**CP Election Documentation**

**Created by**

Niti Assavaplakorn 6031031221

Natchapol Srisang 6031308121

**2110215 Programming Methodology**

**Semester 1 Academic Year 2018**

**Chulalongkorn University**

**CP Election Documentation**

**Introduction**

CP Election is a single player survival game. The goal is to fight against NPCs and finally beat the boss of the game. In addition to normal attack, the player can use various types of helpful(?) items dropped from NPCs to make the game easier.

**Implementation Details**

**\* Noted that Access Modifier can be listed below**

+ (public)

# (protected)

- (private)

Underlined (static)

*Italic (abstract)*

**1. Package application**

1.1. Class Main

1.1.1. Fields

|  |  |
| --- | --- |
| - Stage stage | Store the start stage. |
| - StartScene startScene | Store the start scene. |
| - Scene instructions | Store the instruction scene. |
| - Scene gameScene | Store the game scene. |

1.1.2. Methods

|  |  |
| --- | --- |
| + void main(String[] args) | Launch the game. |
| + void start(Stage primaryStage) | The main entry point of JavaFX application. |
| + void setCenter() | Set the stage at the center of screen. |
| Getters of every fields & setter of startScene |  |

**2. Package constants**

2.1. Enum CCType (NONE, STUN, SLOW, SILENCE)

This enum contains all crowd control (CC) status types.

2.2. Class Images

This class contains all images.

2.2.1. Fields

|  |  |
| --- | --- |
| + Image startscreen | Store the image start screen background |
| + Image playbutton | Store the image playbutton on start screen, set width to 100 and height to 30 |
| + Image playbutton\_hilight | Store the image playbutton with highlight on start screen, set width to 100 and height to 30 |
| + Image info | Store the image info button on start screen |
| + Image instruction1 | Store the image of instruction page 1 |
| + Image instruction2 | Store the image of instruction page 2 |
| + Image button | Store the image backbutton on instruction screen, set width to 100 and height to 66 |
| + Image button\_highlight | Store the image backbutton with highlight on instruction screen, set width to 100 and height to 66 |
| + Image deadscreen | Store the image dead screen background |
| + Image quit | Store the image quit button on dead screen |
| + Image stage | Store the image background map, set width to 1000 and height to 667 |
| + Image playerL | Store the player left side image, set width to 66 and set height to 100 |
| + Image playerR | Store the player right side image, set width to 66 and set height to 100 |
| + Image soldierL | Store the npc left side image, set width to 66 and set height to 100 |
| + Image soldierR | Store the npc right side image, set width to 66 and set height to 100 |
| + Image prayutL | Store the boss prayut left side image |
| + Image prayutR | Store the boss prayut right side image |
| + Image prawitL | Store the boss prawit left side image |
| + Image prawitR | Store the boss prawit right side image |
| + Image podiumL | Store the podium left side image |
| + Image podiumR | Store the podium right side image |
| + Image status bar | Store the status bar image |
| + Image heal | Store the heal item image, set width to 40 and set height to 40 |
| + Image attack | Store the attack item image, set width to 40 and set height to 40 |
| + Image cc | Store the cc item image, set width to 40 and set height to 40 |
| + Image revive | Store the revive item image, set width to 40 and set height to 40 |
| + Image immune | Store the immune item image, set width to 60 and set height to 60 |
| + Image immuneEffect | Store the immune effect image, set width to 110 and set height to 110 |
| + Image[] normalAttackEffect | Store images of normal attacking effect |
| + Image[] healEffect | Store images of healing effect |
| + Image[] stunEffect | Store images of stunned effect |
| + Image[] slowEffect | Store images of slowed effect |
| + Image[] silenceEffect | Store images of silenced effect |
| + Image[] reviveEffect | Store images of reviving effect |

2.2.1. Fields

Set normalAttackEffect, healEffect, stunEffect, slowEffect, silenceEffect, reviveEffect image to array of each variables with ordered.

2.3. Class Sounds

This class contains all sounds.

