



# 1.Class Checklist

Class	Attribute	method	method implement an interface	method explanation
Space	id	Space(int,String,int[],int[]) - constructor		create a space by pass id, size info,and name
	name	getID():int	SpaceInterface	retrieve Space Index(0toN)
	upleft	getUpLeft():int[2]	SpaceInterface	retrieve upleft corner of space
	lowright	getDownRight():int[2]	SpaceInterface	retrieve downright corner
	items:List[Item]	getName():String	SpaceInterface	retrieve name of space
	neighbors:list[Space]	setItem(Item)		add Item into the space, add once every time
	seens:list[Space]	getItems():List[Item]		retrieve item list in the space
	Players:List[Player]	removeItem(Item)		remove an item from the space
		calcNeighbors(List[]:Space )		calculate and set the neighbors of this space
		calcSeens(List[]:Space)		set which space can be seen from this space
		getNeighbors():List[]		get list of neighbor spaces
		getSeens():List[]		get list of spaces can be seen from this space
		toString():String		Return string format "id:{id} name:{\name} leftcome:{\upleft} rightcorner:{\lowright}"
		getPlayers():List<Player>		Get Player list in the space
spaceFactory		addPlayer()		Add a player to the space
		removePlayer(Player:p)		Remove a player in the space
		createSpace()-static method		use createSpace to create a space through Factory class rather than directly using constructor
Item	id	Item(id,String,int) - constructor		create a Item by passing id,name,damage
	name	getID():int	ItemInterface	retrieve Index of this Item
	damage:int	getName():String	ItemInterface	retrieve name of this Item
	space:Space	getDamage():int	ItemInterface	retrieve damage value of this Item
		setSpace(Space)		set in which the space should be placed the item
		getSpace():Space	ItemInterface	get space of which the item placed in
		toString():String		Return string format "id:{id} name:{\name} damage:{\damage}"
ItemFactory		createItem()-static method		use createItem to create a item through Factory class rather than directly using constructor
Target	name	Target(String,int) - constructor		create target character by passing name,health
	health:int	getName():String	CharacterInterface	retrieve name of character
	space:Space	getSpace():Space	CharacterInterface	retrieve space that character settling in at the moment
		getHealth():int	CharacterInterface	retrieve the health value of the character
		move(space:Space)	CharacterInterface	Move the target to the index specified space of space list and settle the attribute space
		toString():String		Return string format "name:{\name} health:{\health}"
TheWorld	name	TheWorld(String,int,int) - constructor		Create the game:Spaces/Charactor/items by a specification file
	row	getColumn():int	MapInterface	retrieve the total column of map
	column	getRow():int	MapInterface	retrieve the total row of map
	spaces:List[Space]	getName():String		retrieve the name of this game
		addSpace(Space)		add a space to the world
	items:List[Item]	getSpaces():List[Space]	MapInterface	retrieve the 0-indexed space list int the map
		addItem(Item)		add an item to the world
	target:Target	getItems():List[Item]		retrieve the 0-indexed item list int this game
		setTarget():void		set target character to the world
		getTarget():Target		retrieve the target charactor int this game
		draw()	MapInterface	use BufferedImage to draw the image of the map and store it in a file

		moveTarget(List spaces, int stop, Enum mode)		Move the target by specified mode, under sequence mode, the character move from start index space to the last index space by sequential order, we should provide scalability to other mode (like random etc.) Stop arg controls how many steps does target move, target will stop at specified step, default is never stop.
	players: List<Player>	getPlayers(): List<Player>		Retrieve the player list of the game
		addPlayer(p: Player)		Add an player for the game
		toString(): String		Return string format "name:{name} row:{row} column:{column}"
Player	id: int	Player(String name, int id, int itemLimit, Boolean isAutomatic)	CharacterInterface	Constructor of the Class
	name: string	getName()	CharacterInterface	Retrieve name of player
	space: Space	getId()	CharacterInterface	Retrieve the current space that player is staying
	items: List<ListInterface>	getSpace()		Retrieve the item list that hold by the player
	itemLimit: int	getItemLimit()		Retrieve the limit of how many items can be carry by the player
	isAutomatic: boolean	move(space: Space): boolean	CharacterInterface	Move a player from current space to another, if well excuted return true else return false
		pickup(item: Item): boolean		Pickup an item list in the current space
		leaveItemToSpace(item: Item): boolean		Drop off an item that hold by the player in the current space
		lookAround(): String		Player can look around the space, return a string That include players info(name, id), the current space player staying, and all the neighbor spaces of current space.
		toString(): String		Return the player's description: include players info(name, id), the items carried by the player, and which space the player staying in
TheWorldFacade		parseTheWordl(Readable): TheWord		parse the map and target and items from a readable input(a file reader)
		drawTheWorld(String)		Draw an png picture for the game map
	theWorld: TheWorld	moveTargetToNext()	This is an agent class for the model Provide the basic function of the game	Move the target to another space orderly
		movePlayer(Player, int)		Move the specified player to the space which id is specified
		pickUpAction(Player, int)		Pickup an item which id is specified by a player
		dropOffAction(Player, Item)		Drop off an specified item to the current space
		lookAroundAction(Player)		Player can look around from the current space
TheWorldController	In: Readable	TheWorldController(in: Readable, out: Appendable, turnLimit: int)		Constructor of Controller
	Out: Appendable	playGame(twf: TheWorldFacade, specification: String)		Main of the controller, directly call functions in TheWorldFacade. And receive specification to create game map.
	currentTurn: int			
	turnLimit: int			
			This color represents new content	

## 2. Test cases design

### 2.1 Space

Firstly create a new space by call constructor function Space (id: int, name: String, upLeft: int, downRight: int) by pass different arguments to test constructor and toString method.

