

## T13A\_ECLAIR Testing plan

Our approach to testing will be writing four sets of tests (white box unit, white box integration, black box unit, black box integration) for the features we are doing. Before we start coding the tests we will brainstorm in this doc and list down what things we need to test for that feature. Next, we will write failing junit tests and comment them out when we merge to master so the pipeline is always passing. Once we have implemented our feature, we first uncomment out the unit white box tests and see if any changes/bug fixes should be made. Since black box and white box integration tests require other features to be implemented, we will merge the completed feature with passing white box tests, so other members can use our feature for tests. When another merges their feature to master, we will uncomment out relevant tests that use that feature so we know that the interaction between the two features is working as intended. We will keep doing this until all the commented out tests for the feature passes.

### Player Unit Test (White Box):

- Successfully add an item to inventory
- Successfully remove an item from inventory
- Get item returns the correct item
- Get item returns null if no item with unique id is found
- Use item returns true if the item can be used
- Use item returns false if the item cannot be used
- Removes given number of treasures and returns true
- Does not remove given number of treasures because the player does not have enough and returns false
- Get key returns a key item if a player has picked up one
- Get key returns null if player does not have a key
- Successfully interacts with a mercenary, it becomes its ally
- Successfully interacts with a spawner, player destroys it
- Interact throws an `IllegalArgumentException` because an invalid id was passed in
- Interact throws an `IllegalArgumentException` because a valid entity id, but belongs to a non interactable entity
- Interact throws an `InvalidActionException`:
  - If the player is not within specified bribing radius to the mercenary, if they are bribing
  - If the player is not cardinally adjacent to the spawner, if they are destroying a spawner
  - If the player does not have enough gold and attempts to bribe a mercenary
  - If the player does not have a weapon and attempts to destroy a spawner
- Successfully builds a bow
- Successfully builds a shield
- Build throws an `IllegalArgumentException`:
  - If buildable is not one of bow, shield
- Build throws an `InvalidActionException`:
  - If the player does not have sufficient items to craft the buildable

- Returns the potion the player has consumed
- Returns null if player has not consumed any potion
- Returns null if potion has expired

#### Player Integration Test (White Box):

- Successfully notifies enemies to move
- Successfully notifies enemies to move away from player when invincibility potion is drank
- Successfully notifies enemies to ignore player when player drinks invisibility potion
- Successfully notifies enemies their default movement behaviour when invincibility potion has expired
- Successfully notifies enemies their enemies to engage in combat with the player when invisibility potion has expired
- Successfully notifies ZombieToastSpawners to update spawn rate

#### Player unit tests (Black box):

- Player moves to item and picks it up successfully
- Player uses a valid item and it removes it from the inventory
- Player tries to use an unusable item that is in their inventory throws an `IllegalArgumentException`
- Player builds a bow successfully, items that need to be used to build is removed from inventory
- Player builds a shield successfully, items that need to be used to build is removed from inventory
- Player not building either a bow or shield throws `IllegalArgumentException`
- Player that does not have enough to build a bow/shield throws `IllegalArgumentException`
- Interact throws an `IllegalArgumentException` because an invalid id was passed in
- Successfully interacts with a mercenary, it becomes its ally
- Successfully interacts with a spawner, player destroys it
- Interact throws an `InvalidActionException`:
  - If the player is not within specified bribing radius to the mercenary, if they are bribing
  - If the player is not cardinally adjacent to the spawner, if they are destroying a spawner
  - If the player does not have enough gold and attempts to bribe a mercenary
  - If the player does not have a weapon and attempts to destroy a spawner

#### Player integration tests (Black box):

- After each tick of player, enemies of notified to move
- After each tick of player, zombie toast spawner is notified to spawn toasts
- When player drinks invincibility potion, mercenaries and zombie toasts run away from player
- When player drinks invisibility potion, enemies ignore the player

- When potions expire, enemies go back to their default behaviour
- Player battles with other non playable actors and wins
- Player battles with other non playable actors and loses
- Player battles with equipment
- Player

#### Dungeon unit test (white box):

- Successfully initializes a dungeon
- Successfully get config from config file
- Correctly get goals
- Correctly get battles

#### Dungeon unit test (black box):

- Gets the correct dungeon response
- Achieved goals are removed from dungeon response goals
- Disjunction goal achieves both goals
- Conjunction goal requires all goals to be achieved
- Conjunction goal requires all other goals to be achieved before exit goal can be achieved
- Spawns spiders at correct tick

#### Visitor/Host Tests:

- Player visitor Test
  - A player can visit a portal, teleporting through said portal
  - A player can visit a boulder, moving said boulder if able
  - A player can visit a boulder, remains the same if unable to move
  - A player can visit a wall, blocked by said wall
  - A player can visit wood, collecting said wood
  - A player can visit an arrow, collecting said arrow
  - A player can visit treasure, collecting said treasure
  - A player can visit a key, collecting said key
  - A player can visit a key, leaving said key if they already have one
  - A player can visit a door, opening door if the player has a key with the right ID
  - A player can visit a door, door remains closed if player does not have the right key
  - A player can visit a bomb, collecting said bomb
  - A player can visit an invisibility potion, collecting said position
  - A player can visit an invincibility potion, collecting said position
  - A player can visit a sword, collecting said sword
  - A player can visit a floor switch, activating it.
  - (Test for player visiting all hostile mobs in each PlayerState)
  - A player can visit a spider, initiating a battle
  - A player can visit a ZombieToast, initiating a battle
  - A player can visit a mercenary, bribing them if the player has enough gold