2.3.1. Fields

|  |  |
| --- | --- |
|  |  |

**3. Package controller**

3.1. Class GameManager

3.1.1. Fields

|  |  |
| --- | --- |
| - GameManager instance = new GameManager() | Static object of GameManager |
| - boolean isGameRunning | True if the game is running |
| - List<Map> maps | List of all maps |
| - Player player | Game’s player |

3.2. Class MonsterAi

3.2.1. Fields

|  |  |
| --- | --- |
|  |  |

3.3. Class MonsterGen

3.3.1. Fields

|  |  |
| --- | --- |
|  |  |

**4. Package exception**

This package contains all exceptions.

4.1. CannotAttackException

This exception is thrown when Character cannot attack.

4.2. CannotMoveException

This exception is thrown when Character cannot move.

4.3. CannotUseItemException

This exception is thrown when Character cannot use item.

4.4. InventoryFullException

This exception is thrown when Player’s inventory is full.

4.5. InventoryEmptyIndexException

This exception is thrown when Player tries to use item that player does not have.

4.6. ItemTypeNoExistException

This exception is thrown when Player tries to use item that type does not exist in the game.

**5. Package input**

5.1. Class KeyInput

This class contains all input keys available in the game.

5.1.1. Fields

|  |  |
| --- | --- |
| - Set<KeyCode> activeKeys | Store the start stage. |
| - Queue<KeyCode> triggerkeys | Store the start scene. |
| - final Set<KeyCode> UNPOLLABLE\_KEYS | Store the instruction scene. |

5.1.2. Methods

|  |  |
| --- | --- |
| - void addKey(KeyCode code) |  |
| - void removeKey(Keycode code) |  |
| + boolean pressingKey(KeyCode code) |  |
| + void clear() |  |
| + boolean isPollAvailable() |  |
| + KeyCode pollKey() |  |
| + void bindScene(Scene scene) |  |

**6. Package model**

6.1. Interface IUpdatable

This interface is for entities that need to be updated.

6.1.1. Methods

|  |  |
| --- | --- |
| + void update() |  |

6.2. Interface IUseable

This interface is for entities that can be used.

6.2.1. Methods

|  |  |
| --- | --- |
| + void use() |  |

6.3. Interface IMoveable

This interface is for entities that can be moved.

6.3.1. Methods

|  |  |
| --- | --- |
| + void move() |  |

6.4. Class Frame

This class is frames of every entities in the game.

6.4.1. Fields

|  |  |
| --- | --- |
| # double posX | x-coordinate of the frame, start from left to right |
| # double posY | y-coordinate of the frame, start from top to bottom |
| # double width | Width of the frame |
| # double height | Height of the frame |

6.4.2. Constructor

|  |  |
| --- | --- |
| + Frame(double posX, double poxY, double width, double height) | Initialize every fields. |

6.3.3. Methods

|  |  |
| --- | --- |
| + boolean isCollideWith(Frame f) | Return true if this frame collides with frame f, otherwise false. |
| Getters & Setters of every fields |  |

*6.5. Class Entity*

This class represents every entities in the game.

6.5.1. Fields

|  |  |
| --- | --- |
| # String name | Entity’s name |
| - Image image | Entity’s image |

6.5.2. Constructor

|  |  |
| --- | --- |
| + Entity(double posX, double posY, double width, double height, String name, Image image) | Initialize every fields. |

6.5.3. Methods

|  |  |
| --- | --- |
| + void render(GraphicContext gc) | Render the entity at coordinate (posX, posY) relative to the screen. |
| Getters of every fields & setter of image |  |

*6.6. Class MoveableEntity*

This class represents every moveable entities of the game.

6.6.1. Fields

|  |  |
| --- | --- |
| + final int LEFT = -1 | Static values that represent the entity’s facing direction |
| + final int RIGHT = 1 |
| # double speedX | Speed in x-axis |
| # double speedY | Speed in y-axis |
| # int facing | Entity’s facing direction (LEFT or RIGHT) |
| - Image imageL | Image when entity is facing left |
| - Image imageR | Image when entity is facing right |

6.6.2. Constructors

|  |  |
| --- | --- |
| + MovableEntity(double posX, double posY, String name, Image imageL, Image imageR) | Initialize every fields, with width and height of the object equal to the width and height of imageL respectively, image is null, and is facing right. |

6.6.3. Methods

|  |  |
| --- | --- |
| + void render(GraphicContext gc) | Render the entity at coordinate (posX, posY) relative to the screen. |
| + void move() | Move the entity. |
| + void setFacing(int facing) | Set facing direction of the entity, and change the image that corresponds to the direction |
| Getters of every fields except facing, and images & Setters of speedX, speedY |  |

*6.7. Class Character*

This class represents every characters of the game, including player and NPCs.