Test constructor and toString()	Input	Expected Value
Normal case	Space(1, "bathroom", new int[]{2,3}, new int[]{5,8}).toString()	"id:1 name:bathroom leftcorner:2,3 rightcorner:5,8"
Space index 0	Space(0, "bathroom", new	"id:0 name:bathroom"

	<code>int[]{2,3},new int[]{5,8}).toString()</code>	<code>leftcorner:2,3 rightcorner:5,8"</code>
Left corner 0,0	<code>Space(1,"bathroom",new int[]{0,0},new int[]{5,8}).toString()</code>	<code>"id:1 name:bathroom leftcorner:0,0 rightcorner:5,8"</code>
Id < 0	<code>Space(-1,"bathroom",new int[]{0,0},new int[]{5,8}).toString()</code>	Throws <code>IllegalArgumentException</code>
No name pass in	<code>Space(1,,new int[]{0,0},new int[]{5,8}).toString()</code>	Throws <code>IllegalArgumentException</code>
Left corner <0	<code>Space(1,"bathroom",new int[]{-1,0},new int[]{5,8}).toString()</code>	Throws <code>IllegalArgumentException</code>
Left corner is righter than right corner	<code>Space(1,"bathroom",new int[]{-10,0},new int[]{5,8}).toString()</code>	Throws <code>IllegalArgumentException</code>
Left corner is higher than right corner	<code>Space(1,"bathroom",new int[]{-1,10},new int[]{5,8}).toString()</code>	Throws <code>IllegalArgumentException</code>

Create a normal Space instance of `Space(1, "bathroom", new int[]{2,3}, new int[]{5,8})` and test get, set method

Test setItem removeItem and get method	Input	Expected Value
<code>getID()</code>	<code>Space(1,"bathroom",new int[]{2,3},new int[]{5,8})</code>	1
<code>getName()</code>	above	"bathroom"
<code>getUpLeft()</code>	above	<code>Int[]{2,3}</code>
<code>getDownRight()</code>	above	<code>Int[]{5,8}</code>
Set an Item into space: <code>setItem(Item)</code>	<code>setItem(New Item(0,"clammer",5))</code>	<code>"id:0 name:clammer,damage:5"</code>
<code>getItems()[0].toString()</code>		
multi items case: <code>getItems()[0].toString()</code> <code>getItems()[1].toString()</code>	<code>setItem(New Item(0,"clammer",5))</code> <code>setItem(New Item(2,"mop",2))</code>	<code>"id:0 name:clammer,damage:5"</code> <code>"id:2 name:mop,damage:2"</code>
Remove item case: <code>removeItem(Item)</code>	<code>item1=setItem(New Item(0,"clammer",5))</code> <code>item2=setItem(New Item(2,"mop",2));</code> <code>removeItem(item1)</code>	<code>getItems()[0].toString():</code> <code>"id:2 name:mop,damage:2"</code>
Remove all cases	<code>item1=setItem(New Item(0,"clammer",5))</code> <code>item2=setItem(New Item(2,"mop",2));</code> <code>removeItem(item1)</code> <code>removeItem(item2)</code>	<code>getItems().size():</code> 0
No item in the room, but try to Print items info	<code>Space(1,"bathroom",new int[]{2,3},new int[]{5,8})</code> Then directly: <code>Print(getItems[0].toString())</code>	Throws <code>NullPointerException</code>

Create more than 1 spaces,and make sure some of them are neighbor(share at least one "wall"), some of them are not . test `calcNeighbors()` which function set neighbors to a space, and `getNeighbors()`;  
Create more tha 1 spaces, make sure some of them has continous ID, some are not, if 2 space have continous ID, that means they can be seen by each other, otherwise, they can't.  
Test `calcSeens()` which set spaces can be seen by specified space, then `getSeens()`.

Test calcNeighbors(), getNeighbors(),calcSeens() and getSeens()	Input	Expected Value
<code>calcNeighbors(List spaces)</code> <code>getNeighbors()</code>	<code>space=new Space(1,"bathroom",new int[]{2,3},new int[]{5,8});</code> <code>list={new Space(2,"kitchen",new int[]{5,3},new int[]{10,8}),</code> <code>New Space(3,"living room",new int[]{15,9},new int[]{22,11});</code>	<code>space.getNeighbors(list).size():</code> 1 <code>space..getNeighbors(list)[0].toString():</code> <code>"id:2 name:kitchen leftcorner:5,3 rightcorner:10,8"</code>

	<code>space.calcNeighbors(list)</code>	
0 neighbor	<code>space=new Space(1,"bathroom",new int[]{2,3},new int[]{5,8}); list={new Space(2,"kitchen",new int[]{11,3},new int[]{12,8}), New Space(3,"living room",new int[]{15,9},new int[]{22,11})};</code>	<code>space.getNeighbors(list).size(): 0</code>
More than 1 neighbor	<code>space=new Space(1,"bathroom",new int[]{2,3},new int[]{5,8}); list={new Space(2,"kitchen",new int[]{5,3},new int[]{10,8}), New Space(3,"living room",new int[]{3,8},new int[]{20,11})};</code>	<code>space.getNeighbors(list).size(): 2 space..getNeighbors(list)[0].toString(): "id:2 name:kitchen leftcorner:5,3 rightcorner:10,8" space..getNeighbors(list)[1].toString(): "id:3 name:living room leftcorner:3,8 rightcorner:20,11"</code>

Then, test `addPlayer()`, `getPlayers()`, and `removePlayer()`;

Add an player to the space	<code>Space.addPlayer( new Player(0,"messi",1,true))</code>	<code>Space.getPlayers.size():1</code>
Add 2 players to the space	<code>Space.addPlayer( new Player(0,"messi",1,true)); Space.addPlayer( new Player(0,"rod",1,true));</code>	<code>Space.getPlayers.size():2</code>
Add 2 players and the getPlayers	<code>Space.addPlayer( new Player(0,"messi",1,true)); Space.addPlayer( new Player(0,"rod",1,true)); getPlayers();</code>	<code>Space.getPlayers.size():2</code>
Add 2 players and remove 1	<code>Player p = new Player(0,"messi",1,true) Player p2 = new Player(0,"rod",1,true) Space.addPlayer(p); Space.addPlayer(p2); getPlayers().size(); Space.removePlayer(p); getPlayers().size() Space.removePlayer(p2); getPlayers().size()</code>	<code>Space.getPlayers.size() from 2 change to 1 to 0</code>

## 2.2 Item

Create an item by constructor, then test get, set method

Test constructor, get and set method of Item class	Input	Expected Value
Test constructor:normal case	<code>Item(1, "mop", 2)</code>	<code>Item(1, "mop", 2).toString(): "id:1 name:mop damage:2"</code>
Id < 0	<code>Item(-1, "mop", 2)</code>	Throws <code>IllegalArgumentException</code>
No name passed	<code>Item(-1, 2)</code>	Throws <code>IllegalArgumentException</code>
Damage <0	<code>Item(1, "mop",- 2)</code>	Throws <code>IllegalArgumentException</code>
Test get method: <code>getID()</code>	<code>Item(1,"mop",2)</code>	1
<code>getName()</code>	above	"mop"

getDamage()	above	2
Set in which space the item placed: setSpace(Space space) getSpace()	setSpace(new Space(1,"bathroom",new int[]{2,3},new int[]{5,8}))	<b>getSpace().getName():</b> "bathroom"
No space been set	Item(1,"mop",2) Then call getSpace()	Throws NullPointerException

## 2.3 Target

Create a target(implements character interface) By constructor, test constructor and get methods

Test constructor, get class	Input	Expected Value
Test constructor:normal case	Target("lucky", 200)	<b>Target("lucky",200).toString():</b> "name:lucky health:200"
No name passed	Target("", 200)	Throws IllegalArgumentException
Health <1	Target("lucky", 0)	Throws IllegalArgumentException
Health <0	Target("lucky", -1)	Throws IllegalArgumentException
getName()	Target("lucky", 200)	"lucky"
getHealth()	above	200

Then, we can test move(), the character can change the space he/she settled through move() by passing specified space.

