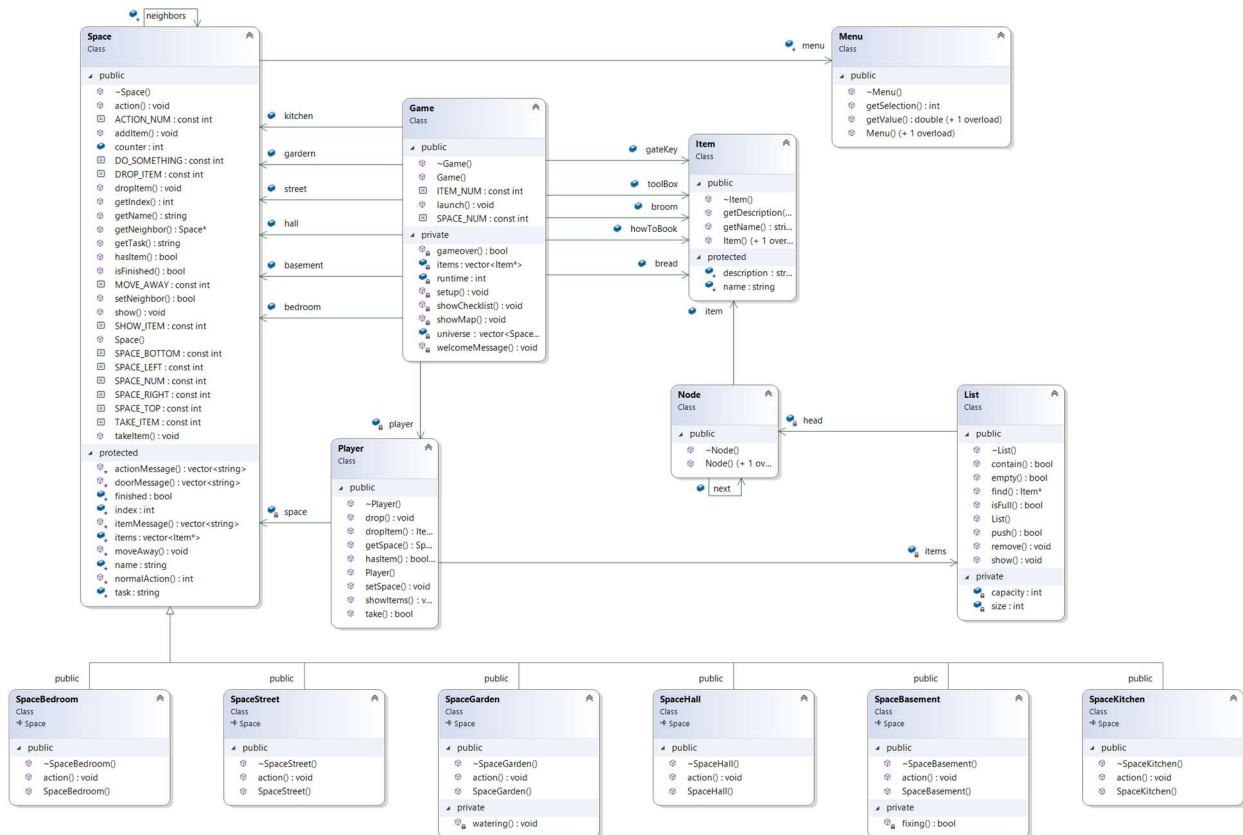Brendan Jang

CS 162

Final Project Reflection

1. Design description
   a. Class diagram

   b. Description
      i. Abstraction and derived classes
         1. Abstraction class:
            a. Class Space
            b. Pure virtual function: virtual void action(Player * player) = 0;
         2. Derived classes
            a. SpaceStreet
            b. SpaceHall
            c. SpaceKitchen
            d. SpaceBedroom
            e. SpaceGarden
            f. SpaceBasement
      ii. Other classes
         1. Menu: provide menu function
         2. Item: items in the game

3. List: the container of all items, the container has a capacity limit
4. Player: the player
5. Node: the container of an item in the list

iii. Gameplay
1. The user can choose the number of steps to be taken before the time expires.
2. The user has to select options from a menu. There is no free form input.
3. Input validation is applied

c. Scenario
i. The player starts in the street outside of the house.
ii. He has to pass through all rooms in the house, fulfill all tasks and then get back to the street.
iii. The key to open the main gate is in the street, it's under the red brick.
iv. After getting into the house, the player is in the hall. He has to sweep the hall.
v. From the hall, he can go upstairs to the bedroom, downstairs to the basement, left to the street, or right to the kitchen.
vi. He has to bring the textbook to help him water the garden then put it in the bedroom.
vii. He has to deliver the bread to her mother in the kitchen.
viii. He has to carry the toolbox to the basement to fix the washing machine. He has to do a calculation there to fix it.

