


Mandatory Case	
CMandatory	
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Soal

Case

HagnaRoK

HagnaRoK is a **role-playing game** simulation. In this game, player start as a new adventurer and is able to do many things, such as **exploring** and **hunting**. As a C Programmer you are asked to **create** the game, **HagnaRoK** using **C language**.

A. Main Menu

```

\=====/
\| HagnaRoK | /
\=====/
1. New Game
2. Load Game
3. About
4. Exit
Choose: _

```

Figure 1. Main Menu

Main Menu contains following menu:

1. **New Game**
2. **Load Game**
3. **About**
4. **Exit**

1. New Game

```
Input nickname [5-20 characters | alphabet only]: Maroo

You have 24 free stats point
1. STR (Current: 1)
2. VIT (Current: 1)
3. AGI (Current: 1)
4. INT (Current: 1)
5. DEX (Current: 1)
6. LUK (Current: 1)
Choose: _
```

Figure 2. New Game

- Before player play the game, program will ask:
 - Player's **nickname** must be **between 5 and 20 characters** and **must be alphabet**.
 - Player's **status point** allocation, allocation of **free points** to STR/VIT/AGI/INT/DEX/LUK.
 - Player will have **24 free status points** and is able to have a **maximum of 9 points** per **status** at the start of the game.
 - Player will **confirm** if the **data** is already **correct** or not, answered by '**Yes**' or '**No**' case sensitive.
- If the player successfully input all the information, set player with the following criteria:
 - Set player's **money (zemy)** with **250 Z**
 - Set player's **level** to **1**.
 - Set player's **HP** and **Max HP** to **100**.
 - Set player's **SP** and **Max SP** to **50**.
 - Set player's **Job Class** as **Freelancer**.
 - Set player's **Experience** to **level up** by 10.
 - Give **player** both **HP Potion** and **SP Potion** by 1 each.
 - **Player** will **spawn** at the middle of **Town of Krontera**.
- After that, move to **Game Menu**.

2. Load Game

- **Validate** the **existence** of **'game save'**.
- If **'game save'** is not found, display *'No save file found'* message.
- If **'game save'** is found, display *'Game loaded.'* message when **player load 'game save'**.
- If player **load 'game save'**, the following data will be **loaded**:
 - Player's **nickname**
 - Player's **status**
 - Player's **free status point**
 - Player's **gear** (with enhancement level)
 - Player's **information**
 - Player's **current map** and **coordinate**
 - Player's **items**
- Please look at **README.txt** for detail information about **'game save'**.
- After **loading game save**, move to **Game Menu**.

3. About

- **Display** introduction, job class description, and how to play **about HagnaRoK** game.
- **Return to main menu** when any key pressed.

4. Exit

- **Display** *'Always try new things, overcome all problems'* message and then **exit the program**.

B. Game Menu

```
Town of Kronera X:20 Y:17
#####
#^Y Y      ~~~~~~      ~~~~~~      YYY^^^#
# ^          ~~~~~~      ~~~~~~      Y Y ^#
# ^ Y Y Y      Y      Y ^#
# ^ ^ Y YY ##   ##   YY Y      ^ ^#
# ^ ^ ^ Y      #   #   Y      ^# Nickname: Maroo
# ^ ^ Y      #   #   Y ^ ^# Job: Freelancer
# ^ ^ ^Y #####   #####   Y^ ^# HP: 100 / 100
# ^    #GOODS###   ###GEAR #      ^# SP: 50 / 50
# ^ ^ ^Y #   #0      0#   #   Y^   # Level: 1
#Y Y YY #####   ...   #####   YY Y # EXP: 0 / 10
O           .///.      # Zemy: 250 Z
O           .///.      #
#Y Y YY #####   ...   #####   YY Y #
# ^ ^ ^Y #   #0      0#   #   Y^   ^#
# ^    #SMITH###   ###INN #      ^#
# ^ ^ ^Y #####   #####   Y^   ^#
# ^ ^ ^Y      @      Y ^   ^# Legend
# ^ ^Y      Y      Y ^# =====
# ^ ^    YY Y   YYY   YYY Y YY      ^ ^# @ = Player
# ^ Y Y ^ ^   ^Y   Y^ ^ ^   Y ^# # = Wall
# ^ YYY^      ^      Y Y ^# ~ = Water
# ^      ^ ^ ^ Y   Y ^ ^ ^   ^# O = Portal
# ^^^^^^^^^^^^^^Y   Y^^^^^^^^^Y   Y ^# ^ = House
#####000##### Y = Tree

Actions: Move[W|A|S|D] | Inventory[I] | Equipment[Q] | Profile[TAB] | Save[V] | Exit[E]
```