6.7.1. Fields

|  |  |
| --- | --- |
| # int hp | Character’s health point |
| # int maxHp | Character’s maximum health point |
| # int minAtk | Character’s minimum attack point |
| # int maxAtk | Character’s maximum attack point |
| # int def | Character’s defense point |
| # CCType status | CC effect applied to the character (default is NONE) |
| # HpBar hpBar | Character’s health bar |
| - int animationTick | Frame counter for rendering animation (start from 0). |
| - int attackTick | Attack frame counter count since last attack frame (start from 0). |
| - int attackCooldown | The number of frame for character to be able to attack again. |
| - int ccedTick | CC frame counter since last CC applied frame (start from 0). |
| - int ccedDuration | The number of frames which CC is applied |
| - boolean isReviveAnimating | True if rendering revive animation (default is false) |
| - boolean isHealAnimating | True if rendering heal animation (default is false) |
| - boolean isAttacking | True if the attack is cooling down, otherwise false. |

6.7.2. Constructors

|  |  |
| --- | --- |
| + Character(double posX, double posY, String name, Image imageL, Image imageR, int maxHp, int atk, int def, int attackCooldown) | Initialize every fields. |

6.7.3. Methods

|  |  |
| --- | --- |
| + boolean isDead() | Return true if the character is dead, otherwise false. |
| + boolean canAttack() | Return true if the character can attack, otherwise false. |
| + boolean canMove() | Return true if the character can move, otherwise false. |
| + boolean isCCed() | Return true if the character was applied CC effect, otherwise false. |
| + boolean isStunned() | Return true if the character is stunned, otherwise false. |
| + boolean isSlowed() | Return true if the character is slowed, otherwise false. |
| + boolean isSilenced() | Return true if the character is silenced, otherwise false. |
| + int getDamage() | Return random damage between minAtk and maxAtk |
| + boolean takeDamage(int damage) | Called when the character is damaged. The damage is reduced by defense point. Return true if the character took damage (damage is more than 0), otherwise false. |
| + void resetAttackTick() | Reset attackTick back to 0. |
| + void addAttackTick() | Increase attackTick by 1. If attackTick equals to attackCooldown, reset attackTick and allow the character to attack. |
| + void resetCCedTick() | Reset ccedTick back to 0. |
| + void addCCedTick() | Increase ccedTick by 1. If ccedTick equals to ccedDuration, reset ccedTick and reset CC effect of the character. |
| + void resetAnimationTick() | Reset animationTick back to 0. |
| + void addAnimationTick() | Increase animationTick by 1. If animationTick equals to 59, reset animationTick and reset all animations. |
| + void renderNormalAttack(GraphicContext gc) | Render normal attack animation. |
| + void renderStatusEffect(GraphicContext gc) | Render CC effect of character. |
| + void renderHealEffect(GraphicContext gc) | Render heal effect. |
| + void renderReviveEffect(GraphicContext gc) | Render revive effect. |
| + *void attack()* | *Throws CannotAttackException* |
| + *void dead()* |  |
| Getters of hp, maxHp, isAttacking, isReviveAnimating, and isHealAnimating & setters of status, isAttacking, isReviveAnimating, isHealAnimating, and ccedDuration |  |

**7. Package model.item**

*7.1. Class Item*

7.1.1. Fields

|  |  |
| --- | --- |
| - int count | Item counter (start from 0) |
| - int maxCount | Maximum number of item that can be collected |
| - final int expireTime = 300 | The expire frame count since dropped |
| - int expireTick | Expire frame counter since dropped |

7.1.2. Constructors

|  |  |
| --- | --- |
| + Item(String name, int maxCount, Image image) | Initialize every fields with posX = 0 and posY = 0. |
| + Item(String name, int maxCount, Image image, double posX, double posY) | Initialize every fields. |