2. Test plan

Test case	Input value	Driver function	Expected Outcome	Observed Outcome
Small step limit	1 1 5 1	main()	Enter the number of steps to run this game Enter a value from 1 to 600: 1 Welcome to The Errand Game You are DJ, a random boy who is running errands. You are coming home from the bakery. You are going to deliver the bread to your mom who is in the kitchen. Next, you will clean the hall with your grandpa's broom, bring toolbox to the basement to fix the washing machine and water plants in the garden.	Enter the number of steps to run this game Enter a value from 1 to 600: 1 Welcome to The Errand Game You are DJ, a random boy who is running errands. You are coming home from the bakery. You are going to deliver the bread to your mom who is in the kitchen. Next, you will clean the hall with your grandpa's broom, bring toolbox to the basement to fix the washing machine and water plants in the garden.

			Then bringing the textbook to the bedroom You will go out to the street when you finish the game We have 1 step left What do you want to do 1. Look around 2, Show the map 3, Look at the checklist Enter a value from 1 to 3: 1 You are in the street Item in the street: 　　key: Gate Key Ways out of the street 　　right direction to the hall What are you going to do 1. Take item 2. Drop item 3. Show items in the bag 4. Move away 5. Pick the key from the hole which is hidden under the red brick Enter a value from 1 to 5: 5 Do you want to take the 'Gate Key' 1, Yes 2. No Enter a value from 1 to 2: 1 Good, You have picked the key You lose	Then bringing the textbook to the bedroom You will go out to the street when you finish the game We have 1 step left What do you want to do 1. Look around 2, Show the map 3, Look at the checklist Enter the value from 1 to 3: 1 You are in the street Item in the street: 　　key: Gate Key Ways out of the street 　　right direction to the hall What are you going to do 1. Take item 2. Drop item 3. Show items in the bag 4. Move away 5. Pick the key from the hole which is hidden under the red brick Enter a value from 1 to 5: 5 Do you want to take the 'Gate Key' 1, Yes 2. No Enter a value from 1 to 2: 1 Good, You have picked the key You lose
Show the player's progress	1 3	Game.launch()	Enter the number of steps to run this game Enter a value from 1 to 600: 1 Welcome to The Errand Game You are DJ, a random boy who is running errands. You are coming home from the bakery You are going to deliver the bread to your mom who is in the kitchen. Next, you will clean the hall with your grandpa's broom,	Enter the number of steps to run this game Enter a value from 1 to 600: 1 Welcome to The Errand Game You are DJ, a random boy who is running errands. You are coming home from the bakery You are going to deliver the bread to your mom who is in the kitchen. Next, you will clean the hall with your grandpa's broom,

			bring toolbox to the basement to fix the washing machine and water plants in the garden. Then bringing the textbook to the bedroom You will go out to the street when you finish the game We have 1 step left What do you want to do 1. Look around 2, Show the map 3, Look at the checklist Enter a value from 1 to 3: 3 Checklist Take the toolbox to the basement to fix the washing machine: UNCHECKED Bring the book to the bedroom and put it on the shelf: UNCHECKED Watering all plants: UNCHECKED Sweep the hall: UNCHECKED Give the bread to Mom: UNCHECKED Pick the key from the hole which is hidden under the red brick: UNCHECKED You lose	bring toolbox to the basement to fix the washing machine and water plants in the garden. Then bringing the textbook to the bedroom You will go out to the street when you finish the game We have 1 step left What do you want to do 1. Look around 2, Show the map 3, Look at the checklist Enter a value from 1 to 3: 3 Checklist Take the toolbox to the basement to fix the washing machine: UNCHECKED Bring the book to the bedroom and put it on the shelf: UNCHECKED Watering all plants: UNCHECKED Sweep the hall: UNCHECKED Give the bread to Mom: UNCHECKED Pick the key from the hole which is hidden under the red brick: UNCHECKED You lose
Show the map	1 2	Game.launch()	Enter the number of steps to run this game Enter a value from 1 to 600: 1 Welcome to The Errand Game You are DJ, a random boy who is running errands. You are coming home from the bakery You are going to deliver the bread to your mom who is in the kitchen.	Enter the number of steps to run this game Enter a value from 1 to 600: 1 Welcome to The Errand Game You are DJ, a random boy who is running errands. You are coming home from the bakery You are going to deliver the bread to your mom who is in the kitchen.

			Next, you will clean the hall with your grandpa's broom, bring toolbox to the basement to fix the washing machine and water plants in the garden. Then bringing the textbook to the bedroom You will go out to the street when you finish the game
			
			We have 1 step left
			What do you want to do
			1. Look around
			2, Show the map
			3, Look at the checklist
			Enter a value from 1 to 3: 2
			Map
			            |bedroom |
			   street | hall | kitchen |
			garden
			          |basement|
			You are at street
			
			You lose
				Next, you will clean the hall with your grandpa's broom, bring toolbox to the basement to fix the washing machine and water plants in the garden. Then bringing the textbook to the bedroom You will go out to the street when you finish the game
				
				We have 1 step left
				What do you want to do
				1. Look around
				2, Show the map
				3, Look at the checklist
				Enter a value from 1 to 3: 2
				Map
				            |bedroom |
				   street | hall | kitchen
				| garden
				          |basement|
				You are at street
				