Figure 3. Game Menu (Town of Krontera)

Game Menu will display following informations:

- Player's **nickname** obtained from **player's input**.
- Player's **job**, default job class is **Freelancer**.
- Player's **hp** and **max hp**, default max hp is **100**.
- Player's **sp** and **max sp**, default max sp is **50**.
- Player's **level**, starting level is **1**.
- Player's **zemy**, starting zemy is **250**.
- Map's legend, player's coordinate and map's name.

Game Menu will contain following **actions**:

1. Move [W|A|S|D]
2. Inventory [I]
3. Equipment [Q]
4. Profile [TAB]
5. Save [V]
6. Exit [E]

Game Menu is divided into three maps:

1. **Town of Krontera**
2. **Krontera South Field**
3. **Krontera Left Field**

➤ **Actions**

1. **Move [W|A|S|D]**

- Player can **press W/A/S/D key** to **move** around the map.
- Player can only move **through free space** and **trees**.

2. **Inventory [I]**

```
Items:
1. HP Potion: 1
2. SP Potion: 1
3. Clover: 0
4. Sticky Mucus: 0
5. Zellopy: 0
Use item [0 to exit]:
```

Figure 4. Inventory

- Display player's **item** and the **quantity** of each item **owned**.
- If player choose a **usable item** to be used, display '*You used [Item Name] and [Item Effect]*' message.

```
You used HP Potion and restored 30 HP
```

Figure 5. Inventory (Using usable item)

- **Usable items** are **HP Potion** and **SP Potion**.

Item Name	Item Effect
HP Potion	Restores 30 HP
SP Potion	Restores 25 SP

- If player choose a **not usable item** to be used, display '*Item is not usable*' message.

```
Item is not usable.
```

Figure 6. Inventory (Using not usable item)

- If player **doesn't have** any **item** in the inventory, display '*You have no items*' message.

```
Items:
You have no items.

Press any key to continue . . .
```

Figure 7. Inventory (No item)

3. Equipment [Q]

- Display player's **equipment status**.
- If player **doesn't have** the **equipment**, the equipment status is **none**.
- If player **does have** the **equipment**, display status as **equipped** and show **enhancement level** and its **DEF bonus**.

```
Equipment:
Helmet: equipped [Enhancement Level: 1][DEF: 5]
Armor: none
Weapon: equipped [Enhancement Level: 0][ATK: 5]

Press any key to continue . . .
```

Figure 8. Equipment

4. Profile [TAB]

- Display player's **free status points**.
- Display player's **status**.
- If player try to allocate **status point** while having **zero free status points**. Display '*No free point available*' message.

```
You have 0 free stats point
1. STR (Current: 12)
2. VIT (Current: 6)
3. AGI (Current: 6)
4. INT (Current: 7)
5. DEX (Current: 1)
6. LUK (Current: 1)
7. Back
Choose: 1
No free point available.

Press any key to continue . . . █
```

Figure 9. Profile (No free status point)

- If player try to allocate **status point** while having **some free status points**. Player will be prompted to **input** the **amount** of **status point** to be allocated.

```

You have 3 free stats point
1. STR (Current: 9)
2. VIT (Current: 6)
3. AGI (Current: 6)
4. INT (Current: 7)
5. DEX (Current: 1)
6. LUK (Current: 1)
7. Back
Choose: 1
Input stat point amount [1-3]: 3
You have allocated 3 point(s) to STR
Press any key to continue . . .

```

Figure 10. Profile (Allocating status point)

5. Save [V]

- Player can **save game** process **only** in **Town of Krontera**.
- The following data will be saved:
 - Player's **nickname**
 - Player's **status**
 - Player's **free status point**
 - Player's **gear** (with enhancement level)
 - Player's **information**
 - Player's **current map** and **coordinate**
 - Player's **items**
- After saving display '*Your data has been saved!*' message.

```

Your data has been saved!
Press any key to continue . . . █

```

Figure 11. Save

6. Exit [E]

- **Ask** player for **confirmation** before exit.
- **Confirmation input** is either **Yes** or **No** and is **case sensitive**.
- Upon **exit**, player will be **redirected** to **Main Menu**.

