


Assignment Case	
DS using CH4	
Periode Berlaku Semester Genap 2023/2024 <i>Valid on Even Year 2023/2024</i>	Software Laboratory Center Assistant Recruitment 24-2

Note: Please focus on the main logic and main features!

(Splash screen and design are not scored)

Soal

Case

Laevateinn

Hendra really wants to play this one turn-based combat game that just released, but it turns out that the game is so expensive and he can't afford it, so Hendra decided to make his own simple turn-based game **Laevateinn**. A simple turn-based game with a **party** consisting of **4 characters**: **Jogoat, Arthur, Jack Frost, and Mona.**

➤ Start Menu

- In this menu, the parties will be created and initialized. If file **"data.txt"** exists, then initialize the parties from that file.
- If file **"data.txt"** doesn't exist, then initialize the **party member** with the provided values.

Name	Speed	Ability	Weakness	Level
Jogoat	20	Inferno	Ice	1
Arthur	28	Thunderbolt	Wind	1
Jack Frost	20	Ice shards	Fire	1
Mona	25	Cyclone	Lightning	1

- There are **4 abilities** in this game, and each one has its **element** type.

Name	Element
Inferno	Fire
Ice shards	Ice
Thunderbolt	Lightning
Cyclone	Wind

- Additionally, **party members** will have these **attributes**.

- **Max HP**

Max HP Calculation
$= 150 + (\text{Level} * 5)$

- **Current HP** will be the same as **Max HP** when a **party is first initialized**.
- **Target EXP** the **EXP amount** needed for a **party to level up**.

Target EXP Calculation
$= \text{Level} * 100$

- **Current EXP** will start at **0** when first initialized.

- **Enemy will also be initialized here.** In this game, there are only **3 types of enemies**, and all of them will **have fixed attributes regardless of the parties' levels**, and all of them share the same structure as the party.

Name	Speed	Ability	Weakness	Level
Fierce Cyclops	25	Ice Shards	Fire	1
Wizard	28	Inferno	Ice	1
Vicious Raven	40	Cyclone	Lightning	1

➤ Main Menu

- This menu contains 4 menus, which are **Battle**, **View Party**, **Quit**, and **Save and Quit**.
- **Prompt** user to **input chosen menu**. **Validate** the input must be **between 1 and 4 inclusively**.

```
Welcome, please choose one of the following actions:  
  
1. Battle  
2. View party  
3. Quit  
4. Save and quit  
  
>>
```

Figure 1. Main Menu

1. If the user chooses **Battle (Menu 1)**, then:

- **1 Random enemy** from the list above will be chosen as the encounter.
- Create a **queue** system using a **linked list** and **push** all the party **members** and the **enemy** into the **linked list** using **push mid**. The list will be ordered based on **speed**, so the enemy/member with the highest speed will get the **first turn**.
- While the **enemy is not dead**, retrieve the **first item** on the **linked list**.
- **If the first item is the enemy**, then the enemy can perform **either of these actions randomly**:
 - **Attack**, deal calculated damage to a random party member. If the party is **resting**, then **half the damage**.

Attack Damage Calculation

$$= 25 + (\text{Level} * 3) * [\text{random number } 1-2]$$

- **Use Ability**, deal calculated damage to a random party member. If the **ability element** is the **party's weakness** and the **party is not resting**, then **double the damage**. If the party is **resting**, then **half the damage**.

Ability Damage Calculation

$$= 25 + (\text{Level} * 5)$$

- If the first item is a party member, then prompt the user to **input** chosen actions.

Validate the input must be **between 1 and 5 inclusively**.

```
Arthur's turn, choose action:
1. Attack
2. Use ability (Thunderbolt)
3. Rest
4. Check queue
5. Escape
>>
```

Figure 2. Battle Menu

- **Attack**, deal calculated damage to the enemy.

Attack Damage Calculation
$= 25 + (\text{Level} * 3) * [\text{random number } 1-2]$

- **Use Ability**, deal calculated damage to the enemy. If the **ability's element** is the **enemy's weakness**, then **double** the **damage**.

Ability Damage Calculation
$= 25 + (\text{Level} * 5)$

- **Rest**, recover **75 HP**, and **halve incoming damage until the next turn**.
- **Check Queue**, and **print the linked list** starting from the **head**.

```
Next turn(s): Arthur -> Mona -> Jogoat -> Jack Frost
Press [ENTER] to continue
```

Figure 3. Check Queue

- **Escape**, **50% chance** of escaping the battle. If the party **fails** to escape, the **turn will be used**, but if the escape **succeeds** then **end the battle** and **the party won't get any EXP**.

Figure 4. Escape Success

You've managed to escape the battle
Press [ENTER] to continue

Figure 4. Escape Success

The enemy noticed you, escape attempt failed
Press [ENTER] to continue

Figure 5. Escape Failed

- Every time the **party/enemy turn ends**, use **pop head** to remove them from the queue.
- When **every battle participant** has **used their turn**, and the **queue is empty**, then **push all the participants** with **more than 0 HP** back into the **queue** and **repeat the entire process**.
- If the **enemy's HP is 0 or less**, **end the battle** and every **party** that **lives** will **receive 50 EXP**.

You've defeated Fierce Cyclops

Parties gained 50 EXP

Jogoat has reached Lv. 2!
Arthur has reached Lv. 2!
Jack Frost has reached Lv. 2!

Press [ENTER] to continue

Figure 6. Battle won

- Validate for every party member's **current EXP** that's **more than or equal to the target EXP**, then **increase the level** of that **party member by 1** and **set the party's current EXP to the remaining EXP**.