				You lose

Game play	30 1 5
	1 1 4 3
	2 1 2 0
	1 1 0 1
	5 1 1 0
	1 2 0 1
	1 1 3 1
	4 3 1
	5 1 1 4
	3 1 1 5
	1 3 1 4
	1 1 4 1
	1 4 0 1
	5 1 4 2
	1 1 0 1
	1 0 1 4
	2 1 5 1
	48 1 4
	0 1 4 1
		Game.launch()	You are in the hall
			Item in the hall:
			     box: Tool Box
			     book: How To Fix
			     Everything For Dummy
			     key: Gate Key
			     broom: Corn Broom with
			     Solid Wood Handle
			Ways out of the hall
			     top direction to the
			     bedroom
			     left direction to the
			     street
			     bottom direction to the
			     basement
			     right direction to the
			     kitchen
			What are you going to do
			1. Take item
			2. Drop item
			3. Show items in the bag
			4. Move away
				You are in the hall
				Item in the hall:
				     box: Tool Box
				     book: How To Fix
				     Everything For Dummy
				     key: Gate Key
				     broom: Corn Broom
				     with Solid Wood Handle
				Ways out of the hall
				     top direction to the
				     bedroom
				     left direction to the
				     street
				     bottom direction to the
				     basement
				     right direction to the
				     kitchen
				What are you going to do
				1. Take item
				2. Drop item
				3. Show items in the bag
				4. Move away

| | | | | 5. Sweep the hall
Enter a value from 1 to 5: 1
What do you want to take
0. box: Tool Box
1. book: How To Fix Everything For Dummy
2. key: Gate Key
3. broom: Corn Broom with Solid Wood Handle
Enter a value from 0 to 3: 1
You have taken 'How To Fix Everything For Dummy'

We have 21 steps left
What do you want to do
1. Look around
2, Show the map
3, Look at the checklist
Enter a value from 1 to 3: 3
Checklist
      Take the toolbox to the basement to fix the washing machine: UNCHECKED
      Bring the book to the bedroom and put it on the shelf: UNCHECKED
      Watering all plants: UNCHECKED
      Sweep the hall: CHECKED
      Give the bread to Mom: UNCHECKED
      Pick the key from the hole which is hidden under the red brick: CHECKED

We have 20 steps left
What do you want to do
1. Look around
2, Show the map
3, Look at the checklist
Enter a value from 1 to 3: 1
You are in the hall
Item in the hall:
      box: Tool Box
      key: Gate Key | 5. Sweep the hall
Enter a value from 1 to 5: 1
What do you want to take
0. box: Tool Box
1. book: How To Fix Everything For Dummy
2. key: Gate Key
3. broom: Corn Broom with Solid Wood Handle
Enter a value from 0 to 3: 1
You have taken 'How To Fix Everything For Dummy'

We have 21 steps left
What do you want to do
1. Look around
2, Show the map
3, Look at the checklist
Enter a value from 1 to 3: 3
Checklist
      Take the toolbox to the basement to fix the washing machine: UNCHECKED
      Bring the book to the bedroom and put it on the shelf: UNCHECKED
      Watering all plants: UNCHECKED
      Sweep the hall: CHECKED
      Give the bread to Mom: UNCHECKED
      Pick the key from the hole which is hidden under the red brick: CHECKED

We have 20 steps left
What do you want to do
1. Look around
2, Show the map
3, Look at the checklist
Enter a value from 1 to 3: 1
You are in the hall
Item in the hall:
      box: Tool Box
      key: Gate Key |

			broom: Corn Broom with Solid Wood Handle
			Ways out of the hall
			    top direction to the bedroom
			    left direction to the street
			    bottom direction to the basement
			    right direction to the kitchen
			What are you going to do
			1. Take item
			2. Drop item
			3. Show items in the bag
			4. Move away
			5. Sweep the hall
			Enter a value from 1 to 5: 4
			What direction you go to
			0. Go to the top direction to the bedroom
			1. Go to left direction to the street
			2. Go to bottom direction to the basement
			3. Go to the right direction to the kitchen
			Enter a value from 0 to 4: 3
			
			We have 19 steps left
			What do you want to do
			1. Look around
			2, Show the map
			3, Look at the checklist
			Enter a value from 1 to 3: 1
			You are in the kitchen
			Ways out of the kitchen
			    left direction to the hall
			    right direction to the garden
			What are you going to do
			1. Take item
			2. Drop item
			3. Show items in the bag
			4. Move away
			5. Give the bread to Mom
			Enter a value from 1 to 5: 5
				broom: Corn Broom with Solid Wood Handle
				Ways out of the hall
				    top direction to the bedroom
				    left direction to the street
				    bottom direction to the basement
				    right direction to the kitchen
				What are you going to do
				1. Take item
				2. Drop item
				3. Show items in the bag
				4. Move away
				5. Sweep the hall
				Enter value from 1 to 5: 4
				What direction you go to
				0. Go to top direction to the bedroom
				1. Go to left direction to the street
				2. Go to bottom direction to the basement
				3. Go to right direction to the kitchen
				Enter value from 0 to 4: 3
				