- If **canceled**, player will be **back to Game Menu**.

➤ Maps

1. Town of Krontera

```

Town of Krontera X:20 Y:14
#####
#^Y Y ~~~~~ YYY^#
#^ ^ ~~~~~ Y Y ^#
#^ Y Y Y Y Y ^#
#^ ^ Y Y Y Y ^#
#^ ^ Y # # Y ^# Nickname: Maroo
#^ ^ Y # # Y ^# Job: Freelancer
#^ ^ Y ##### Y ^# HP: 104 / 104
#^ #GOODS### ##GEAR # ^# SP: 52 / 52
#^ ^ Y # #0 O# # Y^ # Level: 2
#Y Y Y ##### ... ##### Y Y # EXP: 2 / 12
0 .///. # Zemy: 24250 Z
0 .///. #
#Y Y Y ##### ... ##### Y Y #
#^ ^ Y # #0 @ O# # Y^ ^#
#^ #SMITH### ##INN # ^#
#^ ^ Y ##### Y^ ^#
#^ ^ Y Y ^# Legend
#^ ^ Y Y ^# =====
#^ ^ Y Y Y Y Y Y Y Y ^# @ = Player
#^ Y Y ^ ^ ^ Y ^ ^ ^ Y ^# # = Wall
#^ Y Y Y ^ ^ ^ Y Y ^# ~ = Water
#^ ^ ^ ^ Y Y ^ ^ ^ ^# O = Portal
#^ ^ ^ ^ ^ Y Y ^ ^ ^ ^# ^ = House
#####000##### Y = Tree
Actions: Move[W|A|S|D] | Inventory[I] | Equipment[Q] | Profile[TAB] | Save[V] | Exit[E]

```

Figure 12. Game Menu (Town of Krontera)

- Map is **read** from **Krontera.dat**.
- There are four **interactable buildings** in the town.
- Player can visit **Inn** to **restore both HP and SP**.

```

[Innkeeper]
Hello Maroo, you must be tired. Do you want to rest here for 100 Z? (Restores both HP and SP)

[Maroo]
(You have 24250 zemy left). You decide to ...
    1. Rest    2. Not rest
Action: _

```

Figure 13. Game Menu (Town of Krontera -> Inn)

- If player decide to **rest**, **restore both HP and SP** then **deduct** player's **zemy** by **100**. Display *'You chose to rest... Both HP and SP are fully restored!'* message.
- If player decide **not to rest**. Display *'You chose not to rest and continue your adventure'* message.

- Player can visit **Goods** to **buy** and **sell items**.

```
[Goods Dealer]
Welcome Maroo, we have the best goods in Krontera!

[Maroo]
You decide to ...
      1. Buy      2. Sell      3. Back
Action:
```

Figure 14. Game Menu (Town of Krontera -> Goods)

- If player decide to go **back**, display *'You chose not to buy/sell goods and continue your adventure'* message.
- If player decide to **buy items**, display items which can be bought (HP and SP potions).

Item Name	Buy Value
HP Potion	25 Zemy
SP Potion	35 Zemy

- Player will **input** item **quantity** when **buying** item.
- If player have **enough** zemy, display *'You chose to buy [Quantity] [Item Name]. Spending [Zemy spent] Z'* message.

```
[Gear Dealer]
We have HP potion and SP potion stocked up.

[Maroo]
(You have 24050 zemy left). You choose to buy ...
      1. HP Potion[25 Z]      2. SP Potion[35 Z]      3. Back
Action: 1
Input quantity [Min 1]: 900
You chose to buy 900 HP Potion. Spending 22500 Z.

Press any key to continue . . .
```

Figure 15. Game Menu (Town of Krontera -> Goods -> Buying Item)

- If player **don't** have **enough** zemy, display *'Having not enough zemy, you leave the shop'* message.

- If player decide to **sell** items, display items which can be sold (Sticky Mucus, Clover, Zellopy).