Test move, getSpace	Input	Expected Value
move from space to no.1, by sequence mode, then getSpace	list = {new Space(0, "bathroom", new int[]{2,3}, new int[]{5,8}), new Space(1, "kitchen", new int[]{5,3}, new int[]{10,8}), New Space(2, "living room", new int[]{3,8}, new int[]{20,11})}  space = move(list[1])	target.getSpace().toString(): "id:1 name:kitchen leftcorner:5,3 rightcorner:10,8"
Move twice	For (i=0, i<2, i++){ Space = move(list[i]) }	target.getSpace().toString(): "id:2 name:living room leftcorner:3,8 rightcorner:20,11"
Move thrice, out of the boundry of space list	For (i=0, i<3, i++){ Space = move(list[i]) }	Throws IllegalArgumentException

## 2.4 TheWorld

Create TheWorld by constructor that pass into a simple specification file, the file is like this(3 spaces):

It is a 5 spaces mansion with 7 items, it is saved as Mansion.txt, In Driver class, we parser the file by line number, and construct TheWorld instance and Spaces/items/target that associated with TheWorld

Test constructor, get/set class	Input	Expected Value
Test constructor:normal case	world=TheWorld("lucky's mansion",	<b>world.toString():</b>

	200, 100)	"name:lucky's mansion rows:200 columns:100"
No name passed	TheWorld("", 200, 100)	Throws IllegalArgumentException
rows<1	TheWorld("lucky's mansion", 0, 50)	Throws IllegalArgumentException
rows<0	TheWorld("lucky's mansion", -1, 50)	Throws IllegalArgumentException
columns<1	TheWorld("lucky's mansion", 100, 0)	Throws IllegalArgumentException
columns<0	TheWorld("lucky's mansion", 100, -1)	Throws IllegalArgumentException
Test get method: getName()	world=TheWorld("lucky's mansion", 200, 100)	"lucky's mansion"
getRows()	above	200
getColumns()	above	100
addSpace(space)	addSpace(new Space(0, "bathroom", new int[]{2,3}, new int[]{5,8}))	<b>getSpaces()[0].toString():</b> "id:0 name:bathroom leftcorner:2,3 rightcorner:5,8"
getSpaces	getSpaces()[0]	above
add more than 1 space	addSpace(new Space(0, "bathroom", new int[]{2,3}, new int[]{5,8})); addSpace(new Space(1, "kitchen", new int[]{8,15}, new int[]{9,19}));	<b>getSpaces()[0].toString():</b> "id:0 name:bathroom leftcorner:2,3 rightcorner:5,8" <b>getSpaces()[1].toString():</b> "id:1 name:kitchen leftcorner:8,15 rightcorner:9,19"
addItem(space)	addItem(new Item(0, "mop", 10))	<b>getItems()[0].toString():</b> "id:0 name:mop damage:10"
getItems	above	above
Add more than 1 item	addItem(new Item(0, "mop", 10)) addItem(new Item(1, "helmet", 2))	<b>getItems()[0].toString():</b> "id:0 name:mop damage:10" <b>getItems()[1].toString():</b> "id:0 name:helmet damage:2"
addTarget(Target)	addTarget(new Target("Lucky", 200))	<b>getTarget().toString():</b> "name:Lucky health:200"
getTarget	above	above

The target can move through the spaces in specified mode, right now there is only one moving mode called "sequence", it stored in a enum named Mode

Test moveTarget()	Input	Expected Value
Test moveTarget(list,enum),stop at first step	list = {new Space(0, "bathroom", new int[]{2,3}, new int[]{5,8}), new Space(1, "kitchen", new int[]{5,3}, new int[]{10,8}), New Space(2, "living room", new int[]{3,8}, new int[]{20,11})}  space =move(list, Mode.Sequence,1)	<b>space.toString():</b> "id:0 name:bathroom leftcorner:2,3 rightcorner:5,8"
Test moveTarget(list,enum),stop at second step	space =move(list, Mode.Sequence,2)	<b>space.toString():</b> "id:1 name:kitchen leftcorner:5,3 rightcorner:10,8"
Stop at 5 step, move back to kitchen	space =move(list, Mode.Sequence,5)	<b>space.toString():</b> "id:1 name:kitchen leftcorner:5,3 rightcorner:10,8"
Stop at 7 step, move back to kitchen	space =move(list, Mode.Sequence, 7)	<b>space.toString():</b> "id:0 name:bathroom leftcorner:2,3 rightcorner:5,8"
Stop at 9 step, move back to kitchen	space =move(list, Mode.Sequence, 9)	<b>space.toString():</b> "id:2 name:living room leftcorner:3,8 rightcorner:20,11"

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The world class had been rewrite, add 2 attributes : players and turn, should test addPlayer(), getPlayers(), getTurn(), nextTurn();

Test addPlayer() and getPlayers()	Input	Expected Value
Add 1 players to TheWorld	Player p = new Player(0, "messi", 1, true) Space.addPlayer(p);	getPlayers().size() == 1; getPlayers().get(0).getName() == "messi"
Add 2 players to TheWorld	Player p2 = new Player(0, "rod", 1, true) Space.addPlayer(p); Space.addPlayer(p2); getPlayers().size(); getPlayers().size()	getPlayers().size() == 2;

Test getTurn() and nextTurn(), getTurn() return the current player, and nextTurn() shift the next player in the queue to the current one and return.

Test getTurn() and nextTurn()	Input	Expected Value
Add 1 players to TheWorld and getTurn()	Player p = new Player(0, "messi", 1, true) Space.addPlayer(p);	getTurn().getName() == "messi"
Add 1 players to TheWorld and nextTurn()		nextTurn().getName() == "messi"
Add 2 players to TheWorld and getTurn()	Player p = new Player(0, "messi", 1, true) Space.addPlayer(p); Player p = new Player(0, "rodri", 1, true) Space.addPlayer(p);	getTurn().getName() == "messi"
Add 2 players to TheWorld and nextTurn()		nextTurn().getName() == "rodri" getTurn().getName() == "rodri"
Add 2 players to TheWorld and keep nextTurn() for 2 times		nextTurn().getName() == "rodri" nextTurn().getName() == "messi" getTurn().getName() == "messi" It turn back to the head again.

