank
2. Archer
3. Mage
Choose an option: 1
Enter Warrior name: Dek Depe
Enter Warrior health (500 to 5000): 777
Enter Warrior attack (30 to 1000): 234
Enter Warrior defense (0 to 250): 100
Enter shield strength (0 to 500): 123
Dek Depe has been added to the battle.
Welcome to the Battlefield Simulator!
1. Add Warrior
2. Display Warriors
3. Simulate Battle
4. Revive Warrior
5. Exit
Choose an option: 3
Not enough warriors for a battle. Please add more warriors.
Welcome to the Battlefield Simulator!
1. Add Warrior
2. Display Warriors
3. Simulate Battle
4. Revive Warrior
5. Exit
Choose an option: 1
Select type of warrior:
1. Tank
2. Archer
3. Mage
Choose an option: 3
Enter Warrior name: Peokra
Enter Warrior health (500 to 5000): 500
Enter Warrior attack (30 to 1000): 350
Enter Warrior defense (0 to 250): 99
Peokra has been added to the battle.
```

```
Welcome to the Battlefield Simulator!
1. Add Warrior
2. Display Warriors
3. Simulate Battle
4. Revive Warrior
5. Exit
Choose an option: 3
Select the attacking warrior:
1. Dek Depe
2. Peokra
Choose a warrior: 2
Select the defending warrior:
1. Dek Depe
Choose a warrior: 1
Peokra is attacking Dek Depe
Peokra casts a spell that ignores defense!
Dek Depe uses shield! Takes 227 damage, remaining health: 550
Dek Depe survived the attack with 550 health remaining.
Welcome to the Battlefield Simulator!
1. Add Warrior
2. Display Warriors
3. Simulate Battle
4. Revive Warrior
5. Exit
Choose an option: 2
Current warriors in the battlefield:
+----
---+----+
---+----+
                | 234 | 100 | 550 | 0
| Tank
     | Dek Depe
---+----+
                | 350 | 99 | 500 |
      | Peokra
```

Contoh Interaksi 3

Welcome to the Battlefield Simulator!

1. Add Warrior

2. Display Warriors

3. Simulate Battle

4. Revive Warrior

5. Exit

Choose an option: 4
There are currently no warriors to revive.

Welcome to the Battlefield Simulator!

1. Add Warrior

2. Display Warriors

3. Simulate Battle

Choose an option: 1

4. Revive Warrior

5. Exit

Select type of warrior:

```
1. Tank
2. Archer
3. Mage
Choose an option: 3
Enter Warrior name: Leoleshea
Enter Warrior health (500 to 5000): 1000
Enter Warrior attack (30 to 1000): 1000
Enter Warrior defense (0 to 250): 0
Leoleshea has been added to the battle.
Welcome to the Battlefield Simulator!
1. Add Warrior
2. Display Warriors
3. Simulate Battle
4. Revive Warrior
5. Exit
Choose an option: 1
Select type of warrior:
1. Tank
2. Archer
3. Mage
Choose an option: 1
Enter Warrior name: Dummy Tank
Enter Warrior health (500 to 5000): 500
Enter Warrior attack (30 to 1000): 30
Enter Warrior defense (0 to 250): 0
Enter shield strength (0 to 500): 0
Dummy Tank has been added to the battle.
Welcome to the Battlefield Simulator!
1. Add Warrior
2. Display Warriors
3. Simulate Battle
4. Revive Warrior
5. Exit
```

```
Choose an option: 1
Select type of warrior:
1. Tank
2. Archer
3. Mage
Choose an option: 2
Enter Warrior name: Dummy Archer
Enter Warrior health (500 to 5000): 500
Enter Warrior attack (30 to 1000): 30
Enter Warrior defense (0 to 250): 0
Enter critical rate (0.0 to 1.0): 0.0
Enter critical damage multiplier (1.0 to 5.0): 1.0
Dummy Archer has been added to the battle.
Welcome to the Battlefield Simulator!
1. Add Warrior
2. Display Warriors
3. Simulate Battle
4. Revive Warrior
5. Exit
Choose an option: 2
Current warriors in the battlefield:
+----
---+----+
| Type | Name
              | Attack | Defense | Health |
Shield | Crit Rate | Crit Dmg |
----+
1 0.0
      1 1.0
+----
---+----+
+----
---+----+
```