Item Name	Sell Value
Sticky Mucus	7 Zemy
Clover	13 Zemy
Zellopy	18 Zemy

- Player will **input** item **quantity** when **selling** item.
- If player **have** enough **item** to be sold, display '*You chose to sell [Quantity] [Item Name]. Earning [Zemy gained] Z*' message.

```
[Gear Dealer]
What do you want to sell ?

[Maroo]
You choose to sell ...
    1. 1 x Sticky Mucus[7 Z]    2. 0 x Clover[13 Z]    3. 1 x Zellopy[18 Z]    4. Back
Action: 1
Input quantity [1-1]: 1
You chose to sell 1 Sticky Mucus. Earning 7 Z.
Press any key to continue . . .
```

Figure 16. Game Menu (Town of Krontera -> Goods -> Selling Item)

- If player **don't have** enough **item** to be sold, display '*Having not enough goods to sell, you continue your adventure*' message.
- Player can visit **Gear** to **buy equipments**.

```
[Gear Dealer]
Yo Maroo, interested on buying some gears ?

[Maroo]
You decide to ...
    1. Buy    2. Not buy
Action:
```

Figure 17. Game Menu (Town of Krontera -> Gear)

- If player decide **not** to **buy**, display '*You chose not to gear up and continue your adventure*' message.
- If player decide to **buy**, display equipment which can be bought (Helmet, Armor, Weapon).

- If player **have** enough **zemy**, display 'You chose to buy a/an [Equipment Name]. Your ATK/DEF raised by [Equipment ATK/DEF]!' message.

Equipment Name	Effect	Cost
Helmet	4 DEF	300 Zemy
Armor	7 DEF	750 Zemy
Weapon	5 ATK	400 Zemy

```
[Gear Dealer]
Helmet, Armor or Weapon. The best of Krontera!

[Maroo]
(You have 1575 zemy left). You decide to buy ...
    1. Helmet[300 Z]    2. Armor[750 Z]    3. Weapon[400 Z]    4. Back
Action: 2
You chose to buy an Armor. Your DEF raised by 7!
Press any key to continue . . .
```

Figure 18. Game Menu (Town of Krontera -> Gear -> Buying Equipment)

- If player **don't have** enough **zemy**, display 'Having not enough zemy, you leave the shop' message.
- If player **have** the **equipment** already but chose to buy the equipment again, display 'You already have a/an [Equipment Name]' message.
- Player can visit **Smith** to **enhance equipments**.

```
[Blacksmith]
Hello Maroo, be the best by enhancing your gear!

[Maroo]
You decide to ...
    1. Enhance    2. Not enhance
Action: _
```

Figure 19. Game Menu (Town of Krontera -> Smith)

- If player decide **not** to **enhance**, display 'You chose not to enhance and continue your adventure' message.
- If player decide to **enhance**, show **available equipment** to be enhanced.
- Equipment to be enhanced **must be owned** by the player.
- Enhancement **cost** is **50 zemy**.
- Each **enhancement level** increases equipment ATK/DEF by 1.

- If player **own** the **equipment** and **have** enough **zemy**, display ‘You chose to enhance your [Equipment Name]. Your ATK/DEF raised by 1!’ message.

```
[Blacksmith]
Helmet, Armor or Weapon. I can enhance them to their best form.
It cost only 50 Z!

[Maroo]
(You have 1550 zemy left). You decide to enhance ...
    1. Helmet[owned]    2. Armor[none]    3. Weapon[owned]    4. Back
Action: 1
You chose to enhance your Helmet. Your DEF raised by 1!

Press any key to continue . . .
```

Figure 20. Game Menu (Town of Krontera -> Smith -> Enhance Equipment)

- If player **don’t have** enough **zemy**, display ‘Having not enough zemy, you leave the shop’ message.
- If player **doesn’t own** the **equipment**, display ‘You don’t have a/an [Equipment Name]’ message.

1. Krontera South Field & Krontera Left Field

```

Krontera South Field      X:25 Y:1
#####000#####
#####  @  YYYYYY ##  #
#####  YY  YYYYY#  #
#####  YYY  YY #####  #
#####  YY Y  ###  ###  ###
##  YY YY  ###  YY####  # Nickname: Maroo
###  YY  YY  ###  YY##  ##  # Job: Freelancer
#####  *  YYY  #  YY##  #####  HP: 104 / 104
#  ##  YY  #  YY  #  SP: 52 / 52
#  #####  YY  YYY  ##YY  # Level: 2
#####  YYY  YYY *  *##YYY#####  # EXP: 2 / 12
#####  *YY  ##YY##  #####  Zemy: 0 Z
##  ###Y  YYY  *  #####  #####
###  YYY  *  YY  ##  #
#####  ###  YYYYYY  ##  #
#####  #####  YYY####  ##*  #
#####  #####  #####  #####  #
#####YYY####YY#####  ##  # Legend
#####YYYYYYYY#####  ###  # =====
#####YY#####  #####  # @ = Player
#####  *  #####  # = Wall
#####  *  #####  # O = Portal
#####  #####  # Y = Tree
#####  *  #####  # = Monster