## 2.5 Player

Player class is designed to provide all the basic function of a player, including getter and setters, and move(), pickup() for pickup an item, dropoff() for dropoff an item, lookaround() for look around, the class is also implement from CharacterInterface;

Test Constructor	Input	Expected Value
Id < 0	New Player("messi", -1, 10, false)	Throws IllegalArgumentException
itemLimit <= 0	New Player("messi", 1, 0, false) New Player("messi", 1, -1, false)	Throws IllegalArgumentException

Test getter methods

Test getName() getId() getSpace()	Input	Expected Value
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Create a player and test getter	Player p = new Player(0, "messi", 1, true) getName() getId()	getName() == "messi" getId() == "0"
Move a player to a space and getSpace	Player p = new Player(0, "messi", 1, true) Move(New Space(1, "bathroom", new int[]{2,3}, new int[]{5,8})) getSpace(p);	getSpace().getName() == "bathroom"
Move a player from one place to the other	Move(New Space(1, "bathroom", new int[]{2,3}, new int[]{5,8})) Move(New Space(2, "kitchen", new int[]{10,10}, new int[]{20,20}))	getSpace().getName() == "kitchen"

Test other functions : pickup, dropoff, lookaround

Pickup(), dropoff(), lookaround(), toString()	Input	Expected Value
Pickup an item	Item = New Item(1, "mop", 2) pickup(item)	getItems().get(0).getName() == "mop"
Pickup but out of picking up limit	New Player("messi", 1, 1, false)//limit 1 Item = New Item(1, "mop", 2) pickup(item) Item2 = New Item(2, "towel", 2) pickup(item2)	getItems().size() == 1 getItems().get(0).getName() == "mop"
Drop off an item	Item = New Item(1, "mop", 2) pickup(item) dropoff(item)	getItems().size() == 0
Drop off an item but there is no item in the player's item list	Item = New Item(1, "mop", 2) pickup(item) dropoff(item) dropoff(item)	dropoff(item) == false
Lookaround()	Move(New sp = Space(1, "bathroom", new int[]{2,3}, new int[]{5,8})) sp2 = Space(2, "kitchen", new int[]{10,10}, new int[]{20,20})) lookaround();	lookaround() == "this is the player messi, he/she is in the space No.1 bathroom\n he/she is watching the space:\n"+ sp2.toString();
toString()	Player p = new Player(0, "messi", 1, true) Item = New Item(1, "mop", 2) pickup(item) p.toString()	toString() == "this is the player messi, he/she is in the space No.1 bathroom\n he/she is carrying the item No.1 mop\n"
toString() but no item carried	Player p = new Player(0, "messi", 1, true)	toString() == "this is the player messi, he/she is in the space No.1 bathroom\n"

## 2.6 TheWorldFacade

TheWorldFacade provide an agency to the controller, first must test the create world function : parseTheWorld(Readable)

parseTheWorld	Input	Expected Value
Pass an StringReader to create a world It only has 2	StringReader sr = new StringReader("40 40 The Dracula's haunted Castle\n 200 The Earl Decuras\n")	parseTheWorld(StringReader).getName() == "The Dracula's haunted Castle" parseTheWorld(StringReader).getRow() == 40 parseTheWorld(StringReader).getColumn()

space and 2 item	2\n 2 4 10 8 Throne Room\n 8 18 24 23 Grand Ballroom\n 20\n 8 3 Bloodthirst Blade\n 4 2 Vampire's Fang Dagger\n ")	== 40 parseTheWorld(StringReader).getColumn() == 40 parseTheWorld(StringReader).getSpaces().size() ) == 2 parseTheWorld(StringReader).getItems().size() == 2 parseTheWorld(StringReader).getSpaces().get(0).getName() == "Throne Room"
parseTheWorld() but pass an wrong space from the StringReader	StringReader sr = new StringReader("40 40 The Dracula's haunted Castle\n 200 The Earl Decuras\n 2\n 11 9 10 8 Throne Room\n 8 18 24 23 Grand Ballroom\n 20\n 0 3 Bloodthirst Blade\n 1 2 Vampire's Fang Dagger\n ")	The first space parameters are illegal, so it won't be add into TheWorld instance. parseTheWorld(StringReader).getSpaces().size() ) == 1 parseTheWorld(StringReader).getSpaces().getFirst().getName() == "Grand Ballroom"

When the World created, we can test all setter and getter for the facade, since facade is a agent of the model, so most setter and getter is only a wrapper for the method in the base class

Test	Input	Expected Value
<b>addPlayerToTheWorld() getItems() getSpaces() getTarget() getPlayers() getTurnOfTheGame() nextTurn()</b>		
Add Player	Player p = new Player(0, "messi", 1, false) addPlayerToTheWorld(p)	getPlayers().get(0).getName() == "messi"
Add 2 players and getPlayer	Player p = new Player(0, "messi", 1, false) addPlayerToTheWorld(p) Player p2 = new Player(1, "rodri", 1, false) addPlayerToTheWorld(p2)	getPlayers().get(0).getName() == "messi" getPlayers().get(1).getName() == "rodri"
Add 2 players and 1 is a robot	Player p = new Player(0, "messi", 1, false) addPlayerToTheWorld(p) Player p2 = new Player(1, "rodri", 1, true) addPlayerToTheWorld(p2)	getPlayers().get(0).getName() == "messi" getPlayers().get(1).getName() == "rodri" getPlayers().get(1).isAutomatic() == true
Get target of the game getItems()		getTarget().getName() == "The Earl Decuras" getItems().size() == 2 getItems().get(0).getName() == "Bloodthirst Blade" getItems().get(1).getName() == "Vampire's Fang Dagger"
getSpaces()		getSpaces().size() == 2 getSpaces().get(0).getName() == "Throne Room" getSpaces().get(1).getName() == "Grand Ballroom"
getTarget() getTurnOfTheGame()	Player p = new Player(0, "messi", 1, false) addPlayerToTheWorld(p) Player p2 = new Player(1, "rodri", 1, true) addPlayerToTheWorld(p2)	getTarget().getName() == "The Earl Decuras" getTurnOfTheGame().getName() == "messi"

nextTurn()	above	getTurnOfTheGame().getName() == "messi" nextTurn().getName() == "rodri" getTurnOfTheGame().getName() == "messi"
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Then, start to test major processing method :

moveTargetToTheNext(), movePlayer(), pickUpAction(), dropOffAction(), lookAroundAction()