- A player can visit a mercenary, initiating a battle if the player does not have enough gold
- Boulder visitor Test
  - A boulder can visit a floor switch, activating the floor switch
  - A boulder can visit any other entity, no action
- Zombie toast visitor Test
  - A zombie toast can visit a player, initiating a battle
  - A zombie toast can visit a wall, blocking its path
  - A zombie toast can visit a door, blocking its path
  - A zombie toast can visit any other entity, no action
- Spider visitor Test
  - A spider can visit a player, initiating a battle
  - A spider can visit through a door
  - A spider can visit through a switch
  - A spider can visit through a wall
  - A spider can visit through a exit
  - A spider can't visit a boulder.
- Mercenary visitor Test
  - A mercenary can visit a player, initiating a battle if not bribed
  - A mercenary can visit a player, becoming an ally if bribed
  - A mercenary can visit a portal, teleporting through
  - A mercenary can visit a door, traveling through if opened
  - A mercenary can visit a wall, blocking its path

#### Bomb Tests:

- Test bomb placed on Dungeon map by player  
Bomb can only explode after placement of it, so this should be the top priority
- Test setting up bomb cardinally adjacent with inactivated switch and activate it then explode
- Test setting up bomb cardinally adjacent with activated switch and explode

#### Potion tests

- Duration lasts for specified ticks by config
- Invincibility potion causes mercenaries and zombies to run away
- Invisibility potion allows player to pass through enemies undetected

#### NonPlayableActor Tests :

##### Movement Tests:

##### Spider:

- Test spider movement  
This is the basic path of spider movement and priority should be on the top
- Test spider alternates direction when reaches boulder

Spider gonna reverse direction when there is a boulder blocking spider

- Test spider does not move if boulder is above it  
Assumption one, spider should be blocked by this situation
- Test spider does not move if stuck by two boulders on path  
Spider move up firstly, but there are two boulders: one is on the left side of the spider,  
And another is on the right side of the spider, so the spider should not move anymore.

Mercenary:

- Test mercenary finds a path using portal/Test mercenary can teleport  
Mercenary should visit a portal if there is a closer path between player and mercenary himself through portal
- Test ally follows player
- Test mercenary does not move if cannot move any closer to player  
Using a boulder to block a mercenary at the corner and it should not move because there is no path to the player.

Zombie Toast:

- Test zombie\_toast can't interact with portal

System Tests:

- Test movement, picking up objects, building and battling.

Shortest path tests/Swamp tile tests

- Mercenary finds shortest path
- Mercenary finds shortest path with swamp tiles
- Mercenary finds shortest path with portal
- Mercenary finds shortest path with portal and swamp tiles
- Mercenary uses path with swamp tiles for shortest path
- Mercenary changes direction when door opened for shortest path
- Mercenary changes direction when boulder pushed for shortest path
- Mercenary visits swamp tile on is stuck for movement factor
- Zombie visits swamp tile on is stuck for movement factor
- Spider visits swamp tile on is stuck for movement factor
- Assassin visits swamp tile on is stuck for movement factor
- Hydra visits swamp tile on is stuck for movement factor

Midnight Armor tests

- Build midnight armor successfully
- Build midnight armor failed with not enough materials
- Test Midnight armor provide Both defense and attack in battle
- Test Midnight has infinity durability

Scepter tests

- Build scepter with wood, key and sunstone successfully
- Build scepter with wood, treasure and sunstone successfully
- Build scepter with arrows , key and sunstone successfully
- Build scepter with arrows , treasure and sunston successfully
- Test unable to build scepter
- Test mind control duration
- Test scepter durability is limited

#### Sunstone tests

- Can be picked up
- Opens door without being removed
- Counts towards treasure goal
- Both treasure and sunstone count towards treasure goal
- Test can't be used to bribe

#### Bosses tests

- Assassin moves towards player when player is invisible and in recon range
- Assassin will return to moving randomly when player exits recon range
- Assassin interactions (rate between 0 and 1, always fail, always succeed)
- Assassin will not refund treasure if bribe fails
- Hydra will increase in hp rather than lose hp in rounds of battles according to the rate in config
- Hydra either always regenerates or never regenerates

#### Logical Entities tests

- Logical behaviour functions as intended for every logical entity (eg logical entities with the 'and' property will activate when two or more triggering entities are near).
- Logical entities that are activated wirelessly will deactivate when the logical conditions are no longer met.
- Activating a switch mechanically while it is activated does not deactivate it.
- Switches that are activated both mechanically and wirelessly will not deactivate when one of the activation causes deactivates.
- Testing interaction of logical entities with wires and switches (eg does an and entity activate when an activated switch and wire are nearby).
- Non logic bombs are not exploded by circuit
- Logic bombs explode when logic is fulfilled when player places it down
- Logic bombs explode when logic is fulfilled after player activates the circuit

#### M3 System Test

- Test build sceptre, mind control, fight new entity, exit through switch door