				We have 19 step left
				What do you want to do
				1. Look around
				2, Show the map
				3, Look at checklist
				Enter value from 1 to 3: 1
				You are in the kitchen
				Ways out of the kitchen
				    left direction to the hall
				    right direction to the garden
				What are you going to do
				1. Take item
				2. Drop item
				3. Show items in bag
				4. Move away
				5. Give the bread to Mom
				Enter value from 1 to 5: 5

			Do you want to give the bread to Mom
			1, Yes
			2. No
			Enter a value from 1 to 2: 1
			Good, You have finished today errand
			
			We have 18 steps left
			What do you want to do
			1. Look around
			2, Show the map
			3, Look at the checklist
			Enter a value from 1 to 3: 1
			You are in the kitchen
			Item in the kitchen:
			    bread: Texas Toast
			Ways out of the kitchen
			    left direction to the hall
			    right direction to the garden
			What are you going to do
			1. Take item
			2. Drop item
			3. Show items in the bag
			4. Move away
			5. Give the bread to Mom
			Enter a value from 1 to 5: 4
			What direction you go to
			0. Go to top direction back to the kitchen
			1. Go to left direction to the hall
			2. Go to bottom direction back to the kitchen
			3. Go to the right direction to the garden
			Enter a value from 0 to 4: 3
			
			We have 17 steps left
			What do you want to do
			1. Look around
			2, Show the map
			3, Look at the checklist
			Enter a value from 1 to 3: 1
			You are in the garden
			Ways out of the garden
			    left direction to the kitchen
				Do you want to give the bread to Mom
				1, Yes
				2. No
				Enter value from 1 to 2: 1
				Good, You have finished today errand
				
				We have 18 step left
				What do you want to do
				1. Look around
				2, Show the map
				3, Look at checklist
				Enter value from 1 to 3: 1
				You are in the kitchen
				Item in the kitchen:
				    bread: Texas Toast
				Ways out of the kitchen
				    left direction to the hall
				    right direction to the garden
				What are you going to do
				1. Take item
				2. Drop item
				3. Show items in bag
				4. Move away
				5. Give the bread to Mom
				Enter value from 1 to 5: 4
				What direction you go to
				0. Go to top direction back to the kitchen
				1. Go to left direction to the hall
				2. Go to bottom direction back to the kitchen
				3. Go to right direction to the garden
				Enter value from 0 to 4: 3
				
				We have 17 step left
				What do you want to do
				1. Look around
				2, Show the map
				3, Look at checklist
				Enter value from 1 to 3: 1
				You are in the garden
				Ways out of the garden
				    left direction to the kitchen

				What are you going to do 1. Take item 2. Drop item 3. Show items in the bag 4. Move away 5. Watering all plants Enter a value from 1 to 5: 5 Do you want to water all the plants in the garden 1, Yes 2. No Enter a value from 1 to 2: 1 OK, let's read the textbook Page 254 How to Water Plants Effectively So it now came to gardening! Want the most from your plants? To thrive, any plant needs the right amount and kind of sun, water, heat, and soil. Watering your plants is key to keeping them healthy. 1. Check the soil carefully. There are two types of soil: Dry soil - It can be identified if the soil is sandy and has cracks in it. Clay soil - If the soil is sticky and muddy then it is clay soil. 2. Look at the type of plant. Is the plant younger, or a newly grown, or an older one. Younger plants can be at most 4-5 years of age. Then they are categorized as older plants. 3. Research how much water your plants need. This varies from species to species, so look online or in gardening books. 4. See if the soil is wet. If the plants are grown in	What are you going to do 1. Take item 2. Drop item 3. Show items in bag 4. Move away 5. Watering all plants Enter value from 1 to 5: 5 Do you want to water all plants in the garden 1, Yes 2. No Enter value from 1 to 2: 1 OK, let's read the textbook Page 254 How to Water Plants Effectively So it now came to gardening! Want the most from your plants? To thrive, any plant needs the right amount and kind of sun, water, heat and soil. Watering your plants is key to keeping them healthy. 1.Check soil carefully. There are two types of soil: Dry soil - It can be identified if the soil is sandy and has cracks in it. Clay soil - If the soil is sticky and muddy then it is clay soil. 2. Look at the type of plant. Is the plant younger, or a newly grown, or an older one. Younger plants can be at most 4-5 years of age. Then they are categorised as older plants. 3. Research how much water your plants need. This varies from species to species, so look online or in gardening books. 4. See if the soil is wet. If the plants are grown