Test method	processing Input	Expected Value
moveTargetToTheNext()		getTarget().getSpace().getName() == "Throne Room"
moveTargetToTheNext() 2 time	moveTargetToTheNext(); moveTargetToTheNext();	getTarget().getSpace().getName() == "Grand Ballroom"
moveTargetToTheNext() 3 time, turn back to the first space	moveTargetToTheNext(); moveTargetToTheNext(); moveTargetToTheNext();	getTarget().getSpace().getName() == "Throne Room"
movePlayer()	Player p = new Player(0, "messi", 1, false) movePlayer(p, 0) Player p2 = new Player(1, "rodri", 1, true) movePlayer(p2, 1)	p.getSpace().getName() == "Throne Room" p2.getSpace().getName() == "Grand Ballroom"
Move to a invalid space number	movePlayer(p, 0) movePlayer(p, 2)//invalid	movePlayer(p, 2) == false p.getSpace().getName() == "Throne Room"
pickUpAction()	pickUpAction(p, 0)	p.getItems().get(0).getName() == "Bloodthirst Blade"
pickUpAction() over limit	pickUpAction(p, 0) pickUpAction(p, 1)//over limit	p.getItems().get(0).getName() == "Bloodthirst Blade" p.getItems().size() == 1
pickUpAction() with invalid number	pickUpAction(p, 2)//invalid item	pickUpAction(p, 2) == false p.getItems().size() == 0
dropOffAction()	pickUpAction(p, 0) dropOffAction(p, p.getItems().get(0))	p.getItems().size() == 0
lookAroundFromSpace()	Player p = new Player(0, "messi", 1, false) movePlayer(p, 0) Player p2 = new Player(1, "rodri", 1, true) movePlayer(p2, 1) lookAroundFromSpace(p); lookAroundFromSpace(p2)	lookAroundFromSpace(p) == "this is the player messi, he/she is in the space No.0 Throne Room\n now he/she is watching Space No.1 Grand Ballroom; upleft:6,9; downright:12,17;\n includes 1 items\n - Bloodthirst Blade, cause 3 damage\n it has 1 neighbors\n - Space No.0 Throne Room is a neighbor\n\n lookAroundFromSpace(p2) == "this is the player rodri, he/she is in the space No.1 Grand Ballroom\n now he/she is watching the space No.0 Throne Room; upleft:2,3; downright:5,8;\n includes 1 items\n -Vampire's Fang Dagger, cause 4 damage\n it has 1 neighbors\n - Space No.1 Grand Ballroom is a neighbor\n"

## 2.7 TheWorldController

The world controller use playGame() method to control the model by call TheWorldFacade and pass information from the user input/output to the model and vice versa, playGame use 8 different task helper to deal with user command. To test TheWorldController, we should

firstly make a simple model by pass an small specification and use a stringReader to receive input from user.

Test constructor	Input	Expected Value
TheWorldController(Readable in, Appendable out, int turnLimit())	Readable == null	Throw new IllegalArgumentException
TheWorldController(Readable in, Appendable out, int turnLimit())	turnLimit < 1	Throw new IllegalArgumentException

Then test playGame().

Test playGame	Input	Expected Value
	<b>@Before:</b> StringReader specification= new StringReader("40 40 The Dracula's haunted Castle\n 200 The Earl Decuras\n 2\n 11 9 10 8 Throne Room\n 8 18 24 23 Grand Ballroom\n 20\n 0 3 Bloodthirst Blade\n 1 2 Vampire's Fang Dagger\n "); twf = TheWorldFacade();	
Add 1 human-controlled player and move to space 0, and quit	StringReader sri = new StringReader("\n mac n 0 q"); StringBuilder out =new StringBuilder(); TheWorldController(sri, out, 3). playGame(twf, specification);	<b>out.toString().equals(</b> "Add a player controlled by computer? press Y to create a robot,any other key to create a human-controlled player\n please enter his/her name:(only contains alphabeta)\n new player mac has been add\n Press Y to add more player, press any key to continue the game.\n It is turn 0\n Now is mac turn:\n Enter a move for mac to 0. Throne Room 1. Grand Ballroom 2. Blood Fountain\n mac has already move to Throne Room\n It is turn 1\n Now is mac turn:\n Choose an action for mac, only press 1-8: 1.move to another space 2.pickup an item in the space 3.dropoff an item to the space 4.look around 5.add a player 6.draw the map 7.show a player 8.show a space, quit game press q.\n User quit game, ByeBye!\n ")
Add 1 robot player and move to space 1, and quit	StringReader sri = new StringReader("y messi n 1 q"); StringBuilder out = new StringBuilder(); TheWorldController(sri, out, 3). playGame(twf, specification);	<b>out.toString().equals(</b> "Add a player controlled by computer? press Y to create a robot,any other key to create a human-controlled player\n please enter his/her name:(only contains alphabeta)\n new player messi has been add\n Press Y to add more player, press any key to continue the game.\n It is turn 0\n Now is messi turn:\n Enter a move for messi to 0. Throne Room 1. Grand Ballroom 2. Blood Fountain\n messi has already move to Grand Ballroom\n it is turn 1\n Now is messi turn:\n Choose an action for messi, only press 1-8: 1.move to another space 2.pickup an item in the space 3.dropoff an item to the space 4.look around 5.add a player 6.draw the map 7.show a player 8.show a space, quit game press q.\n User quit game, ByeBye!\n")
Add 2 player and 1 is a robot, seperately move to space 0 and space 1 Expected :Stop at turn 2	StringReader sri = new StringReader("\n mac y y messi n 1 q"); StringBuilder out = new StringBuilder(); TheWorldController(sri, out, 3). playGame(twf, specification);	<b>out.toString().equals(</b> Add a player controlled by computer? press Y to create a robot,any other key to create a human-controlled player\n please enter his/her name:(only contains alphabeta)\n new player mac has been add\n Press Y to add more player, press any key to continue the game. Add a player controlled by computer? press Y to create a robot,any other key to create a human-controlled player\n please enter his/her name:(only contains alphabeta)\n new player messi has been add\n It is turn 0\n Now is mac turn:\n

