Mawson Valley

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Programming Fundamentals, SP5 2019
Assignment 2

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Introduction

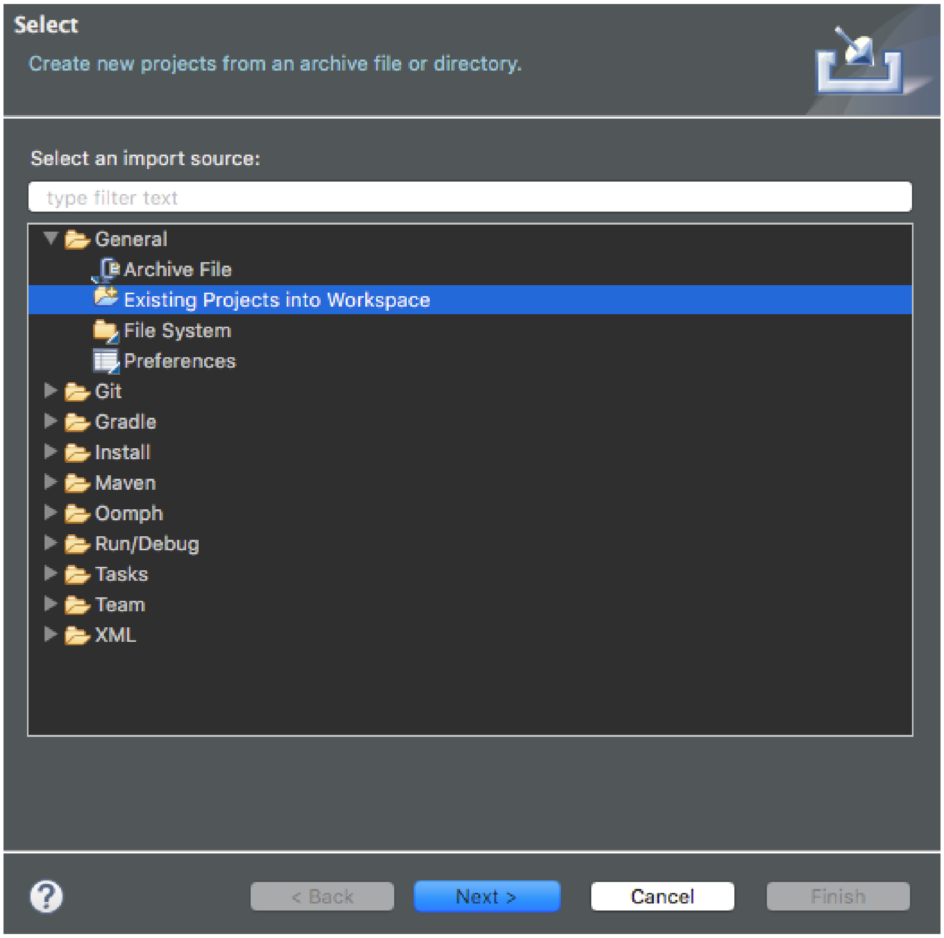
Assignment Structure

One thing that I have learnt in life is that farming simulators are the best strategy for making money as a game dev. Clearly, simulated hard work is much more fun than actual hard work. I have not had any success yet from selling ABS to venture capitalists, so this time I will get my army of junior programmers to build me the ultimate farming simulator! I have been told that we are now in a post-graphics era, where text-based games are the modern standard. With all that in mind, follow this specification to create Mawson Valley.

Figure 1: The ultimate, most lucrative game type

Importing into eclipse

The assignment has been provided as an eclipse project. You just need to import the project into an existing workspace. See Figure 2 for a visual guide. Make sure that your Java JDK has been set, as well as the two jar files that you need for junit to function. This can be found in Project → Properties → Java Build Path → Libraries. The jar files have been provided within the project; there is no need to download any other version and doing so may impact the testing environment.



Select

Create new projects from an archive file or directory.

Select an import source:

Figure 2: Importing the project through File → Import

Part A

Your first task is to create all of the classes shown in Figure 3. If you do not know how to read a UML diagram, then think of this as a research task. Using your knowledge of classes and inheritance, you must create all of the classes shown, *exactly to spec*. You are not provided with these classes—you must make them from scratch—so read this section carefully.