```

Actions: Move[W|A|S|D] | Inventory[I] | Equipment[Q] | Profile[TAB] | Exit[E]

Figure 20. Game Menu (Krontera South Field)

```

Krontera Left Field X:48 Y:12
#####
#####
#####   YYY   YYY#####
#####   YY   YY   YYYYY###
###   YYY   NNNN   YYY   *YYYY###
###   YY   NNNN   *   YYY### Nickname: Maroo
#####   NNNN   YYYYYY### Job: Freelancer
#####   NNNN   YYYYYYYY### HP: 104 / 104
NNNNNN   NNNN   YYY   YYY   YY### SP: 52 / 52
NNNNNNNN   NNNN   YY   *YYYYY YY### Level: 2
NNNNNNNNNNNNNNNNNNNN   YY   YYY### EXP: 2 / 12
NNNNNNNNNNNNNNNNNNNN   *   *   YYY# Zemy: 0 Z
NNNNNNNNNNNNNNNNNNNN   @0
#   NNNNNN   NNNN   0
#   NNNNN   YY   YYYYYYYY   NN   *   ###
##   YYY   YYY   NNNNN   ###
###   YYYYYY   NNN   NN   *   ###
#####   YYY   NNN   *   NNN   ## Legend
#####   YY   NNNN   *   NNN   ## =====
#####   YY   YY   NNNN   ###   @ = Player
#####   YY   YY   YY   #####   # = Wall
#####   YY   ##YY   #####   ~ = Water
#####   #####   #####   0 = Portal
#####   #####*   #####   Y = Tree
#####   #####   #####   * = Monster
#####
Actions: Move[W|A|S|D] | Inventory[I] | Equipment[Q] | Profile[TAB] | Exit[E]

```

Figure 21. Game Menu (Krontera Left Field)

- Map is **read** from **SouthField.dat** and **LeftField.dat**
- List of monsters is **read** from **SouthFieldMob.dat** and **LeftFieldMob.dat**
- Please look at **README.txt** for detail information about 'monster data'.
- There will be **10** monster **spawn** in **both** maps.
- **Randomize** monster type. The **chance** for each monster type is 50%.
- **Randomize** monster spawn coordinate.
- Monster can **spawn** at **free space** or **below tree**.
- Monster which **spawn below tree won't be revealed** until player **encounter** the monster.

C. Battle Menu

```
Enemy: Lunatic  
HP: 60 / 60  
  
You: Maroo  
HP: 104 / 104  
SP: 52 / 52  
  
Action:  
1. Attack  
2. Skill  
3. Item  
4. Flee  
Choose: _
```

Figure 22. Battle Menu

Battle Menu will display following information:

- Enemy's **name**
- Enemy's **hp** and **max hp**
- Player's **nickname**
- Player's **hp** and **max hp**
- Player's **sp** and **max sp**

Battle Menu consists of two turns:

- **Player Turn**
- **Enemy Turn**

Battle Menu will contain following **actions**:

1. **Attack**
2. **Skill**
3. **Item**
4. **Flee**

➤ **Player Turn**

Player will **always** have the **first turn**.

1. Attack

- Player's **attack** is classified as **physical attack**.
- When attacking there is a **chance** the monster **tries to evade**

$$\text{Monster Evasion} = \frac{\text{Monster AGI}}{100} \times 100\%$$

- If the monster **tries to evade**, there is a **chance** your **attack** would still **hit** the monster

$$\text{Player Hit} = \frac{\text{Player DEX}}{100} \times 100\%$$

- If monster **tries to evade** and your **attack hit** the monster, display '[Monster Name] tries to evade. But your attack didn't miss!' message.
- If monster **tries to evade** and your **attack missed**, display '[Monster Name] tries to evade.. your attack missed' message.
- If your **attack hit** the target, **calculate** player's **damage**

$$\text{Player Damage} = \text{Random}(0 \text{ to } STR - 1) + (STR / 2) + 3$$

- If player **have a weapon**, **add** bonus **ATK** to player **damage**

$$\text{Player Damage} = \text{Player Damage} + 5 + \text{Weapon Enhancement Level}$$