		<p>Enter a move for mac to 0. Throne Room 1. Grand Ballroom 2. Blood Fountain\n</p> <p>mac has already move to Throne Room\n</p> <p>it is turn 1\n</p> <p>Now is messi turn:\n</p> <p>Enter a move for mac to 0. Throne Room 1. Grand Ballroom 2. Blood Fountain\n</p> <p>messi has already move to Grand Ballroom\n</p> <p>it is turn 2\n</p> <p>Now is mac turn:\n</p> <p>Choose an action for messi, only press 1-8: 1.move to another space 2.pickup an item in the space 3.dropoff an item to the space 4.look around 5.add a player 6.draw the map 7.show a player 8.show a space, quit game press q.\n</p> <p>User quit game, ByeBye!\n")</p>
<p>Add 1 player and move to room 0, then pick up item and quit</p> <p>Expected : 1 item picked up by player</p> <p>Expected: target move to space 1</p> <p>Expected: stop at turn 2</p>	<pre>StringReader sri = new StringReader("n mac n 0 2 0 q"); StringBuilder out = new StringBuilder(); TheWorldController(sri, out, 3). playGame(twf, specification);</pre>	<p><b>out.toString().equals(</b></p> <p>Add a player controlled by computer? press Y to create a robot,any other key to create a human-controlled player\n</p> <p>please enter his/her name:(only contains alphabeta)\n</p> <p>new player mac has been add\n</p> <p>Press Y to add more player, press any key to continue the game.\n</p> <p>It is turn 0\n</p> <p>Now is mac turn:\n</p> <p>Enter a move for mac to 0. Throne Room 1. Grand Ballroom 2. Blood Fountain\n</p> <p>mac has already move to Throne Room\n</p> <p>The Earl Decuras has already moved to No. 0 Throne Room\n</p> <p>It is turn 1\n</p> <p>Now is mac turn:\n</p> <p>Choose an action for mac, only press 1-8: 1.move to another space 2.pickup an item in the space 3.dropoff an item to the space 4.look around 5.add a player 6.draw the map 7.show a player 8.show a space, quit game press q.\n</p> <p>please pick an item showing below.\n</p> <p>0. Bloodthirst Blade\n</p> <p>the item had been picked up by mac.\n</p> <p>The Earl Decuras has already moved to No. 1 Grand Ballroom\n</p> <p>It is turn 2\n</p> <p>Now is mac turn:\n</p> <p>Choose an action for mac, only press 1-8: 1.move to another space 2.pickup an item in the space 3.dropoff an item to the space 4.look around 5.add a player 6.draw the map 7.show a player 8.show a space, quit game press q.\n</p> <p>User quit game, ByeBye!\n")</p>
<p>Add 1 player and move to room 0, then pick up item 0 and try to pick up another(but there is no more in the space)and quit</p> <p>Expected : 1 item picked up by player( 1 pickup fail for being out of limit)</p> <p>Expected : prompts for there is no more items</p>	<pre>StringReader sri = new StringReader("n mac n 0 2 0 2 q"); StringBuilder out = new StringBuilder(); TheWorldController(sri, out, 3). playGame(twf, specification);</pre>	<p><b>out.toString().equals(</b></p> <p>Add a player controlled by computer? press Y to create a robot,any other key to create a human-controlled player\n</p> <p>please enter his/her name:(only contains alphabeta)\n</p> <p>Mac\n</p> <p>new player mac has been add\n</p> <p>Press Y to add more player, press any key to continue the game.\n</p> <p>It is turn 0\n</p> <p>Now is mac turn:\n</p> <p>Enter a move for mac to 0. Throne Room 1. Grand Ballroom 2. Blood Fountain\n</p> <p>mac has already move to Throne Room\n</p> <p>The Earl Decuras has already moved to No. 0 Throne Room\n</p> <p>It is turn 1\n</p> <p>Now is mac turn:\n</p> <p>Choose an action for mac, only press 1-8: 1.move to another space 2.pickup an item in the space 3.dropoff an item to the space 4.look around 5.add a player 6.draw the map 7.show a player 8.show a space, quit game press q.\n</p> <p>please pick an item showing below.\n</p> <p>0. Bloodthirst Blade\n</p> <p>the item had been picked up by mac.\n</p> <p>The Earl Decuras has already moved to No. 1 Grand Ballroom\n</p> <p>It is turn 2\n</p> <p>Now is mac turn:\n</p> <p>Choose an action for mac, only press 1-8: 1.move to another space 2.pickup an item in the space 3.dropoff an item to the space 4.look around 5.add a player 6.draw the map 7.show a player 8.show a space, quit game press q.\n</p> <p>there is no item list in the room. try something different to do.\n</p> <p>It is turn 2\n</p> <p>Now is mac turn:\n</p> <p>Choose an action for mac, only press 1-8: 1.move to another space 2.pickup an item in the space 3.dropoff an item to the space 4.look around 5.add a player 6.draw the map 7.show a player 8.show a space, quit game press q.\n</p> <p>User quit game, ByeBye!\n")</p>
<p>Add 1 player and move to room 0, then pick up item 0 and move to room 1 and pick up</p>	<pre>StringReader sri = new StringReader("n mac n 0 2 0 1 1 2 q"); StringBuilder out = new</pre>	<p><b>out.toString().equals(</b></p> <p>Add a player controlled by computer? press Y to create a robot,any other key to create a human-controlled player\n</p> <p>please enter his/her name:(only contains alphabeta)\n</p> <p>new player mac has been add\n</p>

