**HONG KONG INSTITUTE OF VOCATIONAL EDUCATION DEPARTMENT OF INFORMATION TECHNOLOGY HIGHER DIPLOMA IN SOFTWARE ENGINEERING (IT114105) ITP4507 Contemporary Topics in Software Engineering Assignment Report**

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# Assumptions regarding the problem context

Requirement

## Analysis

* The Player and Hero ID is unique, unchangeable
* Assume user enter “c” to create create player command
* Assume user enter “g” to create set current player command
* Assume user enter “a” to create add hero command
* Assume user enter “m” to create call hero skill command
* Assume user enter “d” to create delete hero command
* Assume user enter “s” to create show player detail command
* Assume user enter “p” to create display all players command
* Assume user enter “t” to create change player’s name command
* Assume user enter “u” to create undo command
* Assume user enter “r” to create redo command
* Assume user enter “l” to create list undo/redo list command
* Assume user enter “x” to create exit system command
* Can not create hero if no player
* Exit command will initialize the programming data
* Only Warrior and Warlock hero types are initially supported
* Only one Scanner instance is used for keyboard input

## Desgin

### Use restore specific method to undo in Memento

### The Command pattern is used for each game action (e.g., create player, add hero).

### The Factory pattern handles the creation of command

### The Open Closed Principle is followed to allow easy extension of hero types.

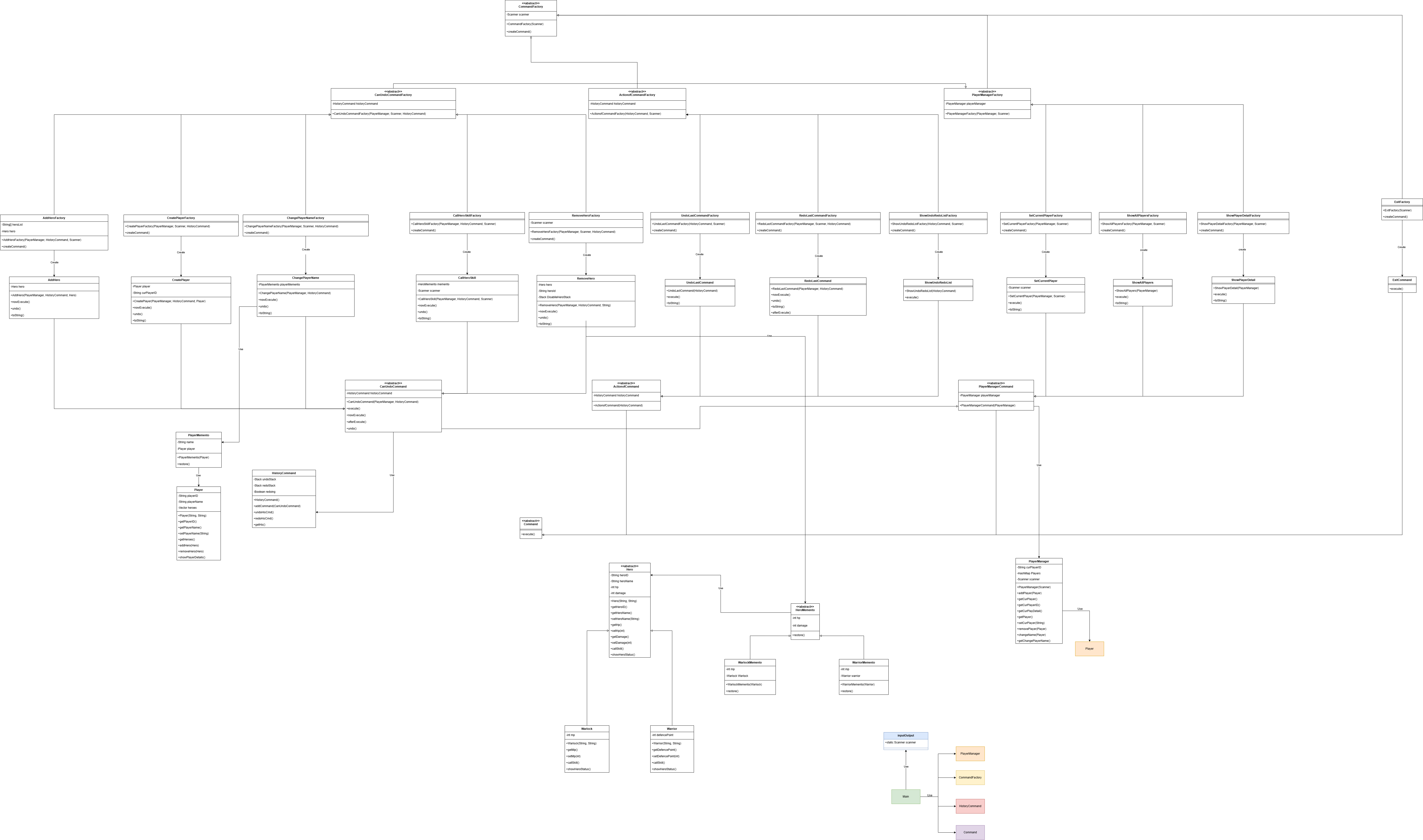
### Each command has a unique class to handle its specific functionality.