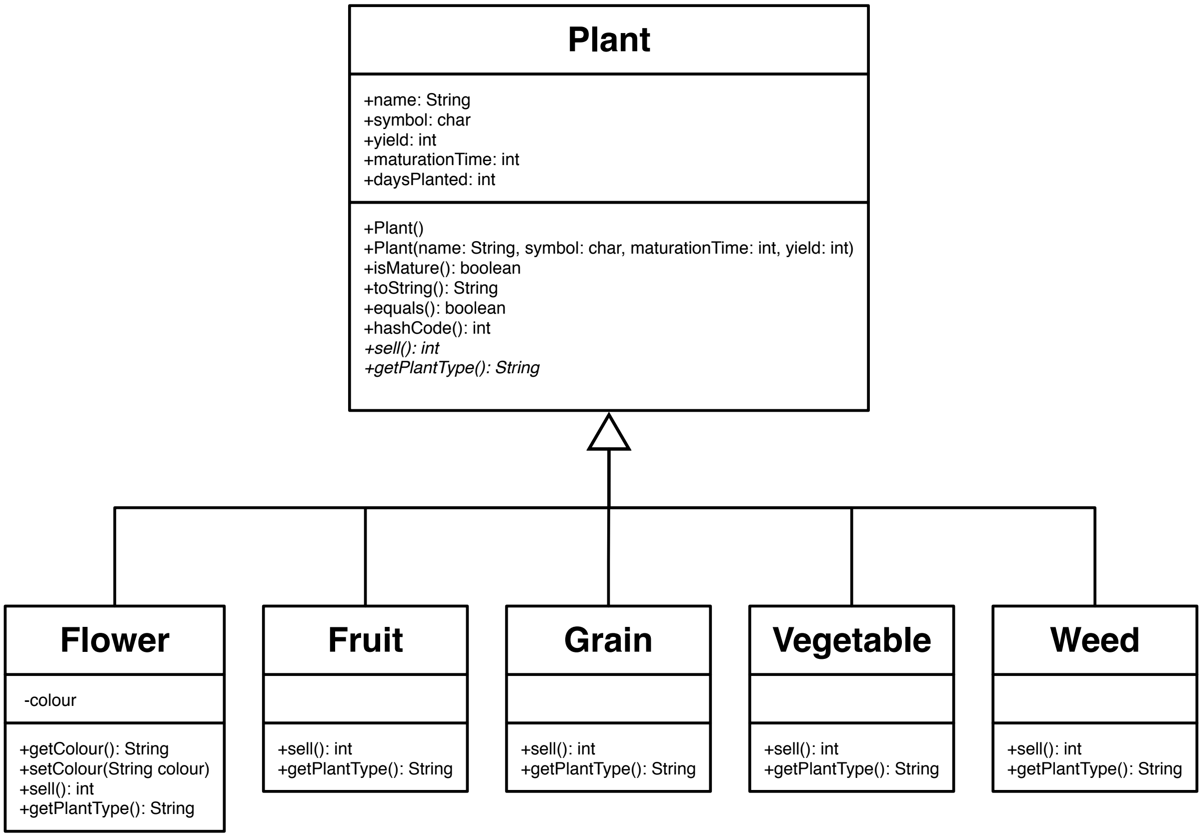


Figure 3: UML diagram representing your plant class structure

`Plant`

This is the parent class of the whole hierarchy. Create this class first in the `plants` package. This class must be made abstract and feature two abstract methods: `sell()` and `getPlantType()`. It must also have all the other instance variables, constructors, and methods, as shown in Figure 3. Pay attention to the visibility notation, which will tell you if they are to be made public or private.

Other child classes

Now create all of the other child classes, as indicated in Figure 3. You must implement the two abstract methods that were inherited from `Plant`.

Default constructor

The default constructor for each plant type should create an object of the respective type with the correct default values, as indicated in Table 1. The `Weed` class should not have a default constructor.