<p>item 1 and quit Expected : 1 item picked up by player( 1 pickup fail for being out of limit) Expected: target move to space 2 Expected: stop at turn 3</p>	<pre>StringBuilder(); TheWorldController(sri, out, 3). playGame(twf, specification);</pre>	<p>Press Y to add more player, press any key to continue the game.\n It is turn 0\n Now is mac turn:\n Enter a move for mac to 0. Throne Room 1. Grand Ballroom 2. Blood Fountain \n mac has already move to Throne Room\n The Earl Decuras has already moved to No. 0 Throne Room\n It is turn 1\n Now is mac turn:\n Choose an action for mac, only press 1-8: 1.move to another space 2.pickup an item in the space 3.dropoff an item to the space 4.look around 5.add a player 6.draw the map 7.show a player 8.show a space, quit game press q.\n please pick an item showing below.\n 0. Bloodthirst Blade\n the item had been picked up by mac.\n The Earl Decuras has already moved to No. 1 Grand Ballroom\n It is turn 2\n Now is mac turn:\n Choose an action for mac, only press 1-8: 1.move to another space 2.pickup an item in the space 3.dropoff an item to the space 4.look around 5.add a player 6.draw the map 7.show a player 8.show a space, quit game press q.\n Enter a move for mac to 1. Grand Ballroom\n mac has already move to Grand Ballroom\n The Earl Decuras has already moved to No. 2 Blood Fountain\n It is turn 3\n Now is mac turn:\n Choose an action for mac, only press 1-8: 1.move to another space 2.pickup an item in the space 3.dropoff an item to the space 4.look around 5.add a player 6.draw the map 7.show a player 8.show a space, quit game press q\n mac has no room to carry more items, try to drop off an item first.\n It is turn 3\n Now is mac turn:\n Choose an action for mac, only press 1-8: 1.move to another space 2.pickup an item in the space 3.dropoff an item to the space 4.look around 5.add a player 6.draw the map 7.show a player 8.show a space, quit game press q.\n User quit game, ByeBye!\n</p>
<p>Add 1 player and move to room 0, then pick up item 0 and dropoff item 0 and quit Expected : 1 item picked up by player Expected: 1 item drop off Expected: target move to space 2 Expected: stop at turn 3</p>	<pre>StringReader sri = new StringReader("n mac n 0 2 0 3 0 q"); StringBuilder out =new StringBuilder(); TheWorldController(sri, out, 3). playGame(twf, specification);</pre>	<p><b>out.toString().equals(</b> Add a player controlled by computer? press Y to create a robot,any other key to create a human-controlled player\n please enter his/her name:(only contains alphabeta)\n new player mac has been add\n Press Y to add more player, press any key to continue the game.\n It is turn 0\n Now is mac turn:\n Enter a move for mac to 0. Throne Room 1. Grand Ballroom 2. Blood Fountain\n mac has already move to Throne Room\n The Earl Decuras has already moved to No. 0 Throne Room\n It is turn 1\n Now is mac turn:\n Choose an action for mac, only press 1-8: 1.move to another space 2.pickup an item in the space 3.dropoff an item to the space 4.look around 5.add a player 6.draw the map 7.show a player 8.show a space, quit game press q.\n please pick an item showing below.\n 0. Bloodthirst Blade \n the item had been picked up by mac.\n The Earl Decuras has already moved to No. 1 Grand Ballroom\n It is turn 2\n Now is mac turn:\n Choose an action for mac, only press 1-8: 1.move to another space 2.pickup an item in the space 3.dropoff an item to the space 4.look around 5.add a player 6.draw the map 7.show a player 8.show a space, quit game press q.\n please leave an item in the space, items are shown below.\n 0. Bloodthirst Blade\n the item had been drop off by mac.\n The Earl Decuras has already moved to No. 2 Blood Fountain\n <b>It is turn 3</b>\n Now is mac turn:\n Choose an action for mac, only press 1-8: 1.move to another space 2.pickup an item in the space 3.dropoff an item to the space 4.look around 5.add a player 6.draw the map 7.show a player 8.show a space, quit game press q.\n User quit game, ByeBye!\n</p>
<p>Try to drop off item but there is no item carried by the player Expected: stop at turn 1</p>	<pre>StringReader sri = new StringReader("n mac n 0 3 q"); StringBuilder out =new StringBuilder(); TheWorldController(sri, out, 3).</pre>	<p><b>out.toString().equals(</b> Add a player controlled by computer? press Y to create a robot,any other key to create a human-controlled player\n please enter his/her name:(only contains alphabeta)\n new player mac has been add\n Press Y to add more player, press any key to continue the game.\n</p>



Drop off do not complete, so it still be turn 1. Target is still in space 0( for the reason that turn 1 was not completed)	playGame(twf, specification);	It is turn 0\nNow is mac turn:\nEnter a move for mac to 0. Throne Room 1. Grand Ballroom 2. Blood Fountain\nmac has already move to Throne Room\n <b>The Earl Decuras has already moved to No. 0 Throne Room</b> \nIt is turn 1\nNow is mac turn:\nChoose an action for mac, only press 1-8: 1.move to another space 2.pickup an item in the space 3.dropoff an item to the space 4.look around 5.add a player 6.draw the map 7.show a player 8.show a space, quit game press q.\nthere is no item carried by mac. try something different to do.\n <b>It is turn 1</b> \nNow is mac turn:\nChoose an action for mac, only press 1-8: 1.move to another space 2.pickup an item in the space 3.dropoff an item to the space 4.look around 5.add a player 6.draw the map 7.show a player 8.show a space, quit game press q.\nUser quit game, ByeBye!\n)
Add 1 player and move to room 0, and check space1 description and q Expected : Expected: target move to space 0 Expected: stop at turn 1	StringReader sri = new StringReader("\n mac n 0 8 1 q"); StringBuilder out =new StringBuilder(); TheWorldController(sri, out, 3). playGame(twf, specification);	<b>out.toString().equals(</b> Add a player controlled by computer? press Y to create a robot,any other key to create a human-controlled player\nplease enter his/her name:(only contains alphabeta)\nnew player mac has been add\nPress Y to add more player, press any key to continue the game.\nIt is turn 0\nNow is mac turn:\nEnter a move for mac to 0. Throne Room 1. Grand Ballroom 2. Blood Fountain\nmac has already move to Throne Room\n <b>The Earl Decuras has already moved to No. 0 Throne Room</b> \nIt is turn 1\nNow is mac turn:\nChoose an action for mac, only press 1-8: 1.move to another space 2.pickup an item in the space 3.dropoff an item to the space 4.look around 5.add a player 6.draw the map 7.show a player 8.show a space, quit game press q.\nplease pick a space to show description\n0. Throne Room 1. Grand Ballroom 2. Blood Fountain\nSpace No.1 Grand Ballroom; upleft:5,8; downright:18,9;\nincludes 1 items\n- Vampire's Fang Dagger, cause 2 damage\nit has 2 neighbors\n- Space No.0 Throne Room is a neighbor\n- Space No.2 Blood Fountain is a neighbor\nIt is turn 1\nNow is mac turn:\nChoose an action for mac, only press 1-8: 1.move to another space 2.pickup an item in the space 3.dropoff an item to the space 4.look around 5.add a player 6.draw the map 7.show a player 8.show a space, quit game press q.\nUser quit game, ByeBye!\n)
Add 1 player and move to room 0, and check player description and q Expected : Expected: target move to space 0 Expected: stop at turn 1	StringReader sri = new StringReader("\n mac n 0 7 0 q"); StringBuilder out =new StringBuilder(); TheWorldController(sri, out, 3). playGame(twf, specification);	<b>out.toString().equals(</b> Add a player controlled by computer? press Y to create a robot,any other key to create a human-controlled player\nplease enter his/her name:(only contains alphabeta)\nnew player mac has been add\nPress Y to add more player, press any key to continue the game.\nIt is turn 0\nNow is mac turn:\nEnter a move for mac to 0. Throne Room 1. Grand Ballroom 2. Blood Fountain\nmac has already move to Throne Room\n <b>The Earl Decuras has already moved to No. 0 Throne Room</b> \nIt is turn 1\nNow is mac turn:\nChoose an action for mac, only press 1-8: 1.move to another space 2.pickup an item in the space 3.dropoff an item to the space 4.look around 5.add a player 6.draw the map 7.show a player 8.show a space, quit game press q.\nplease pick a player to show description\n0. mac\n <b>this is the player mac, he/she is in the space No.0 Throne Room</b> \nIt is turn 1\nNow is mac turn:\nChoose an action for mac, only press 1-8: 1.move to another space 2.pickup an item in the space 3.dropoff an item to the space 4.look around 5.add a player 6.draw the map 7.show a player 8.show a space, quit game press q.\nUser quit game, ByeBye!\n)
Add 1 player and move to room 0 and look around and quit	StringReader sri = new StringReader("\n mac n 0 4 q"); StringBuilder out =new	<b>out.toString().equals(</b> Add a player controlled by computer? press Y to create a robot,any other key to create a human-controlled player\nplease enter his/her name:(only contains alphabeta)\n