			dry soil, it would need more amount of water and clay soil obviously needs less amount of water as it has more moisture. 5. Give appropriate water. Remember that different kinds and ages of plants have different requirements. Younger ones typically need less water than older ones, while newly planted ones need only small amount of water. 6. Get the timing right. The best time of day to water is always in the morning. This gives the plant time to absorb the water and get ready to handle the heat, cold, or just the energy it takes to produce chlorophyll, grow, and move nutrients around. If you water in the late afternoon or evening, the problem is that the plant is now wet and the air temperature is cool. Those are the best conditions for mildews, molds, and all kinds of disease problems. Keep life simple, water in the morning. 7. Concentrate watering on the roots. Roots require more water than leaves. In fact, roots only require water. As said earlier wet leaves will lead to diseases. 8. Water slowly. Watering fast is like giving just 20% of water to plants rest all	in dry soil, it would need more amount of water and clay soil obviously needs less amount of water as it has more moisture. 5. Give appropriate water. Remember that different kinds and ages of plants have different requirements. Younger ones typically need less water than older ones, while newly planted ones need only small amount of water. 6. Get the timing right.The best time of day to water is always in the morning. This gives the plant time to absorb the water and get ready to handle heat, cold, or just the energy it takes to produce chlorophyll, grow, and move nutrients around.If you water in the late afternoon or evening, the problem is that the plant is now wet and the air temperature is cool. Those are the best conditions for mildews, molds, and all kinds of disease problems. Keep life simple, water in the morning. 7. Concentrate watering on the roots. Roots require more water than leaves. In fact roots only require water. As said earlier wet leaves will lead to diseases. 8. Water slowly. Watering fast is like giving just 20% of water to plants rest all

			waste.[1] Water slower. Doing this water will remain around roots, as a result, it will get more water. Watering fast may generate a great flow, causing erosion and leading to most of the water flowing away anyway.	waste.[1] Water slower. Doing this water will remain around roots as a result it will get more water. Watering fast may generate a great flow, causing erosion and leading to most of the water flowing away anyway.
			9. Use a rain gauge. It measures how many centimetres the rain falls in that area so you would be able to give plants the desired quantity of water.	9. Use a rain gauge. It measures how many centimeter the rain falls in that area so you would be able to give plants the desired quantity of water.
			10. Use a sprinkler in your garden. Sprinklers are very effective. They give water to plants at the proper time, and you don't have to worry about doing it with a hose or watering can. It is similar to the drop-by-drop method (irrigation method used in farming).	10. Use a sprinkler in your garden. Sprinklers are very effective. They give water to plants at the proper time, and you don't have to worry about doing it with a hose or watering can. It is similar to the drop-by-drop method (irrigation method used in farming).
			11. Micro-drip irrigation systems can be installed to deliver water directly to where the plants can use it. Applied slowly, water gradually soaks to the roots, rather than running off or evaporating. It will save you time and reduce the amount of water that's wasted.	11. Micro-drip irrigation systems can be installed to deliver water directly to where the plants can use it. Applied slowly, water gradually soaks to the roots, rather than running off or evaporating. It will save you time and reduce the amount of water that's wasted.
			There are a lot of instructions. It's time to pick up the sprinkler and make it work	There are a lot of instructions. It's time to pick up the sprinkler and make it work
			We have 16 steps left What do you want to do	We have 16 steps left

| | | | | 1. Look around
2, Show the map
3, Look at the checklist
Enter a value from 1 to 3: 3
Checklist
       Take the toolbox to the basement to fix the washing machine: UNCHECKED
       Bring the book to the bedroom and put it on the shelf: UNCHECKED
       Watering all plants: CHECKED
       Sweep the hall: CHECKED
       Give the bread to Mom: CHECKED
       Pick the key from the hole which is hidden under the red brick: CHECKED

We have 15 steps left
What do you want to do
1. Look around
2, Show the map
3, Look at the checklist
Enter a value from 1 to 3: 1
You are in the garden
Ways out of the garden
       left direction to the kitchen
What are you going to do
1. Take item
2. Drop item
3. Show items in the bag
4. Move away
5. Watering all plants
Enter a value from 1 to 5: 4
What direction you go to
0. Go to top direction back to the garden
1. Go to left direction to the kitchen
2. Go to bottom direction back to the garden
3. Go to right direction back to the garden | What do you want to do
1. Look around
2, Show the map
3, Look at the checklist
Enter a value from 1 to 3: 3
Checklist
       Take the toolbox to the basement to fix the washing machine: UNCHECKED
       Bring the book to the bedroom and put it on the shelf: UNCHECKED
       Watering all plants: CHECKED
       Sweep the hall: CHECKED
       Give the bread to Mom: CHECKED
       Pick the key from the hole which is hidden under the red brick: CHECKED

We have 15 steps left
What do you want to do
1. Look around
2, Show the map
3, Look at the checklist
Enter a value from 1 to 3: 1
You are in the garden
Ways out of the garden
       left direction to the kitchen
What are you going to do
1. Take item
2. Drop item
3. Show items in the bag
4. Move away
5. Watering all plants
Enter a value from 1 to 5: 4
What direction you go to
0. Go to top direction back to the garden
1. Go to left direction to the kitchen
2. Go to bottom direction back to the garden |