Table 1: Default values for the respective instance variables in the default constructor

Plant	name	symbol	maturationTime	yield
Flower	Daisy	*	7	3
Fruit	Apple	@	14	1
Grain	Wheat	!	4	8
Vegetable	Capsicum	^	8	2
Weed	N/A	N/A	N/A	N/A

`sell()`

This method must calculate the current sell price of the respective plant type, following Table 2. The price range indicates that the returned price must be a random integer from within that range, inclusive. For example, the sell price of a flower could be $7, $8, $9, $10, or $11, which then would be multiplied by its yield of 3.

Table 2: The harvest sell price for each plant type

Type	Sell Price
Flower	$7–11 * yield
Fruit	$40–60 * yield
Grain	$2–4 * yield
Vegetable	$6–15 * yield
Weed	$0

`getPlantType()`

This method should return a `String` that is the name of the class, in all lowercase. For example, in the `Flower` class, it should return `"flower"`.

Part B

In this section, you should create and complete the following five custom exception classes, all in the `exceptions` package.

- `BeyondStockException`
- `FieldNotTilledException`
- `InsufficientFundsException`
- `NoAvailableSeedlingException`
- `OutOfStockException`

The general format of your exception classes should be as follows:

```
package exceptions;
public class MyException extends Exception {
    public MyException(String message) {
        super(message);
    }
}}
```

The expected output at the end of this document will show you how the messages are expected to be formatted.

Part C

Next, you should move to the `Player` class, as there are some methods you need to complete.

`getPlant`

This method should return a Plant object and take one argument, a single `String`. The purpose of this method is to loop over the player's seedlings list and return the first `Plant` object that matches the type that is passed in. For example, if looking for a flower, the method should return the first `Flower` object that it finds in the seedling list. If there is no matching plant in the seedling list, the method should throw a `NoAvailableSeedlingException`.

You will need to understand polymorphism in order to solve this method. One strategy would be to first determine which of the four plant sub-types the passed in string represents, make a temporary object of that type, and then use the `getClass()` method in your loop to see if the object in the seedlings list matches. For example,
`if (a.getClass() == b.getClass())`.

Finally, keep in mind that it may be easier to expect the shorthand name for each of the plants: ‘fl’, ‘fr’, ‘g’, ‘v’.

`pay`

This method should be `void` and take one argument, a single `int`. This is the method that you will later call to buy plants from the nursery. All it needs to do is subtract the purchase amount, passed into the method, from the player's funds instance variable. If there is not enough money in the funds, this method should return an `InsufficientFundsException`.

Part D

In this section, you'll complete some methods that will allow you to represent the farm field. The `Field` class creates a $10 * 10$ grid (in the form of a 2D `Plant` array), giving you 100 spaces in which to plant crops. You are responsible for implementing the following methods.

`plantSeed`

This method should be `void` and take three arguments, a `Plant` object that is the seedling to plant, an `int` to represent the row, and another `int` to represent the column. Your singular task is to plant the provided `Plant` object in the provided field space. If the space is not `null`, you should throw a `FieldNotTilledException`.

`toString`

This method should return a `String` and take no arguments. It should build a string representation of the field grid. You should use the symbol character from each of the plant objects and a plain '.' for any `null` space. For example:

```
   0  1  2  3  4  5  6  7  8  9
0  .  .  .  .  @  .  .  .  .  .
1  .  .  .  .  .  .  .  .  .  .
2  .  .  .  .  .  .  .  .  .  .
3  .  .  .  .  .  .  .  .  .  !
4  .  .  .  .  .  .  .  ^  .  .
5  .  #  .  .  .  .  .  .  .  .
6  .  .  .  .  .  .  .  .  .  .
7  .  .  .  .  .  *  .  .  .  #
8  .  #  .  .  .  .  .  .  .  .
9  .  .  .  .  .  .  .  .  .  .
```

`writeToFile`

This method should be `void` and take no arguments. It should write out the field to a file called "field.txt". This may sound difficult, but all you need to do is create the file and write the output of your `toString` method to it.

Part E

The `Main` class is where you will do the bulk of work. If you run the `Main` `class`, you will see that the game loop has been implemented for you. All you have to do is complete the code inside the following methods. As always, you are free to add any private methods or variables that you want, but you should not need to.