Remaining EXP
= CurrentEXP – TargetEXP

- If a party member **leveled up**, make sure to **recalculate** their **Max HP** and **Target EXP**.
- **Party** members with **HP less than or equal to 0** will be **revived** with **1 HP** after the **battle ends**.

2. If the user chooses **View party**, then:

- **Print all the party member's attributes.**

```

Party Status:

Jogoat
HP: 127/155
Speed: 20
Level: 2
EXP: 0/200
Ability: Inferno (Fire)
Weakness: Ice

Arthur
HP: 39/155
Speed: 28
Level: 2
EXP: 0/200
Ability: Thunderbolt (Lightning)
Weakness: Wind

Jack Frost
HP: 69/155
Speed: 20
Level: 2
EXP: 0/200
Ability: Ice Shards (Ice)
Weakness: Fire

Mona
HP: 1/155
Speed: 25
Level: 1
EXP: 50/100
Ability: Cyclone (Wind)
Weakness: Lightning

Press [ENTER] to continue

```

Figure 7. View Party

3. If the user chooses **Quit**, then:

- **Prompt the user to input “y” or “n”.**
- **Validate that the input must be either “y” or “n” (case sensitive).**
- **If the input is “n” then return to the main menu.**
- **If the input is “y” then show Exit Page.**

```
Are you sure you want to quit without saving? All of your progress will be lost[y/n]:
```

Figure 8. Quit

4. If the user chooses **Save and quit**, then:

- **Prompt the user to input “y” or “n”.**
- **Validate that the input must be either “y” or “n” (case sensitive).**
- **If the input is “n” then return to the main menu.**
- **If the input is “y” then save every party member's data into “data.txt” with the following format for each party, then show Exit Page.**

```
[Name]#[CurrentHP]#[Level]#[CurrentEXP]
```

➤ **Exit Page**

- **Display Quotes and terminate the program.**

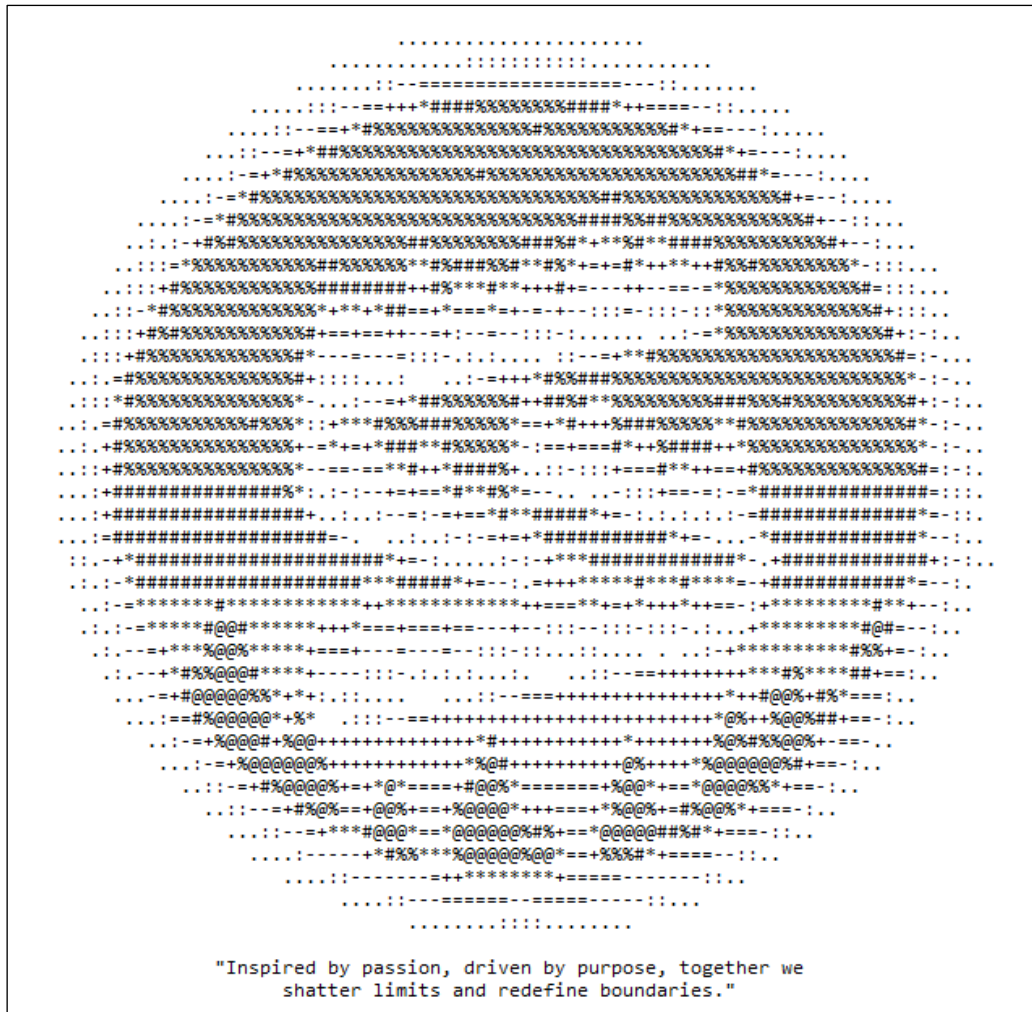


Figure 9. Exit Page

Please run the EXE file to see the sample program.