			Enter a value from 0 to 4: 1
			
			We have 14 steps left
			What do you want to do
			1. Look around
			2, Show the map
			3, Look at the checklist
			Enter a value from 1 to 3: 1
			You are in the kitchen
			Item in the kitchen:
			      bread: Texas Toast
			Ways out of the kitchen
			      left direction to the hall
			      right direction to the
			      garden
			What are you going to do
			1. Take item
			2. Drop item
			3. Show items in the bag
			4. Move away
			5. Give the bread to Mom
			Enter a value from 1 to 5: 4
			What direction you go to
			0. Go to top direction back to the
			      kitchen
			1. Go to left direction to the hall
			2. Go to bottom direction back to
			      the kitchen
			3. Go to the right direction to the
			      garden
			Enter a value from 0 to 4: 1
			
			We have 13 steps left
			What do you want to do
			1. Look around
			2, Show the map
			3, Look at the checklist
			Enter a value from 1 to 3: 1
			You are in the hall
			Item in the hall:
			      box: Tool Box
			      key: Gate Key
			      broom: Corn Broom with
			      Solid Wood Handle
			Ways out of the hall
			      top direction to the
			      bedroom
				3. Go to right direction back to
				      the garden
				Enter a value from 0 to 4: 1
				
				We have 14 steps left
				What do you want to do
				1. Look around
				2, Show the map
				3, Look at the checklist
				Enter a value from 1 to 3: 1
				You are in the kitchen
				Item in the kitchen:
				      bread: Texas Toast
				Ways out of the kitchen
				      left direction to the hall
				      right direction to the
				      garden
				What are you going to do
				1. Take item
				2. Drop item
				3. Show items in the bag
				4. Move away
				5. Give the bread to Mom
				Enter a value from 1 to 5: 4
				What direction you go to
				0. Go to top direction back to
				      the kitchen
				1. Go to left direction to the hall
				2. Go to bottom direction back
				      to the kitchen
				3. Go to the right direction to
				      the garden
				Enter a value from 0 to 4: 1
				
				We have 13 steps left
				What do you want to do
				1. Look around
				2, Show the map
				3, Look at the checklist
				Enter a value from 1 to 3: 1
				You are in the hall
				Item in the hall:
				      box: Tool Box
				      key: Gate Key
				      broom: Corn Broom
				      with Solid Wood Handle
				Ways out of the hall

			left direction to the street
			bottom direction to the basement
			right direction to the kitchen
			What are you going to do
			1. Take item
			2. Drop item
			3. Show items in the bag
			4. Move away
			5. Sweep the hall
			Enter a value from 1 to 5: 4
			What direction you go to
			0. Go to the top direction to the bedroom
			1. Go to left direction to the street
			2. Go to bottom direction to the basement
			3. Go to the right direction to the kitchen
			Enter a value from 0 to 4: 0
			
			We have 12 steps left
			What do you want to do
			1. Look around
			2, Show the map
			3, Look at the checklist
			Enter a value from 1 to 3: 1
			You are in the bedroom
			Ways out of the bedroom
			    bottom direction to the hall
			What are you going to do
			1. Take item
			2. Drop item
			3. Show items in the bag
			4. Move away
			5. Bring the book to the bedroom and put it on the shelf
			Enter a value from 1 to 5: 5
			Do you want to drop the book
			1, Yes
			2. No
			Enter a value from 1 to 2: 1
			Good, The book has been on the shelf
				top direction to the bedroom
				left direction to the street
				bottom direction to the basement
				right direction to the kitchen
				What are you going to do
				1. Take item
				2. Drop item
				3. Show items in the bag
				4. Move away
				5. Sweep the hall
				Enter a value from 1 to 5: 4
				What direction you go to
				0. Go to the top direction to the bedroom
				1. Go to left direction to the street
				2. Go to bottom direction to the basement
				3. Go to the right direction to the kitchen
				Enter a value from 0 to 4: 0
				
				We have 12 steps left
				What do you want to do
				1. Look around
				2, Show the map
				3, Look at the checklist
				Enter a value from 1 to 3: 1
				You are in the bedroom
				Ways out of the bedroom
				    bottom direction to the hall
				What are you going to do
				1. Take item
				2. Drop item
				3. Show items in the bag
				4. Move away
				5. Bring the book to the bedroom and put it on the shelf
				Enter a value from 1 to 5: 5
				Do you want to drop the book
				1, Yes
				2. No

We have 11 steps left
What do you want to do
1. Look around
2, Show the map
3, Look at the checklist
Enter a value from 1 to 3: 1
You are in the bedroom
Item in the bedroom:
        book: How To Fix
        Everything For Dummy
Ways out of the bedroom
        bottom direction to the
        hall
What are you going to do
1. Take item
2. Drop item
3. Show items in the bag
4. Move away
5. Bring the book to the bedroom
        and put it on the shelf
Enter a value from 1 to 5: 4
What direction you go to
0. Go to top direction back to the
        bedroom
1. Go to left direction back to the
        bedroom
2. Go to bottom direction to the
        hall
3. Go to right direction back to
        the bedroom
Enter a value from 0 to 4: 2

We have 10 steps left
What do you want to do
1. Look around
2, Show the map
3, Look at the checklist
Enter a value from 1 to 3: 1
You are in the hall
Item in the hall:
        box: Tool Box
        key: Gate Key
        broom: Corn Broom with
        Solid Wood Handle
Ways out of the hall
        top direction to the
        bedroom