7.1.3. Methods

|  |  |
| --- | --- |
| + boolean isExpired() | Return true if the item is iexpired, otherwise false. |
| + addCount(int count) | Add the number of the item by the parameter if not exceeding maxCount. Return true if successfully add count, otherwise false. |
| + void addExpireTick() | Increase expireTick by 1. |
| + void update() | Update expireTick. |
| + void use() | Activate the item if exists. Reduce count if activated successfully. |
| + *boolean activate()* | *Activate the item, return true if activated successfully, otherwise false.* |
| + void render(GraphicContext gc) | Render the item. |
| Getter of count |  |

7.2. Class AttackItem

7.2.1. Fields

|  |  |
| --- | --- |
| - final int minDamage = 75 | Minimum damage of item |
| - final int maxDamage = 150 | Maximum damage of item |

7.2.2. Constructors

|  |  |
| --- | --- |
| + AttackItem() | Initialize every fields with following value:  - name = “Attack Item”  - maxCount = 5  - image = Images.attack  - posX = 0  - posY = 0 |
| + AttackItem(double posX, double posY) | Initialize every fields with following value:  - name = “Attack Item”  - maxCount = 5  - image = Images.attack |

7.2.3. Methods

|  |  |
| --- | --- |
| - int getDamage() | Return random damage of item between minDamage and maxDamage |
| + boolean activate() | Damage all NPCs in the scene by the amount of getDamage(). Always return true. |

7.3. Class CCItem

7.3.1. Constructors

|  |  |
| --- | --- |
| + CCItem() | Initialize every fields with following value:  - name = “Random CC Item”  - maxCount = 5  - image = Images.cc  - posX = 0  - posY = 0 |
| + CCItem(double posX, double posY) | Initialize every fields with following value:  - name = “Random CC Item”  - maxCount = 5  - image = Images.cc |

7.3.2. Methods

|  |  |
| --- | --- |
| + boolean activate() | Apply random CC effect between STUN, SLOW, and SILENCE to all NPCs in the scene. Always return true. |

7.4. Class HealItem

7.4.1. Fields

|  |  |
| --- | --- |
| - final int minHealHp = 50 | Minimum healing HP |
| - final int maxHealHp = 200 | Maximum healing HP |

7.4.2. Constructors

|  |  |
| --- | --- |
| + HealItem() | Initialize every fields with following value:  - name = “Heal Potion”  - maxCount = 5  - image = Images.heal  - posX = 0  - posY = 0 |
| + HealItem(double posX, double posY) | Initialize every fields with following value:  - name = “Heal Potion”  - maxCount = 5  - image = Images.heal |

7.4.3. Methods

|  |  |
| --- | --- |
| - int getHealHp() | Return random healing HP of item between minHealHp and maxHealHp |
| + boolean activate() | Heal the player by the amount of getHealHp(). Return false if player’s HP is max. |

7.5. Class ImmuneItem

7.5.1. Fields

|  |  |
| --- | --- |
| + final int duration = 100 | Duration of immune effect |

7.5.2. Constructors

|  |  |
| --- | --- |
| + ImmuneItem() | Initialize every fields with following value:  - name = “Immune Item”  - maxCount = 5  - image = Images.immune  - posX = 0  - posY = 0 |
| + ImmuneItem(double posX, double posY) | Initialize every fields with following value:  - name = “Immune Item”  - maxCount = 5  - image = Images.immune |

7.5.3. Methods

|  |  |
| --- | --- |
| + boolean activate() | Make player immune to damage while in duration. Return false if player has already immune. |

7.6. Class ReviveItem

7.6.1. Constructors

|  |  |
| --- | --- |
| + ReviveItem() | Initialize every fields with following value:  - name = “Revive Item”  - maxCount = 1  - image = Images.revive  - posX = 0  - posY = 0 |
| + ReviveItem(double posX, double posY) | Initialize every fields with following value:  - name = “Revive Item”  - maxCount = 1  - image = Images.revive |

7.6.2. Methods

|  |  |
| --- | --- |
| + boolean activate() | Make player revivable. Return false if player has been already revivable. |

**8. Package model.map**

8.1. Class Map

8.1.1. Fields

|  |  |
| --- | --- |
| - final int X\_PADDING = 150 | Both axes padding |
| - final int Y\_PADDING = 66 |
| - Image image | Map’s image |
| - double moveSpeed | Map’s move speed (default is 4) |
| - MediaPlayer bgm | Background music player |
| - List<NPC> listNPC | List of all NPCs in the map |
| - List<Item> listItem | List of all items in the map |
| - List<Boss> listBoss | List of all bosses in the map |
| - List<Podium> listPodium | List of all podium effect in the map |
| - StatusBar statusBar | Status bar of player |