### Commands are executed sequentially, with an option to queue undo/redo operations.

# Application design with class diagram

**一張含有 文字, 螢幕擷取畫面, 圖表, 字型 的圖片

自動產生的描述**

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# Discussion and explanation on each of the design patterns applied to the application

## Abstract Factory Pattern

**Abstract Factory** is a creational design pattern that lets you produce families of related objects without specifying their concrete classes

**Abstract Factory:**

|  |  |
| --- | --- |
| CommandFactory | |
| PlayerManagerFactory | ActionofCommandFactory |
| CanUndoCommandFactory |  |
| PlayerFactory | |
| Hero Factory | |

**ConcreateFactory:**

|  |  |  |
| --- | --- | --- |
| **Class** | **SubClass** | **Product** |
| CommandFactory | ExitFactory | ExitCommand |
| PlayerManagerFactory | SetCurrentPlayerFactory  ShowAllPlayersFactory  ShowPlayerDetailFactory | SetCurrentPlayer  ShowAllPlayers  ShowPlayerDetail |
| ActionofCommandFactory | ShowUndoRedoListFactory  UndoLastCommandFactory  RedoLastCommandFactory | ShowUndoRedoList  UndoLastCommand |
| CanUndoCommandFactory | AddHeroFactory  CallHeroSkillFactory  ChangePlayerNameFactory  CreatePlayerFactory | AddHero  CallHeroSkill  ChangePlayerName  CreatePlayer  RedoLastCommand |
| PlayerFactory |  | Player |
| HeroFactory |  | Warrior,Warlock |

## Command Pattern:

**Command** is a behavioral design pattern that turns a request into a stand-alone object that contains all information about the request. This transformation lets you pass requests as a method arguments, delay or queue a request’s execution, and support undoable operations.

Invoker:Main class excute command from factory

Receiver:Player,Hero class udpdate the data from command pattern request

**Abstract Command:**

|  |  |
| --- | --- |
| Command | |
| CanUndoCommand | ActionofCommand |
| PlayerManagerCommand |  |

**Concreate Command:**

|  |  |
| --- | --- |
| **Abstract Class** | **Sub Class** |
| Command | Exit command |
| CanUndoCommand | AddHero  CallHeroSkill  ChangePlayerName  CreatePlayer  RedoLastCommand  RemoveHero |
| ActionofCommand | ShowUndoRedoList  UndoLastCommand |
| PlayerManagerCommand | SetCurrentPlayer  ShowAllPlayers  ShowPlayerDetail |

# Test Plan and Test Cases

Test Function:

Add Hero:

|  |
| --- |
|  |
| Error handle: |
|  |

Call Hero Skill:

|  |
| --- |
|  |
| Error handle: |
|  |

Change Player Name:

|  |
| --- |
|  |
| Error handle: |
|  |

Create Player:

|  |
| --- |
|  |
| Error handle: |
|  |

Exit System:

|  |
| --- |
|  |

Redo Last Command

|  |
| --- |
|  |
| Error Handle: |
|  |

Remove Hero:

|  |
| --- |
|  |
| Error Handle: |
|  |

Set Current Player:

|  |
| --- |
|  |
| Error Handle: |
|  |

Show All Players:

|  |
| --- |
|  |

Show current Player details:

|  |
| --- |
|  |
| Error Handle: |
|  |

Show Undo/Redo List

|  |
| --- |
|  |

Undo Last Command:

|  |
| --- |
|  |
| Error Handle： |
|  |

Test Case 1:

|  |
| --- |
| c  1  Kenlau number1  c  2  Kenlau number2  g  1  a  H1,Kenlau's number 1 hero 1  1  a  H2,Kenlau's number 1 hero 2  2  p  g  2  a  H3,Kenlau's number 2 hero  1  m  H3  u  u  l  p  s  r  s  p  g  1  s  g  2  s  t  1  kenlau number 1 new name  p  x |
| Same as expected result |
| Fantastic World (FW)  c = create player, g = set current player, a = add hero, m = call hero skill, d = delete hero, s = show player, p = display all players, t = change player's name, u = undo, r = redo, l = list undo/redo, x = exit system  Please enter command [ c | g | a | m | d | s | p | t | u | r | l | x ] :-c  1  Kenlau number1  c  2  Kenlau number2  g  1  a  Player ID:Player Name:  Fantastic World (FW)  c = create player, g = set current player, a = add hero, m = call hero skill, d = delete hero, s = show player, p = display all players, t = change player's name, u = undo, r = redo, l = list undo/redo, x = exit system  The Current Player is ID: 1 Name: Kenlau number1  Please enter command [ c | g | a | m | d | s | p | t | u | r | l | x ] :-Player ID:Player Name:  Fantastic World (FW)  c = create player, g = set current player, a = add hero, m = call hero skill, d = delete hero, s = show player, p = display all players, t = change player's name, u = undo, r = redo, l = list undo/redo, x = exit system  The Current Player is ID: 2 Name: Kenlau number2  Please enter command [ c | g | a | m | d | s | p | t | u | r | l | x ] :-Please input player ID:-  Changed current player to 1  Fantastic World (FW)  c = create player, g = set current player, a = add hero, m = call hero skill, d = delete hero, s = show player, p = display all players, t = change player's name, u = undo, r = redo, l = list undo/redo, x = exit system  The Current Player is ID: 1 Name: Kenlau number1  Please enter command [ c | g | a | m | d | s | p | t | u | r | l | x ] :-Please input hero information (id, name):-H1,Kenlau's number 1 hero 1  1  a  Hero Type (1 = Warrior | 2 = Warlock ):-Hero ID: H1 Hero Name: Kenlau's number 1 hero 1is created  Fantastic World (FW)  c = create player, g = set current player, a = add hero, m = call hero skill, d = delete hero, s = show player, p = display all players, t = change player's name, u = undo, r = redo, l = list undo/redo, x = exit system  The Current Player is ID: 1 Name: Kenlau number1  Please enter command [ c | g | a | m | d | s | p | t | u | r | l | x ] :-Please input hero information (id, name):-H2,Kenlau's number 1 hero 2  2  p  g  2  a  H3,Kenlau's number 2 hero  1  m  H3  u  Hero Type (1 = Warrior | 2 = Warlock ):-Hero ID: H2 Hero Name: Kenlau's number 1 hero 2is created  Fantastic World (FW)  c = create player, g = set current player, a = add hero, m = call hero skill, d = delete hero, s = show player, p = display all players, t = change player's name, u = undo, r = redo, l = list undo/redo, x = exit system  The Current Player is ID: 1 Name: Kenlau number1  Please enter command [ c | g | a | m | d | s | p | t | u | r | l | x ] :-Player ID: 1, Player Name: Kenlau number1  Player ID: 2, Player Name: Kenlau number2  Fantastic World (FW)  c = create player, g = set current player, a = add hero, m = call hero skill, d = delete hero, s = show player, p = display all players, t = change player's name, u = undo, r = redo, l = list undo/redo, x = exit system  The Current Player is ID: 1 Name: Kenlau number1  Please enter command [ c | g | a | m | d | s | p | t | u | r | l | x ] :-Please input player ID:-  Changed current player to 2  Fantastic World (FW)  c = create player, g = set current player, a = add hero, m = call hero skill, d = delete hero, s = show player, p = display all players, t = change player's name, u = undo, r = redo, l = list undo/redo, x = exit system  The Current Player is ID: 2 Name: Kenlau number2  Please enter command [ c | g | a | m | d | s | p | t | u | r | l | x ] :-Please input hero information (id, name):-Hero Type (1 = Warrior | 2 = Warlock ):-Hero ID: H3 Hero Name: Kenlau's number 2 herois created  Fantastic World (FW)  c = create player, g = set current player, a = add hero, m = call hero skill, d = delete hero, s = show player, p = display all players, t = change player's name, u = undo, r = redo, l = list undo/redo, x = exit system  The Current Player is ID: 2 Name: Kenlau number2  Please enter command [ c | g | a | m | d | s | p | t | u | r | l | x ] :-Please input the hero ID:Hero status before calling the skill:  H3, Kenlau's number 2 hero, Warrior, Hp: 500, Damage: 0, Defence Point: 500  Hero status after calling the skill:  H3, Kenlau's number 2 hero, Warrior, Hp: 500, Damage: 250, Defence Point: 400  Fantastic World (FW)  c = create player, g = set current player, a = add hero, m = call hero skill, d = delete hero, s = show player, p = display all players, t = change player's name, u = undo, r = redo, l = list undo/redo, x = exit system  The Current Player is ID: 2 Name: Kenlau number2  Please enter command [ c | g | a | m | d | s | p | t | u | r | l | x ] :-  Fantastic World (FW)  c = create player, g = set current player, a = add hero, m = call hero skill, d = delete hero, s = show player, p = display all players, t = change player's name, u = undo, r = redo, l = list undo/redo, x = exit system  The Current Player is ID: 2 Name: Kenlau number2  Please enter command [ c | g | a | m | d | s | p | t | u | r | l | x ] :-u  l  p  s  r  s  Fantastic World (FW)  c = create player, g = set current player, a = add hero, m = call hero skill, d = delete hero, s = show player, p = display all players, t = change player's name, u = undo, r = redo, l = list undo/redo, x = exit system  The Current Player is ID: 2 Name: Kenlau number2  Please enter command [ c | g | a | m | d | s | p | t | u | r | l | x ] :-Undo Stack:  Command:Create Player  Command:Create Player  Command:Add Hero  Command:Add Hero  Redo Stack:  Command:Call Hero Skill  Command:Add Hero  Fantastic World (FW)  c = create player, g = set current player, a = add hero, m = call hero skill, d = delete hero, s = show player, p = display all players, t = change player's name, u = undo, r = redo, l = list undo/redo, x = exit system  The Current Player is ID: 2 Name: Kenlau number2  Please enter command [ c | g | a | m | d | s | p | t | u | r | l | x ] :-Player ID: 1, Player Name: Kenlau number1  Player ID: 2, Player Name: Kenlau number2  Fantastic World (FW)  c = create player, g = set current player, a = add hero, m = call hero skill, d = delete hero, s = show player, p = display all players, t = change player's name, u = undo, r = redo, l = list undo/redo, x = exit system  The Current Player is ID: 2 Name: Kenlau number2  Please enter command [ c | g | a | m | d | s | p | t | u | r | l | x ] :-Player Name: Kenlau number2  Hero List:  Fantastic World (FW)  c = create player, g = set current player, a = add hero, m = call hero skill, d = delete hero, s = show player, p = display all players, t = change player's name, u = undo, r = redo, l = list undo/redo, x = exit system  The Current Player is ID: 2 Name: Kenlau number2  Please enter command [ c | g | a | m | d | s | p | t | u | r | l | x ] :-  Fantastic World (FW)  c = create player, g = set current player, a = add hero, m = call hero skill, d = delete hero, s = show player, p = display all players, t = change player's name, u = undo, r = redo, l = list undo/redo, x = exit system  The Current Player is ID: 2 Name: Kenlau number2  Please enter command [ c | g | a | m | d | s | p | t | u | r | l | x ] :-Player Name: Kenlau number2  Hero List:  H3, Kenlau's number 2 hero, Warrior, Hp: 500, Damage: 0, Defence Point: 500  Fantastic World (FW)  c = create player, g = set current player, a = add hero, m = call hero skill, d = delete hero, s = show player, p = display all players, t = change player's name, u = undo, r = redo, l = list undo/redo, x = exit system  The Current Player is ID: 2 Name: Kenlau number2  Please enter command [ c | g | a | m | d | s | p | t | u | r | l | x ] :-Invalid command!(Main 53)  Fantastic World (FW)  c = create player, g = set current player, a = add hero, m = call hero skill, d = delete hero, s = show player, p = display all players, t = change player's name, u = undo, r = redo, l = list undo/redo, x = exit system  The Current Player is ID: 2 Name: Kenlau number2  Please enter command [ c | g | a | m | d | s | p | t | u | r | l | x ] :-Invalid command!(Main 53)  Fantastic World (FW)  c = create player, g = set current player, a = add hero, m = call hero skill, d = delete hero, s = show player, p = display all players, t = change player's name, u = undo, r = redo, l = list undo/redo, x = exit system  The Current Player is ID: 2 Name: Kenlau number2  Please enter command [ c | g | a | m | d | s | p | t | u | r | l | x ] :-p  Player ID: 1, Player Name: Kenlau number1  Player ID: 2, Player Name: Kenlau number2  Fantastic World (FW)  c = create player, g = set current player, a = add hero, m = call hero skill, d = delete hero, s = show player, p = display all players, t = change player's name, u = undo, r = redo, l = list undo/redo, x = exit system  The Current Player is ID: 2 Name: Kenlau number2  Please enter command [ c | g | a | m | d | s | p | t | u | r | l | x ] :-g  Please input player ID:-  1  Changed current player to 1  Fantastic World (FW)  c = create player, g = set current player, a = add hero, m = call hero skill, d = delete hero, s = show player, p = display all