Enter a value from 1 to 2: 1
Good, The book has been on the
        shelf

We have 11 steps left
What do you want to do
1. Look around
2, Show the map
3, Look at the checklist
Enter a value from 1 to 3: 1
You are in the bedroom
Item in the bedroom:
        book: How To Fix
        Everything For Dummy
Ways out of the bedroom
        bottom direction to the
        hall
What are you going to do
1. Take item
2. Drop item
3. Show items in the bag
4. Move away
5. Bring the book to the
        bedroom and put it on
        the shelf
Enter a value from 1 to 5: 4
What direction you go to
0. Go to top direction back to
        the bedroom
1. Go to left direction back to
        the bedroom
2. Go to bottom direction to the
        hall
3. Go to right direction back to
        the bedroom
Enter a value from 0 to 4: 2

We have 10 steps left
What do you want to do
1. Look around
2, Show the map
3, Look at the checklist
Enter a value from 1 to 3: 1
You are in the hall
Item in the hall:
        box: Tool Box
        key: Gate Key

left direction to the
street
bottom direction to the
basement
right direction to the
kitchen
What are you going to do
1. Take item
2. Drop item
3. Show items in the bag
4. Move away
5. Sweep the hall
Enter a value from 1 to 5: 1
What do you want to take
0. box: Tool Box
1. key: Gate Key
2. broom: Corn Broom with Solid
Wood Handle
Enter a value from 0 to 2: 0
You have taken 'Tool Box'

We have 9 steps left
What do you want to do
1. Look around
2, Show the map
3, Look at the checklist
Enter a value from 1 to 3: 1
You are in the hall
Item in the hall:
key: Gate Key
broom: Corn Broom with
Solid Wood Handle
Ways out of the hall
top direction to the
bedroom
left direction to the
street
bottom direction to the
basement
right direction to the
kitchen
What are you going to do
1. Take item
2. Drop item
3. Show items in the bag
4. Move away
5. Sweep the hall
Enter a value from 1 to 5: 1

broom: Corn Broom
with Solid Wood Handle
Ways out of the hall
top direction to the
bedroom
left direction to the
street
bottom direction to the
basement
right direction to the
kitchen
What are you going to do
1. Take item
2. Drop item
3. Show items in the bag
4. Move away
5. Sweep the hall
Enter a value from 1 to 5: 1
What do you want to take
0. box: Tool Box
1. key: Gate Key
2. broom: Corn Broom with Solid
Wood Handle
Enter a value from 0 to 2: 0
You have taken 'Tool Box'

We have 9 steps left
What do you want to do
1. Look around
2, Show the map
3, Look at the checklist
Enter a value from 1 to 3: 1
You are in the hall
Item in the hall:
key: Gate Key
broom: Corn Broom
with Solid Wood Handle
Ways out of the hall
top direction to the
bedroom
left direction to the
street
bottom direction to the
basement
right direction to the
kitchen
What are you going to do
1. Take item

| | | | What do you want to take
0. key: Gate Key
1. broom: Corn Broom with Solid
    Wood Handle
Enter a value from 0 to 1: 0
You have taken 'Gate Key'

We have 8 steps left
What do you want to do
1. Look around
2, Show the map
3, Look at the checklist
Enter a value from 1 to 3: 1
You are in the hall
Item in the hall:
    broom: Corn Broom with
    Solid Wood Handle
Ways out of the hall
    top direction to the
    bedroom
    left direction to the
    street
    bottom direction to the
    basement
    right direction to the
    kitchen
What are you going to do
1. Take item
2. Drop item
3. Show items in the bag
4. Move away
5. Sweep the hall
Enter a value from 1 to 5: 4
What direction you go to
0. Go to the top direction to the
    bedroom
1. Go to left direction to the
    street
2. Go to bottom direction to the
    basement
3. Go to the right direction to the
    kitchen
Enter a value from 0 to 4: 2

We have 7 steps left
What do you want to do
1. Look around
2, Show the map | 2. Drop item
3. Show items in the bag
4. Move away
5. Sweep the hall
Enter a value from 1 to 5: 1
What do you want to take
0. key: Gate Key
1. broom: Corn Broom with Solid
    Wood Handle
Enter a value from 0 to 1: 0
You have taken 'Gate Key'

We have 8 steps left
What do you want to do
1. Look around
2, Show the map
3, Look at the checklist
Enter a value from 1 to 3: 1
You are in the hall
Item in the hall:
    broom: Corn Broom
    with Solid Wood Handle
Ways out of the hall
    top direction to the
    bedroom
    left direction to the
    street
    bottom direction to the
    basement
    right direction to the
    kitchen
What are you going to do
1. Take item
2. Drop item
3. Show items in the bag
4. Move away
5. Sweep the hall
Enter a value from 1 to 5: 4
What direction you go to
0. Go to the top direction to the
    bedroom
1. Go to left direction to the
    street
2. Go to bottom direction to the
    basement
3. Go to the right direction to
    the kitchen
Enter a value from 0 to 4: 2 |