`buyPlants`

This method should be `void` and take one argument, a single `String` that contains input from the console. The input will be in the following format: '`fr,3 v,2 fl,1 g,6`'. That string should be parsed, one token at a time, to purchase:

- 3 fruit

- 2 vegetables
- 1 flower
- 6 grain

To parse the string, you should make good use of the `split()` method, using the documentation to research how to change the delimiter. Secondly, you will want to to convert the number to an integer so that you can use it as a quantity (instead of just a string). Research how to use `Integer.parseInt()`.

To actually buy the plants from the nursery, you should make use of the static method `Nursery.buyPlant()`. Provided that `buyPlant()` returns true, you should add the newly purchased plant(s) to the player's seedlings list.

`plantPlants`

This method should be `void` and take one argument, a single `String` that contains input from the console. The input will be in the following format: ‘`fl,1,4 g,5,7`’. That string would plant a `Flower` object in row 1, column 4 of the field spaces 2D array, and a `Grain` object in row 5, column 7. You should parse the string in much the same way as `buyPlants`.

Finally, you will need to catch any exceptions raised from the `plantSeed` method that you should use from the `Field` class.

Assume you start with this field:

```
   0  1  2  3  4  5  6  7  8  9
0  .  .  .  .  #  .  .  .  .  .
1  .  .  .  .  .  .  .  .  .  .
2  .  .  .  .  .  .  .  .  .  .
3  .  .  .  .  .  .  .  #  .  .
4  .  .  .  .  .  .  .  .  .  .
5  .  .  .  .  .  .  .  .  .  .
6  .  .  .  .  .  .  .  .  .  .
7  .  .  .  .  .  .  .  .  .  .
8  .  .  .  .  .  .  .  .  .  .
9  .  .  .  .  .  .  .  .  .  .
```

Then you enter this command into the plant plants menu: ‘fl,1,4 fr,7,3 fr,7,4 fr,8,3 g,3,8 v,9,0’ (assume that you have all of these plants in the seedlings list). Your field print out would look like the following:

```
   0  1  2  3  4  5  6  7  8  9
0  .  .  .  .  #  .  .  .  .  .
1  .  .  .  .  *  .  .  .  .  .
2  .  .  .  .  .  .  .  .  .  .
3  .  .  .  .  .  .  .  #  !  .
4  .  .  .  .  .  .  .  .  .  .
5  .  .  .  .  .  .  .  .  .  .
6  .  .  .  .  .  .  .  .  .  .
7  .  .  .  @  @  .  .  .  .  .
8  .  .  .  @  .  .  .  .  .  .
9  ^  .  .  .  .  .  .  .  .  .
```

`tillSoil`

This method should be `void` and take one argument, a single `String` that contains input from the console. The input will be in the following format ‘0,4 2,5’, where this would till the spaces at row 0, column 4, and row 2, column 5, respectively. By tilling the soil, any `Plant` object on this space is removed, replacing it with `null`. This is the only way to clear weeds, since they should be ignored at harvest. You could also use it to remove other plant types.

Assume you start with this field:

```
   0  1  2  3  4  5  6  7  8  9
0  .  .  .  .  #  .  .  .  .  .
1  .  .  .  .  .  .  .  .  .  .
2  .  .  .  .  .  #  .  #  #  .
3  .  .  .  .  .  .  .  .  .  .
4  .  .  .  .  .  .  .  .  .  .
5  .  .  #  .  .  .  .  .  .  .
6  .  .  #  .  .  .  .  #  .  .
7  .  .  .  .  .  .  .  .  .  .
8  .  .  .  .  .  .  .  .  .  .
9  .  .  .  .  .  .  .  .  .  .
```

Then you enter this command into the till soil menu: ‘0,4 2,5’. Your field print out would look like the following:

```
  0 1 2 3 4 5 6 7 8 9
0 . . . . . . . . . .
1 . . . . . . . . . .
2 . . . . . . . # # .
3 . . . . . . . . . .
4 . . . . . . . . . .
5 . . # . . . . . . .
6 . . # . . . . # . .
7 . . . . . . . . . .
8 . . . . . . . . . .
9 . . . . . . . . . .
```

maturePlants

This method should be `void` and take no arguments. All that it needs to do is mature every valid `Plant` object in the field by one day. To do this, you should increment each plant's `daysPlanted` instance variable. Upon harvest, a plant will only be harvested if it is at or beyond the `maturationTime`.