8.1.2. Constructor

|  |  |
| --- | --- |
| + Map(Image image, AudioClip bgm) | Initialize map with background image and bgm. |

8.1.3. Methods

|  |  |
| --- | --- |
| + List<NPC> collideNPCs(Frame f) | Return list of all NPCs that collide with Frame f. |
| + List<Item> collideItems(Frame f) | Return list of all items that collide with Frame f. |
| + void addItem(Item item) | Add item to the map. |
| + void removeItem(Item item) | Remove item from the map. |
| + void addPodium(Podium podium) | Add podium to the map. |
| + void removePodium(Podium podium) | Remove podium from the map. |
| - void moveMap() | Move the map when player tries to move out of screen. |
| - void motion(MoveableEntity e) | Move the MoveableEntity e in the map, except player. |
| + void motionPlayer(Player p) | Move player and map so the player is always on screen. |
| + void motionAll() | Move all MoveableEntity in the map except player. |
| + void spawnMonsterRandom() | Spawn an NPC with random coordinate. |
| + void spawnBossRandom() | Spawn a boss with random coordinate. |
| + void rander(GraphicContext gc) | Render everything in the map. |
| + void update() | Update every updatable entities in the map. |
| + void playBgm() | Play BGM sound. |
| Getters of listNPC, listItem, listBoss, and listPodium |  |

**9. Package model.player**

9.1. Class Player

9.1.1. Fields

|  |  |
| --- | --- |
| - Item[] inventory | Player’s inventory, consists of [AttackItem, CCItem, HealItem, ImmuneItem] |
| - boolean isImmune | True if player is immune (default false) |
| - boolean isRevivable | True if player can be revived (default false) |
| - int immuneTick | Frame counter of player’s immunity (start from 0) |
| - double attackRange | Player’s attack range (default 30) |

9.1.2. Constructor

|  |  |
| --- | --- |
| + Player(double posX, double posY) | Initialize player with following values:  - posX, posY from parameters  - name = “Netikun”  - imageL = Images.playerL  - imageR = Images.playerR  - maxHp = 1000  - minAtk = 50  - maxAtk = 150  - def = 50  - attackCooldown = 30 |

9.1.3. Methods

|  |  |
| --- | --- |
| + boolean isDead() | Return true if player is dead and cannot be revived. |
| + boolean canUseItem() | Return true if player is alive and no CC applied. |
| + boolean heal(int hp) | Heal player by hp. Return false if health has been already max. |
| + void refresh() | Refresh hp to maxHp. |
| + void revive() | Revive player and clear all CC effect. |
| + void attack() | Throws CannotAttackException when player cannot attack. Deal damage and knock back to every NPCs within attack area. |
| + boolean takeDamage(int damage) | Called when player is damaged. The damage is reduced by defense point. Return false if player did not take damage (damage is 0 or player is immune). |
| + void dead() | Called when player is dead. Stop player motion and play death scene. |
| + Frame getPlayerArea() | Return player’s frame. |
| + Frame getAttackArea() | Return player’s attack area frame. |
| + void resetImmuneTick() | Reset immune |

**10. Package model.npc**

10.1. Class NPC

10.1.1. Fields

|  |  |
| --- | --- |
| - double speed | Random speed for NPC |

10.1.2. Constructor

|  |  |
| --- | --- |
| + NPC(double posX, double posY) | Initialize player with following values:  - posX, posY from parameters  - name = “Netikun”  - imageL = Images.playerL  - imageR = Images.playerR  - maxHp = 1000  - minAtk = 50  - maxAtk = 150  - def = 50  - attackCooldown = 30  - speed = random value between 1 and 2 |
| + NPC(double posX, double posY, String name, Image imageL, Image imageR, int maxHp, int minAtk, int maxAtk, int def, int attackCooldown) | Initialize every fields with parameters and set speed to 8. |

10.1.3. Methods

|  |  |
| --- | --- |
| + void attack() | Throws CannotAttackException if cannot attack. |