			3, Look at the checklist	We have 7 steps left
			Enter a value from 1 to 3: 1	What do you want to do
			You are in the basement	1. Look around
			Ways out of the basement	2, Show the map
			top direction to the hall	3, Look at the checklist
			What are you going to do	Enter a value from 1 to 3: 1
			1. Take item	You are in the basement
			2. Drop item	Ways out of the basement
			3. Show items in the bag	top direction to the hall
			4. Move away	What are you going to do
			5. Take the toolbox to the	1. Take item
			basement to fix the	2. Drop item
			washing machine	3. Show items in the bag
			Enter a value from 1 to 5: 5	4. Move away
			Are you ready to fix the washing	5. Take the toolbox to the
			machine	basement to fix the
			1, Yes	washing machine
			2. No	Enter a value from 1 to 5: 5
			Enter a value from 1 to 2: 1	Are you ready to fix the washing
			The machine has got some	machine
			problem with its resistor.	1, Yes
			Let's do some physics calculation.	2. No
			A resistor has a voltage across it	Enter a value from 1 to 2: 1
			of 120 volts and	The machine has got some
			a current through it of 2.5	problem with its
			amperes.	resistor.
			Calculate the resistance of the	Let's do some physics
			resistor.	calculation.
				A resistor has a voltage across it
			Enter a value from 0 to 20000: 48	of 120 volts and
			Good, we have to increase the	a current through it of 2.5
			resistance of the resistor	amperes.
			this time	Calculate the resistance of the
			The washing machine has been	resistor.
			fixed	
				Enter a value from 0 to 20000:
			We have 6 steps left	48
			What do you want to do	Good, we have to increase the
			1. Look around	resistance of the
			2, Show the map	resistor this time
			3, Look at the checklist	The washing machine has been
			Enter a value from 1 to 3: 1	fixed
			You are in the basement	
			Ways out of the basement	We have 6 steps left
			top direction to the hall	What do you want to do
			What are you going to do	1. Look around
			1. Take item	2, Show the map
			2. Drop item	

			3. Show items in the bag
			4. Move away
			5. Take the toolbox to the basement to fix the washing machine
			Enter a value from 1 to 5: 4
			What direction you go to
			0. Go to the top direction to the hall
			1. Go to left direction back to the basement
			2. Go to bottom direction back to the basement
			3. Go to right direction back to the basement
			Enter a value from 0 to 4: 0
			
			We have 5 steps left
			What do you want to do
			1. Look around
			2, Show the map
			3, Look at the checklist
			Enter a value from 1 to 3: 1
			You are in the hall
			Item in the hall:
			    broom: Corn Broom with Solid Wood Handle
			Ways out of the hall
			    top direction to the bedroom
			    left direction to the street
			    bottom direction to the basement
			    right direction to the kitchen
			What are you going to do
			1. Take item
			2. Drop item
			3. Show items in the bag
			4. Move away
			5. Sweep the hall
			Enter a value from 1 to 5: 4
			What direction you go to
			0. Go to the top direction to the bedroom
			1. Go to left direction to the street
				3, Look at the checklist
				Enter a value from 1 to 3: 1
				You are in the basement
				Ways out of the basement
				    top direction to the hall
				What are you going to do
				1. Take item
				2. Drop item
				3. Show items in the bag
				4. Move away
				5. Take the toolbox to the basement to fix the washing machine
				Enter a value from 1 to 5: 4
				What direction you go to
				0. Go to the top direction to the hall
				1. Go to left direction back to the basement
				2. Go to bottom direction back to the basement
				3. Go to right direction back to the basement
				Enter a value from 0 to 4: 0
				
				We have 5 steps left
				What do you want to do
				1. Look around
				2, Show the map
				3, Look at the checklist
				Enter a value from 1 to 3: 1
				You are in the hall
				Item in the hall:
				    broom: Corn Broom with Solid Wood Handle
				Ways out of the hall
				    top direction to the bedroom
				    left direction to the street
				    bottom direction to the basement
				    right direction to the kitchen
				What are you going to do
				1. Take item
				2. Drop item
				3. Show items in the bag

			2. Go to bottom direction to the basement 3. Go to the right direction to the kitchen Enter a value from 0 to 4: 1 You win	4. Move away 5. Sweep the hall Enter a value from 1 to 5: 4 What direction you go to 0. Go to the top direction to the bedroom 1. Go to left direction to the street 2. Go to bottom direction to the basement 3. Go to the right direction to the kitchen Enter a value from 0 to 4: 1 You win

3. Reflection
   a. The hardest part of the assignment was creating the game scenario. I think that because creativity is something I have trouble with, it was hard to come up with a concept. I decided to work on a relatively simple game that requires the player's character to run some errands. Each errand requires a prerequisite of sorts such as solving a calculation or having a certain item in the player's inventory. Upon completion of all tasks that are given to the character, the player has to move the character back to the street to win the game.
   b. I defined a new list so that it has a capacity limit.
   c. The player can continuously pick up and drop items so it should be a static variable of the class to reduce the run time.
   d. Each derived class has its own way to run "action" function of the abstract class.