players, t = change player's name, u = undo, r = redo, l = list undo/redo, x = exit system  The Current Player is ID: 1 Name: Kenlau number1  Please enter command [ c | g | a | m | d | s | p | t | u | r | l | x ] :-s  Player Name: Kenlau number1  Hero List:  H1, Kenlau's number 1 hero 1, Warrior, Hp: 500, Damage: 0, Defence Point: 500  H2, Kenlau's number 1 hero 2, Warlock, Hp: 100, Damage: 200, Mp: 500  Fantastic World (FW)  c = create player, g = set current player, a = add hero, m = call hero skill, d = delete hero, s = show player, p = display all players, t = change player's name, u = undo, r = redo, l = list undo/redo, x = exit system  The Current Player is ID: 1 Name: Kenlau number1  Please enter command [ c | g | a | m | d | s | p | t | u | r | l | x ] :-g  Please input player ID:-  2  Changed current player to 2  Fantastic World (FW)  c = create player, g = set current player, a = add hero, m = call hero skill, d = delete hero, s = show player, p = display all players, t = change player's name, u = undo, r = redo, l = list undo/redo, x = exit system  The Current Player is ID: 2 Name: Kenlau number2  Please enter command [ c | g | a | m | d | s | p | t | u | r | l | x ] :-s  Player Name: Kenlau number2  Hero List:  H3, Kenlau's number 2 hero, Warrior, Hp: 500, Damage: 0, Defence Point: 500  Fantastic World (FW)  c = create player, g = set current player, a = add hero, m = call hero skill, d = delete hero, s = show player, p = display all players, t = change player's name, u = undo, r = redo, l = list undo/redo, x = exit system  The Current Player is ID: 2 Name: Kenlau number2  Please enter command [ c | g | a | m | d | s | p | t | u | r | l | x ] :-t  Player ID:1  Please input new name of the current player:-Kenlau number 1 new name  Player’s name is updated.  Fantastic World (FW)  c = create player, g = set current player, a = add hero, m = call hero skill, d = delete hero, s = show player, p = display all players, t = change player's name, u = undo, r = redo, l = list undo/redo, x = exit system  The Current Player is ID: 2 Name: Kenlau number2  Please enter command [ c | g | a | m | d | s | p | t | u | r | l | x ] :-p  Player ID: 1, Player Name: Kenlau number 1 new name  Player ID: 2, Player Name: Kenlau number2  Fantastic World (FW)  c = create player, g = set current player, a = add hero, m = call hero skill, d = delete hero, s = show player, p = display all players, t = change player's name, u = undo, r = redo, l = list undo/redo, x = exit system  The Current Player is ID: 2 Name: Kenlau number2  Please enter command [ c | g | a | m | d | s | p | t | u | r | l | x ] :-x  Exiting the game...  PS C:\Users\ku123\Desktop\Google Drive\ITP4507Assignment> ^C  PS C:\Users\ku123\Desktop\Google Drive\ITP4507Assignment>  PS C:\Users\ku123\Desktop\Google Drive\ITP4507Assignment> c:; cd 'c:\Users\ku123\Desktop\Google Drive\ITP4507Assignment'; & 'C:\Program Files\Java\jdk-21\bin\java.exe' '-XX:+ShowCodeDetailsInExceptionMessages' '-cp' 'C:\Users\ku123\AppData\Roaming\Code\User\workspaceStorage\ae087d0ead6759d752baa6fa45b11ba4\redhat.java\jdt\_ws\ITP4507Assignment\_c3616827\bin' 'Main'  Fantastic World (FW)  c = create player, g = set current player, a = add hero, m = call hero skill, d = delete hero, s = show player, p = display all players, t = change player's name, u = undo, r = redo, l = list undo/redo, x = exit system  Please enter command [ c | g | a | m | d | s | p | t | u | r | l | x ] :-c  1  Kenlau number1  c  2  Kenlau number2  g  1  a  Player ID:Player Name:  Fantastic World (FW)  c = create player, g = set current player, a = add hero, m = call hero skill, d = delete hero, s = show player, p = display all players, t = change player's name, u = undo, r = redo, l = list undo/redo, x = exit system  The Current Player is ID: 1 Name: Kenlau number1  Please enter command [ c | g | a | m | d | s | p | t | u | r | l | x ] :-Player ID:Player Name:  Fantastic World (FW)  c = create player, g = set current player, a = add hero, m = call hero skill, d = delete hero, s = show player, p = display all players, t = change player's name, u = undo, r = redo, l = list undo/redo, x = exit system  The Current Player is ID: 2 Name: Kenlau number2  Please enter command [ c | g | a | m | d | s | p | t | u | r | l | x ] :-Please input player ID:-  Changed current player to 1  Fantastic World (FW)  c = create player, g = set current player, a = add hero, m = call hero skill, d = delete hero, s = show player, p = display all players, t = change player's name, u = undo, r = redo, l = list undo/redo, x = exit system  The Current Player is ID: 1 Name: Kenlau number1  Please enter command [ c | g | a | m | d | s | p | t | u | r | l | x ] :-Please