```
-+----+
Welcome to the Battlefield Simulator!
1. Add Warrior
2. Display Warriors
3. Simulate Battle
4. Revive Warrior
5. Exit
Choose an option: 3
Select the attacking warrior:
1. Dummy Archer
2. Dummy Tank
3. Leoleshea
Choose a warrior: 3
Select the defending warrior:
1. Dummy Archer
2. Dummy Tank
Choose a warrior: 1
Leoleshea is attacking Dummy Archer
Leoleshea casts a spell that ignores defense!
Dummy Archer takes 1000 damage, remaining health: 0
Dummy Archer has fallen in battle.
Dummy Archer has been removed from the battle.
Welcome to the Battlefield Simulator!
1. Add Warrior
2. Display Warriors
3. Simulate Battle
4. Revive Warrior
5. Exit
Choose an option: 2
Current warriors in the battlefield:
+----+
```

```
---+----+
                  | Attack | Defense | Health |
| Type
       | Name
Shield | Crit Rate | Crit Dmg |
+----
---+----+
+----
----+
Welcome to the Battlefield Simulator!
1. Add Warrior
2. Display Warriors
3. Simulate Battle
4. Revive Warrior
5. Exit
Choose an option: 3
Select the attacking warrior:
1. Dummy Tank
2. Leoleshea
Choose a warrior: 2
Select the defending warrior:
1. Dummy Tank
Choose a warrior: 1
Leoleshea is attacking Dummy Tank
Leoleshea casts a spell that ignores defense!
Dummy Tank takes 1000 damage, remaining health: 0
Dummy Tank has fallen in battle.
Dummy Tank has been removed from the battle.
Welcome to the Battlefield Simulator!
1. Add Warrior
2. Display Warriors
```

3. Simulate Battle 4. Revive Warrior 5. Exit									
Choose an option: 2									
Current warriors in the battlefield:									
+	Attack Defens								
	1000 0	1000							
+		+							
Welcome to the Battlefield Simulator! 1. Add Warrior 2. Display Warriors 3. Simulate Battle 4. Revive Warrior 5. Exit Choose an option: 4 Reviving Dummy Archer Successfully revived Dummy Archer!									
Welcome to the Battlefield Simulator! 1. Add Warrior 2. Display Warriors 3. Simulate Battle 4. Revive Warrior 5. Exit									
Choose an option: 2									
Current warriors in the battlefield:									
+									

```
| Attack | Defense | Health |
| Type
      | Name
Shield | Crit Rate | Crit Dmg |
+----
---+----+
        | Dummy Archer | 30 | 0 | 1000 |
| Archer
1 0.0
         1.0
+----
---+----+
---+----+
Welcome to the Battlefield Simulator!
1. Add Warrior
2. Display Warriors
3. Simulate Battle
4. Revive Warrior
5. Exit
Choose an option: 3
Select the attacking warrior:
1. Dummy Archer
2. Leoleshea
Choose a warrior: 2
Select the defending warrior:
1. Dummy Archer
Choose a warrior: 1
Leoleshea is attacking Dummy Archer
Leoleshea casts a spell that ignores defense!
Dummy Archer takes 1000 damage, remaining health: 0
Dummy Archer has fallen in battle.
Dummy Archer has been removed from the battle.
Welcome to the Battlefield Simulator!
1. Add Warrior
2. Display Warriors
3. Simulate Battle
```