- When attacking, there is a **chance** for **critical**

$$\text{Player Critical Hit} = \frac{\text{Player LUK}}{100} \times 100\%$$

- If the **attack** is **critical**, **double** the **damage** and display 'Critical Hit!' message.

$$\text{Player Damage} = \text{Player Damage} \times 2$$

- After calculating player's damage, monster's **VIT** can **reduce** player's **damage**

$$\text{Player Damage} = \text{Player Damage} - \text{Monster VIT} * 0.5$$

- If player's **damage** goes **below** 1, set player's damage to 1.
- Enemy **HP** will then be **decreased** with player's **damage**.
- Display 'You attacked and dealt [Player Damage] damage' message.
- This action **consumes** player's **turn**

2. Skill

Skills:
 1. Bash [10 SP]
 2. Fire Bolt [25 SP]
 3. Back
 Choose:

Figure 23. Battle Menu (Skill)

- **Display skills** the player can use.
- **Bash** skill is classified as **physical** attack.
- **Fire bolt** skill is classified as **magic** attack.
- If the player uses **Bash** skill, calculate player **damage**.

$$\text{Player Damage} = \text{Player STR} * 2 + 3$$

- If player have a **weapon**, add bonus **ATK** to player's **damage**.

$$\text{Player Damage} = \text{Player Damage} + 5 + \text{Weapon Enhancement Level}$$

- After calculating player's damage, monster's **VIT** can **reduce** player's **damage**.

$$\text{Player Damage} = \text{Player Damage} - \text{Monster VIT} * 0.5$$

- If player's **damage** goes **below** 1, set player's damage to 1.
- Enemy **HP** will then be **decreased** with player's **damage**.
- Player's **SP** will be **reduced** by 10.

- If player's **SP** goes **below** 0, set player's SP to 0.
 - Display 'You use Bash! Dealing [Player Damage] damage' message.
 - This action **consumes** player's **turn**.
- If the player uses **Fire Bolt** skill, calculate player **damage**.

$$\text{Player Damage} = \text{Player INT} * 5 + 3$$

- If player have a **weapon**, add bonus **ATK** to player **damage**

$$\text{Player Damage} = \text{Player Damage} + 5 + \text{Weapon Enhancement Level}$$

- After calculating player's **damage**, monster's **VIT** can **reduce** player's **damage**

$$\text{Player Damage} = \text{Player Damage} - \text{Monster VIT} * 0.5$$

- If player's **damage** goes **below** 1, set player's damage to 1.
 - Enemy **HP** will then be **decreased** with player's **damage**.
 - Player's **SP** will be **reduced** by 25.
 - If player's **SP** goes **below** 0, set player's sp to 0.
 - Display 'You used Fire Bolt! Dealing [Player Damage] magic damage' message.
 - This action **consumes** player's **turn**.
- If player **doesn't have** enough **SP**, display 'Not enough SP...' message.

3. Item

- Display only **usable** items. (HP and SP Potions)
- If player choose to **use HP Potion**,
 - **Restore** player's **hp** by 30.
 - If player's hp **exceed** max hp, **set hp** to **max hp**.
 - HP potion will be **decreased** by 1.
 - Display 'You used HP Potion and restored 30 HP' message.
 - This action **consumes** player's **turn**.
- If player choose to **use SP Potion**,

- **Restore** player's **sp** by 25.
- If player's sp **exceed** max sp, **set sp** to **max sp**.
- SP potion will be **decreased** by 1.
- Display '*You used SP Potion and restored 25 SP*' message.
- This action **consumes** player's **turn**.
- If player choose to **use HP or SP Potion** while **not having** any, display '*Not enough potion*' message.

4. Flee

- If player choose to **flee**, **calculate** flee **chance**

$$Player\ Flee = \frac{Player\ HP}{Player\ Max\ HP} \times 100\%$$

- If player flee **success**, display '*You try to flee... and succeed!*' message.
- If player flee **failed**, display '*You try to flee... but failed..*' message.
- This action **consumes** player's **turn**.

➤ Enemy Turn

1. Attack

- Monster's **attack** is classified as **physical** attack.
- When attacking there is a **chance** the player **tries** to **evade**

$$Player\ Evasion = \frac{Player\ AGI}{100} \times 100\%$$

- If the player **tries** to **evade**, there is a **chance** monster's **attack** would still **hit** the player

$$Monster\ Hit = \frac{Monster\ DEX}{100} \times 100\%$$

- If player **tries** to **evade** and monster's **attack** **hit** the target, display '*You tried to evade. But [Monster Name] attack didn't miss!*' message.
- If player **tries** to **evade** and monster's **attack** **missed**, display '*You tried to evade.. [Monster Name] attack missed*' message.