input hero information (id, name):-H1,Kenlau's number 1 hero 1  1  a  H2,Kenlau's number 1 hero 2  2  p  g  2  a  H3,Kenlau's number 2 hero  1  m  H3  u  u  l  p  s  r  s  p  g  1  s  g  2  s  t  1  Hero Type (1 = Warrior | 2 = Warlock ):-Hero ID: H1 Hero Name: Kenlau's number 1 hero 1is created  Fantastic World (FW)  c = create player, g = set current player, a = add hero, m = call hero skill, d = delete hero, s = show player, p = display all players, t = change player's name, u = undo, r = redo, l = list undo/redo, x = exit system  The Current Player is ID: 1 Name: Kenlau number1  Please enter command [ c | g | a | m | d | s | p | t | u | r | l | x ] :-Please input hero information (id, name):-Hero Type (1 = Warrior | 2 = Warlock ):-Hero ID: H2 Hero Name: Kenlau's number 1 hero 2is created  Fantastic World (FW)  c = create player, g = set current player, a = add hero, m = call hero skill, d = delete hero, s = show player, p = display all players, t = change player's name, u = undo, r = redo, l = list undo/redo, x = exit system  The Current Player is ID: 1 Name: Kenlau number1  Please enter command [ c | g | a | m | d | s | p | t | u | r | l | x ] :-Player ID: 1, Player Name: Kenlau number1  Player ID: 2, Player Name: Kenlau number2  Fantastic World (FW)  c = create player, g = set current player, a = add hero, m = call hero skill, d = delete hero, s = show player, p = display all players, t = change player's name, u = undo, r = redo, l = list undo/redo, x = exit system  The Current Player is ID: 1 Name: Kenlau number1  Please enter command [ c | g | a | m | d | s | p | t | u | r | l | x ] :-Please input player ID:-  Changed current player to 2  Fantastic World (FW)  c = create player, g = set current player, a = add hero, m = call hero skill, d = delete hero, s = show player, p = display all players, t = change player's name, u = undo, r = redo, l = list undo/redo, x = exit system  The Current Player is ID: 2 Name: Kenlau number2  Please enter command [ c | g | a | m | d | s | p | t | u | r | l | x ] :-Please input hero information (id, name):-Hero Type (1 = Warrior | 2 = Warlock ):-Hero ID: H3 Hero Name: Kenlau's number 2 herois created  Fantastic World (FW)  c = create player, g = set current player, a = add hero, m = call hero skill, d = delete hero, s = show player, p = display all players, t = change player's name, u = undo, r = redo, l = list undo/redo, x = exit system  The Current Player is ID: 2 Name: Kenlau number2  Please enter command [ c | g | a | m | d | s | p | t | u | r | l | x ] :-Please input the hero ID:Hero status before calling the skill:  H3, Kenlau's number 2 hero, Warrior, Hp: 500, Damage: 0, Defence Point: 500  Hero status after calling the skill:  H3, Kenlau's number 2 hero, Warrior, Hp: 500, Damage: 250, Defence Point: 400  Fantastic World (FW)  c = create player, g = set current player, a = add hero, m = call hero skill, d = delete hero, s = show player, p = display all players, t = change player's name, u = undo, r = redo, l = list undo/redo, x = exit system  The Current Player is ID: 2 Name: Kenlau number2  Please enter command [ c | g | a | m | d | s | p | t | u | r | l | x ] :-  Fantastic World (FW)  c = create player, g = set current player, a = add hero, m = call hero skill, d = delete hero, s = show player, p = display all players, t = change player's name, u = undo, r = redo, l = list undo/redo, x = exit system  The Current Player is ID: 2 Name: Kenlau number2  Please enter command [ c | g | a | m | d | s | p | t | u | r | l | x ] :-  Fantastic World (FW)  c = create player, g = set current player, a = add hero, m = call hero skill, d = delete hero, s = show player, p = display all players, t = change player's name, u = undo, r = redo, l = list undo/redo, x = exit system  The Current Player is ID: 2 Name: Kenlau number2  Please enter command [ c | g | a | m | d | s | p | t | u | r | l | x ] :-Undo Stack:  Command:Create Player  Command:Create Player  Command:Add Hero  Command:Add Hero  Redo Stack:  Command:Call Hero Skill  Command:Add Hero  Fantastic World (FW)  c = create player, g = set current player, a = add hero, m = call hero skill, d = delete hero, s = show player, p = display all players, t = change player's name, u = undo, r = redo, l = list undo/redo, x = exit system  The Current Player is ID: 2 Name: Kenlau number2  Please enter command [ c | g | a | m | d | s | p | t | u | r | l | x ] :-Player ID: 1, Player Name: Kenlau number1  Player ID: 2, Player Name: Kenlau number2  Fantastic World (FW)  c = create player, g = set current player, a = add hero, m = call hero skill, d = delete hero, s = show player, p = display all players, t = change player's name, u = undo, r = redo, l = list undo/redo, x = exit system  The Current Player is ID: 2 Name: Kenlau number2  Please enter command [ c | g | a | m | d | s | p | t | u | r | l | x ] :-Player Name: Kenlau number2  Hero List:  Fantastic World (FW)  c = create player, g = set current player, a = add hero, m = call hero skill, d = delete hero, s = show player, p = display all players, t = change player's name, u = undo, r = redo, l = list undo/redo, x = exit system  The Current Player is ID: 2 Name: Kenlau number2  Please enter command [ c | g | a | m | d | s | p | t | u | r | l | x ] :-  Fantastic World (FW)  c = create player, g = set current player, a = add hero, m = call hero skill, d = delete hero, s = show player, p = display all players, t = change player's name, u = undo, r = redo, l = list undo/redo, x = exit system  The Current Player is ID: 2 Name: Kenlau number2  Please enter command [ c | g | a | m | d | s | p | t | u | r | l | x ] :-Player Name: Kenlau number2  Hero List:  H3, Kenlau's number 2 hero, Warrior, Hp: 500, Damage: 0, Defence Point: 500  Fantastic World (FW)  c = create player, g = set current player, a = add hero, m = call hero skill, d = delete hero, s = show player, p = display all players, t = change player's name, u = undo, r = redo, l = list undo/redo, x = exit system  The Current Player is ID: 2 Name: Kenlau number2  Please enter command [ c | g | a | m | d | s | p | t | u | r | l | x ] :-Player ID: 1, Player Name: Kenlau number1  Player ID: 2, Player Name: Kenlau number2  Fantastic World (FW)  c = create player, g = set current player, a = add hero, m = call hero skill, d = delete hero, s = show player, p = display all players, t = change player's name, u = undo, r = redo, l = list undo/redo, x = exit system  The Current Player is ID: 2 Name: Kenlau number2  Please enter command [ c | g | a | m | d | s | p | t | u | r | l | x ] :-Please input player ID:-  Changed current player to 1  Fantastic World (FW)  c = create player, g = set current player, a = add hero, m = call hero skill, d = delete hero, s = show player, p = display all players, t = change player's name, u = undo, r = redo, l = list undo/redo, x = exit system  The Current Player is ID: 1 Name: Kenlau number1  Please enter command [ c | g | a | m | d | s | p | t | u | r | l | x ] :-Player Name: Kenlau number1  Hero List:  H1, Kenlau's number 1 hero 1, Warrior, Hp: 500, Damage: 0, Defence Point: 500  H2, Kenlau's number 1 hero 2, Warlock, Hp: 100, Damage: 200, Mp: 500  Fantastic World (FW)  c = create player, g = set current player, a = add hero, m = call hero skill, d = delete hero, s = show player, p = display all players, t = change player's name, u = undo, r = redo, l = list undo/redo, x = exit system  The Current Player is ID: 1 Name: Kenlau number1  Please enter command [ c | g | a | m | d | s | p | t | u | r | l | x ] :-Please input player ID:-  Changed current player to 2  Fantastic World (FW)  c = create player, g = set current player, a = add hero, m = call hero skill, d = delete hero, s = show player, p = display all players, t = change player's name, u = undo, r = redo, l = list undo/redo, x = exit system  The Current Player is ID: 2 Name: Kenlau number2  Please enter command [ c | g | a | m | d | s | p | t | u | r | l | x ] :-Player Name: Kenlau number2  Hero List:  H3, Kenlau's number 2 hero, Warrior, Hp: 500, Damage: 0, Defence Point: 500  Fantastic World (FW)  c = create player, g = set current player, a = add hero, m = call hero skill, d = delete hero, s = show player, p = display all players, t = change player's name, u = undo, r = redo, l = list undo/redo, x = exit system  The Current Player is ID: 2 Name: Kenlau number2  Please enter command [ c | g | a | m | d | s | p | t | u | r | l | x ] :-Player ID:Please input new name of the current player:-kenlau number 1 new name  p  x  Player’s name is updated.  Fantastic World (FW)  c = create player, g = set current player, a = add hero, m = call hero skill, d = delete hero, s = show player, p = display all players, t = change player's name, u = undo, r = redo, l = list undo/redo, x = exit system  The Current Player is ID: 2 Name: Kenlau number2  Please enter command [ c | g | a | m | d | s | p | t | u | r | l | x ] :-Player ID: 1, Player Name: kenlau number 1 new name  Player ID: 2, Player Name: Kenlau number2  Fantastic World (FW)  c = create player, g = set current player, a = add hero, m = call hero skill, d = delete hero, s = show player, p = display all players, t = change player's name, u = undo, r = redo, l = list undo/redo, x = exit system  The Current Player is ID: 2 Name: Kenlau number2  Please enter command [ c | g | a | m | d | s | p | t | u | r | l | x ] :-Exiting the game... |