<p>Expected: target move to space 1 Expected: stop at turn 2</p>	<pre>StringBuilder(); TheWorldController(sri, out, 3). playGame(twf, specification);</pre>	<p>new player mac has been add\n Press Y to add more player, press any key to continue the game.\n It is turn 0\n Now is mac turn:\n Enter a move for mac to 0. Throne Room 1. Grand Ballroom 2. Blood Fountain \n mac has already move to Throne Room\n The Earl Decuras has already moved to No. 0 Throne Room\n It is turn 1\n Now is mac turn:\n Choose an action for mac, only press 1-8: 1.move to another space 2.pickup an item in the space 3.dropoff an item to the space 4.look around 5.add a player 6.draw the map 7.show a player 8.show a space, quit game press q.\n <b>this is the player mac, he/she is in the space No.0 Throne Room\n</b> <b>now he/she is watching the space:\n</b> <b>Space No.1 Grand Ballroom; upleft:5,8; downright:18,9;\n</b> <b>includes 1 items\n</b> <b>- Vampire's Fang Dagger, cause 2 damage\n</b> <b>it has 2 neighbors\n</b> <b>- Space No.0 Throne Room is a neighbor\n</b> <b>- Space No.2 Blood Fountain is a neighbor\n</b> <b>The Earl Decuras has already moved to No. 1 Grand Ballroom\n</b> It is turn 2\n Now is mac turn:\n Choose an action for mac, only press 1-8: 1.move to another space 2.pickup an item in the space 3.dropoff an item to the space 4.look around 5.add a player 6.draw the map 7.show a player 8.show a space, quit game press q.\n User quit game, ByeBye!\n</p>
<p>move 4 time and game stopped by excess the turn limits Expected: target move to space 0(round back) Expected: player move to space 1(0,1,2,1) Expected: stop at turn 3(run 4 times)</p>	<pre>StringReader sri = new StringReader("n mac n 0 1 1 1 2 1 1 "); StringBuilder out =new StringBuilder(); TheWorldController(sri, out, 3). playGame(twf, specification);</pre>	<p><b>out.toString().equals(</b> Add a player controlled by computer? press Y to create a robot,any other key to create a human-controlled player\n please enter his/her name:(only contains alphabet)\n new player mac has been add\n Press Y to add more player, press any key to continue the game.\n It is turn 0\n Now is mac turn:\n Enter a move for mac to 0. Throne Room 1. Grand Ballroom 2. Blood Fountain\n mac has already move to Throne Room\n The Earl Decuras has already moved to No. 0 Throne Room\n It is turn 1\n Now is mac turn:\n Choose an action for mac, only press 1-8: 1.move to another space 2.pickup an item in the space 3.dropoff an item to the space 4.look around 5.add a player 6.draw the map 7.show a player 8.show a space, quit game press q.\n Enter a move for mac to 1. Grand Ballroom\n mac has already move to Grand Ballroom\n The Earl Decuras has already moved to No. 1 Grand Ballroom\n It is turn 2\n Now is mac turn:\n Choose an action for mac, only press 1-8: 1.move to another space 2.pickup an item in the space 3.dropoff an item to the space 4.look around 5.add a player 6.draw the map 7.show a player 8.show a space, quit game press q.\n Enter a move for mac to 0. Throne Room 2. Blood Fountain\n mac has already move to Blood Fountain\n The Earl Decuras has already moved to No. 2 Blood Fountain\n It is turn 3\n Now is mac turn:\n Choose an action for mac, only press 1-8: 1.move to another space 2.pickup an item in the space 3.dropoff an item to the space 4.look around 5.add a player 6.draw the map 7.show a player 8.show a space, quit game press q.\n Enter a move for mac to 1. Grand Ballroom\n <b>mac has already move to Grand Ballroom\n</b> <b>The Earl Decuras has already moved to No. 0 Throne Room\n</b> <b>You have played enough turns, game is over, ByeBye!\n</b></p>
<p>Add a robot,and run to the end (stopped by excessing the turn limits) Expected: target move to space 0(round back) Expected: player move to space 1(1)</p>	<pre>Use mocking TheWorldFacade, to make sure that robot can run every action orderly(first move to space 1,and pickup an item,and dropoff an item,and lookaround and the move to space 2,and go on...) StringReader sri = new</pre>	<p><b>out.toString().equals(</b> Add a player controlled by computer? press Y to create a robot,any other key to create a human-controlled player\n please enter his/her name:(only contains alphabet)\n new player mac has been add\n Press Y to add more player, press any key to continue the game.\n It is turn 0\n Now is mac turn:\n <b>mac has already move to Grand Ballroom\n</b> The Earl Decuras has already moved to No. 0 Throne Room\n It is turn 1\n</p>



<p>Expected: stop at turn 3(run 4 times)</p>	<pre>StringReader("y mac n "); StringBuilder out =new StringBuilder(); TheWorldController(sri, out, 3). playGame(twtf, specification);</pre>	<p>Now is mac turn:\n  mac decide to pickup an item\n  please pick an item showing below.\n  1. Vampire's Fang Dagger \n  <b>the item had been picked up by mac.\n</b>  The Earl Decuras has already moved to No. 1 Grand Ballroom\n  It is turn 2\n  Now is mac turn:\n  mac decide to drop off an item to the space\n  please leave an item in the space, items are shown below.\n  1. Vampire's Fang Dagger \n  <b>the item had been left to the space Grand Ballroom by mac.\n</b>  The Earl Decuras has already moved to No. 2 Blood Fountain\n  It is turn 3\n  Now is mac turn:\n  mac decide to look up around\n  <b>this is the player mac, he/she is in the space No.1 Grand Ballroom\n</b>  <b>now he/she is watching the space:\n</b>  <b>Space No.0 Throne Room; upleft:7,6; downright:13,7;\n</b>  <b>includes 1 items\n</b>  - Bloodthirst Blade, cause 3 damage\n  it has 1 neighbors\n  - Space No.1 Grand Ballroom is a neighbor\n  <b>now he/she is watching the space:\n</b>  <b>Space No.2 Blood Fountain; upleft:2,7; downright:4,10;\n</b>  <b>includes 1 items\n</b>  - Shadow Scythe, cause 2 damage\n  it has 1 neighbors\n  - Space No.1 Grand Ballroom is a neighbor\n  <b>The Earl Decuras has already moved to No. 0 Throne Room\n</b>  You have played enough turns, game is over, ByeBye!\n)</p>
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