```
4. Revive Warrior
5. Exit
Choose an option: 4
Reviving Dummy Tank...
Successfully revived Dummy Tank!
Welcome to the Battlefield Simulator!
1. Add Warrior
2. Display Warriors
3. Simulate Battle
4. Revive Warrior
5. Exit
Choose an option: 2
Current warriors in the battlefield:
---+----+
Shield | Crit Rate | Crit Dmg |
+----
---+----+
+----+----+-----
---+----+
     | Leoleshea | 1000 | 0 | 1000 |
Welcome to the Battlefield Simulator!
1. Add Warrior
2. Display Warriors
3. Simulate Battle
4. Revive Warrior
5. Exit
Choose an option: 4
Reviving Dummy Archer...
```

Successfully revived Dummy Archer!									
Welcome to the Battlefield Simulator! 1. Add Warrior 2. Display Warriors 3. Simulate Battle 4. Revive Warrior 5. Exit									
Choose an option: 2									
Current warriors in the battlefield:									
+ Type Shield Crit	+	Attack	Defense	Health	I				
Archer 0.0	Dummy Archer	30	0	1000	I				
+ Tank	Dummy Tank	30	0	1500	0				
+ Mage	Leoleshea	1000	0		· -+				
	++								
Welcome to the Battlefield Simulator! 1. Add Warrior 2. Display Warriors 3. Simulate Battle 4. Revive Warrior 5. Exit Choose an option: 3 Select the attacking warrior:									
1. Dummy Archer									

```
2. Dummy Tank
3. Leoleshea
Choose a warrior: 3
Select the defending warrior:
1. Dummy Archer
2. Dummy Tank
Choose a warrior: 1
Leoleshea is attacking Dummy Archer
Leoleshea casts a spell that ignores defense!
Dummy Archer takes 1000 damage, remaining health: 0
Dummy Archer has fallen in battle.
Dummy Archer has been removed from the battle.
Welcome to the Battlefield Simulator!
1. Add Warrior
2. Display Warriors
3. Simulate Battle
4. Revive Warrior
5. Exit
Choose an option: 4
Reviving Dummy Archer...
Successfully revived Dummy Archer!
Welcome to the Battlefield Simulator!
1. Add Warrior
2. Display Warriors
3. Simulate Battle
4. Revive Warrior
5. Exit
Choose an option: 3
Select the attacking warrior:
1. Dummy Tank
2. Leoleshea
3. Dummy Archer
Choose a warrior: 2
Select the defending warrior:
```

- Dummy Tank
 Dummy Archer
- Choose a warrior: 3

Leoleshea is attacking Dummy Archer
Leoleshea casts a spell that ignores defense!
Dummy Archer takes 1000 damage, remaining health: 0
Dummy Archer has fallen in battle.

Dummy Archer has been removed from the battle.

Welcome to the Battlefield Simulator!

- 1. Add Warrior
- 2. Display Warriors
- 3. Simulate Battle
- 4. Revive Warrior
- 5. Exit

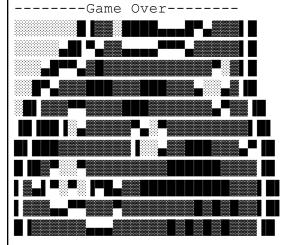
Choose an option: 4

Dummy Archer cannot be revived anymore.

Welcome to the Battlefield Simulator!

- 1. Add Warrior
- 2. Display Warriors
- 3. Simulate Battle
- 4. Revive Warrior
- 5. Exit

Choose an option: 5



Komponen Penilaian

- 15% Penambahan Warrior
- 10% Display Warrior
- 25% Simulasi Warrior
- 10% Revive Warrior
- 20% Implementasi Generics dan Collections
- 10% Standar Penulisan Kode (*Tiga kriteria standar kode: 1. Indentasi yang konsisten; 2. Aturan penamaan harus mengikuti Java Naming Convention; 3. Penamaan Module, Class, Method, dan Variabel yang tidak ambigu)
- 10% Dokumentasi dan kerapian kode

Pengumpulan Berkas

Kumpulkan berkas .java yang telah di-zip dengan format penamaan seperti berikut. [KodeAsdos]_[Kelas]_[NPM]_[NamaLengkap]_Lab7.zip

Contoh:

DDP_A_1234567890_DekDePe_Lab7.zip