Test Case 2:

|  |
| --- |
| c  1  kenlau1  a  1,kenlau 1 hero  1  a  2,kenlau 2 hero 2  2  c  2  kenlau2  a  3,kenlau2 hero 2  1  l  u  u  u  r  r  r  s  g  1  s  x |
| Fantastic World (FW)  c = create player, g = set current player, a = add hero, m = call hero skill, d = delete hero, s = show player, p = display all players, t = change player's name, u = undo, r = redo, l = list undo/redo, x = exit system  Please enter command [ c | g | a | m | d | s | p | t | u | r | l | x ] :-c  1  kenlau1  a  1,kenlau 1 hero  1  a  Player ID:Player Name:  Fantastic World (FW)  c = create player, g = set current player, a = add hero, m = call hero skill, d = delete hero, s = show player, p = display all players, t = change player's name, u = undo, r = redo, l = list undo/redo, x = exit system  The Current Player is ID: 1 Name: kenlau1  Please enter command [ c | g | a | m | d | s | p | t | u | r | l | x ] :-Please input hero information (id, name):-Hero Type (1 = Warrior | 2 = Warlock ):-Hero ID: 1 Hero Name: kenlau 1 herois created  Fantastic World (FW)  c = create player, g = set current player, a = add hero, m = call hero skill, d = delete hero, s = show player, p = display all players, t = change player's name, u = undo, r = redo, l = list undo/redo, x = exit system  The Current Player is ID: 1 Name: kenlau1  Please enter command [ c | g | a | m | d | s | p | t | u | r | l | x ] :-Please input hero information (id, name):-2,kenlau 2 hero 2  2  c  2  kenlau2  a  3,kenlau2 hero 2  1  l  u  u  u  r  r  Hero Type (1 = Warrior | 2 = Warlock ):-Hero ID: 2 Hero Name: kenlau 2 hero 2is created  Fantastic World (FW)  c = create player, g = set current player, a = add hero, m = call hero skill, d = delete hero, s = show player, p = display all players, t = change player's name, u = undo, r = redo, l = list undo/redo, x = exit system  The Current Player is ID: 1 Name: kenlau1  Please enter command [ c | g | a | m | d | s | p | t | u | r | l | x ] :-Player ID:Player Name:  Fantastic World (FW)  c = create player, g = set current player, a = add hero, m = call hero skill, d = delete hero, s = show player, p = display all players, t = change player's name, u = undo, r = redo, l = list undo/redo, x = exit system  The Current Player is ID: 2 Name: kenlau2  Please enter command [ c | g | a | m | d | s | p | t | u | r | l | x ] :-Please input hero information (id, name):-Hero Type (1 = Warrior | 2 = Warlock ):-Hero ID: 3 Hero Name: kenlau2 hero 2is created  Fantastic World (FW)  c = create player, g = set current player, a = add hero, m = call hero skill, d = delete hero, s = show player, p = display all players, t = change player's name, u = undo, r = redo, l = list undo/redo, x = exit system  The Current Player is ID: 2 Name: kenlau2  Please enter command [ c | g | a | m | d | s | p | t | u | r | l | x ] :-Undo Stack:  Command:Create Player  Command:Add Hero  Command:Add Hero  Command:Create Player  Command:Add Hero  Redo Stack:  Fantastic World (FW)  c = create player, g = set current player, a = add hero, m = call hero skill, d = delete hero, s = show player, p = display all players, t = change player's name, u = undo, r = redo, l = list undo/redo, x = exit system  The Current Player is ID: 2 Name: kenlau2  Please enter command [ c | g | a | m | d | s | p | t | u | r | l | x ] :-  Fantastic World (FW)  c = create player, g = set current player, a = add hero, m = call hero skill, d = delete hero, s = show player, p = display all players, t = change player's name, u = undo, r = redo, l = list undo/redo, x = exit system  The Current Player is ID: 2 Name: kenlau2  Please enter command [ c | g | a | m | d | s | p | t | u | r | l | x ] :-  Fantastic World (FW)  c = create player, g = set current player, a = add hero, m = call hero skill, d = delete hero, s = show player, p = display all players, t = change player's name, u = undo, r = redo, l = list undo/redo, x = exit system  Please enter command [ c | g | a | m | d | s | p | t | u | r | l | x ] :-  Fantastic World (FW)  c = create player, g = set current player, a = add hero, m = call hero skill, d = delete hero, s = show player, p = display all players, t = change player's name, u = undo, r = redo, l = list undo/redo, x = exit system  Please enter command [ c | g | a | m | d | s | p | t | u | r | l | x ] :-  Fantastic World (FW)  c = create player, g = set current player, a = add hero, m = call hero skill, d = delete hero, s = show player, p = display all players, t = change player's name, u = undo, r = redo, l = list undo/redo, x = exit system  Please enter command [ c | g | a | m | d | s | p | t | u | r | l | x ] :-  Fantastic World (FW)  c = create player, g = set current player, a = add hero, m = call hero skill, d = delete hero, s = show player, p = display all players, t = change player's name, u = undo, r = redo, l = list undo/redo, x = exit system  The Current Player is ID: 2 Name: kenlau2  Please enter command [ c | g | a | m | d | s | p | t | u | r | l | x ] :-r  s  g  1  s  x  Fantastic World (FW)  c = create player, g = set current player, a = add hero, m = call hero skill, d = delete hero, s = show player, p = display all players, t = change player's name, u = undo, r = redo, l = list undo/redo, x = exit system  The Current Player is ID: 2 Name: kenlau2  Please enter command [ c | g | a | m | d | s | p | t | u | r | l | x ] :-Player Name: kenlau2  Hero List:  3, kenlau2 hero 2, Warrior, Hp: 500, Damage: 0, Defence Point: 500  Fantastic World (FW)  c = create player, g = set current player, a = add hero, m = call hero skill, d = delete hero, s = show player, p = display all players, t = change player's name, u = undo, r = redo, l = list undo/redo, x = exit system  The Current Player is ID: 2 Name: kenlau2  Please enter command [ c | g | a | m | d | s | p | t | u | r | l | x ] :-Please input player ID:-  Changed current player to 1  Fantastic World (FW)  c = create player, g = set current player, a = add hero, m = call hero skill, d = delete hero, s = show player, p = display all players, t = change player's name, u = undo, r = redo, l = list undo/redo, x = exit system  The Current Player is ID: 1 Name: kenlau1  Please enter command [ c | g | a | m | d | s | p | t | u | r | l | x ] :-Player Name: kenlau1  Hero List:  1, kenlau 1 hero, Warrior, Hp: 500, Damage: 0, Defence Point: 500  2, kenlau 2 hero 2, Warlock, Hp: 100, Damage: 200, Mp: 500  Fantastic World (FW)  c = create player, g = set current player, a = add hero, m = call hero skill, d = delete hero, s = show player, p = display all players, t = change player's name, u = undo, r = redo, l = list undo/redo, x = exit system  The Current Player is ID: 1 Name: kenlau1  Please enter command [ c | g | a | m | d | s | p | t | u | r | l | x ] :-Exiting the game... |
| Same as result |

# Well documented Source Code