- If monster's **attack hit** the player, **calculate** monster's **damage**

$$\text{Monster Damage} = \text{Random}(0 \text{ to } \text{Monster STR} - 1) + (\text{Monster STR} / 2)$$

- When attacking, there is a **chance** for **critical**

$$\text{Monster Critical Hit} = \frac{\text{Monster LUK}}{100} \times 100\%$$

- If the **attack** is **critical**, **double** the **damage** and display 'Critical Hit!' message.

$$\text{Monster Damage} = \text{Monster Damage} \times 2$$

- After **calculating** monster's **damage**, player's **VIT** can **reduce** monster's **damage**

$$\text{Monster Damage} = \text{Monster Damage} - \text{Player VIT} \times 0.5$$

- If player have a **helmet**, **add** bonus **DEF** for player

$$\text{Monster Damage} = \text{Monster Damage} - 4 - \text{Helmet Enhancement Level}$$

- If player have an **armor**, **add** bonus **DEF** for player

$$\text{Monster Damage} = \text{Monster Damage} - 7 - \text{Armor Enhancement Level}$$

- If monster's **damage** goes **below 1**, **set** monster's **damage** to 1.
- Player **HP** will then be **decreased** with monster's **damage**.
- Display '[Monster Name] attacked and dealt [Monster Damage] damage' message.
- This action **consumes** monster's **turn**

➤ Battle Finish

- Player Wins

You attacked and dealt 23 damage.

You win and get 5 experiences!

Leveled up!

You are now level 3!

You gain 3 free status points

Monster drops:

No drops.

Figure 24. Battle Menu (Player Wins)

- This condition is fulfilled when **monster HP** is **empty**.
- Display **experience gained** from monster.
- If player level up, display **current level** and **status points** gained message.
- If player level up, **reset experience** and increase **experience** to **next level**.

$$\text{Experience to Level} = \text{Experience to Level} \times 1.25$$

- If player level up, increase **max hp** and **restore full hp**,

$$\text{Max HP} = \text{Max HP} + \text{Max HP} / 25$$

- If player level up, increase **max sp** and **restore full sp**,

$$\text{Max SP} = \text{Max SP} + \text{Max SP} / 25$$

- If player level up, increase **free status points** by 3.

- If defeated monster is **Poring**, the **drop rates** will be,

Item Name	Drop Rate	Quantity			
		1	2	3	4
Sticky Mucus	35%	100%	-	-	-
Clover	20%	100%	-	-	-
Zellopy	10%	100%	-	-	-

- If defeated monster is **Lunatic**, the **drop rates** will be,

Item Name	Drop Rate	Quantity			
		1	2	3	4
Sticky Mucus	50%	50%	50%	-	-
Clover	35%	50%	50%	-	-
Zellopy	20%	50%	50%	-	-

- If defeated monster is **Thief Bug**, the **drop rates** will be,

Item Name	Drop Rate	Quantity			
		1	2	3	4
Sticky Mucus	75%	34%	33%	33%	-
Clover	50%	34%	33%	33%	-
Zellopy	35%	34%	33%	33%	-

- If defeated monster is **Snake**, the **drop rates** will be,

Item Name	Drop Rate	Quantity			
		1	2	3	4
Sticky Mucus	90%	25%	25%	25%	25%
Clover	75%	25%	25%	25%	25%
Zellopy	50%	25%	25%	25%	25%

- If there are **no drops**, display `No drops` message.
- If there are **drops**, display the item name and quantity.

- **Player Loses**

```
Snake attacks!!  
  
Snake attacked and dealt 56 damage.  
  
You are dead and lost 3 experiences...  
You will spawn at Town of Krontera
```

Figure 25. Battle Menu (Player Loses)

- This condition is fulfilled when **player HP** is **empty**.
- Display **experience loss**, loss calculated from **experience** to **next level**.

$$\text{Experience Loss} = \text{Experience to Level} \times 0.25$$

- If experience drops **below zero**, set experience to **zero**.
- Player will **spawn** back at **Town of Krontera** with **hp** and **sp** fully **restored**.

Please run the EXE file to see the sample program

Read the README.txt for additional information!