harvestPlants

This method should return a `Plant` array and take no arguments. The purpose of the method is to check for mature plants in the field. If you find a mature plant, you should do the following steps:

- Iterate over the field spaces
- Check that there is a plant in each space
- Check that the plant is mature
- If mature, add to a list/array
- Replace plant with null
- Once all spaces have been checked, return your list/array of mature plants

sellHarvest

This method should return an `int` and take one argument, an array of `Plant` objects. There are two main parts of this method.

1. Sell all of the plants.

   All you need to do is iterate over the provided array of `Plant` objects and sell them for their going price. You should recall from Part A which method to use. The one catch is that you need to somehow keep track of how much money you are making from each plant type. This will come in handy for the second part of this method. You should add the total income to the player's funds.

2. Generate a receipt. This part is responsible for building a `String` to represent a receipt. It needs to be itemised so that you can see how much money you made for each plant type. It should include a $0 amount for plant types that were not sold in the harvest. The format should look like this:

   ```
   Harvest receipt:
   Flowers: $78
   Fruit: $0
   Grain: $96
   Vegetables: $56
   ```

   You need to save this receipt string into the provided `harvestReceipt` instance variable.

Marking Scheme

The marking of this assignment will work a little differently to that of the first assignment. You have been given a very detailed specification and you must use it to implement your classes and methods as closely as possible. Where you are specifically told to handle events and exceptions, you must do exactly that. Where you find an unmentioned fringe-case, your task is to handle it as best as possible. **For this assignment, your main task is to deliver a fully playable game, in accordance with the specification document.**

To test that everything is working, you have three options:

1. Follow this specification and sample output
2. Investigate your code in the Eclipse/IntelliJ debugger
3. Write your own unit tests, like the first assignment

This situation is very common in the industry. A client will come to you with a set of requirements, and your job is to implement something to meet those requirements. You will not always have a neatly-bundled testing suite.

The style marks will specifically look at the following:

- Solution follows the assignment specification
- Clear and adequate commenting of all logic and code flow
- Consistency of indentation
- Consistency of curly brace usage
- Adherence to principles of DRY—don't repeat yourself.

Following the assignment specification includes exactly matching your `Plant` inheritance structure to that of the UML diagram.

As a final note, your code should only be put in the classes and methods that are mentioned in this document. There should be no need to create other methods and classes.

Good luck!

Table 3: Mark allocation

Part A	
Correct inheritance	5
Abstract methods	2.5
Default constructor	2.5
sell method	2.5
getPlantType method	2.5
Total:	15
Part B	
BeyondStockException	2
FieldNotTilledException	2
InsufficientFundsException	2
NoAvailableSeedlingException	2
OutOfStockException	2
Total:	10
Part C	
getPlant method	5
pay method	2
Total:	7
Part D	
toString method	10
writeToFile	3
Total:	13
Part E	
buyPlants method	8
plantPlants method	8
tillSoil method	7
maturePlants	5
harvestPlants	7
sellHarvest	10
Total:	45
Style:	10
Grand Total:	100

Example Play-Through

```
    0   1   2   3   4   5   6   7   8   9
0   .   .   .   .   .   .   .   .   .   .
1   .   .   .   .   .   .   .   .   .   .
2   .   .   .   .   .   .   .   .   .   .
3   .   .   .   .   .   .   .   .   .   .
4   .   .   .   .   .   .   .   .   .   .
5   .   .   .   .   .   .   .   .   .   .
```

```
6  .  .  .  .  .  .  .  .  .  .
7  .  .  .  .  .  #  .  .  .  .
8  .  .  .  .  #  .  .  .  .  .
9  .  #  .  .  .  .  .  .  .  .

Round number: 1 | 9 rounds until harvest | Funds: $200
What would you like to do?
Your available choices are: [b = Buy Plant | p = Plant plants | t = Till
 ↪  Soil | e = End Round | q = Quit Game]
Choice: b
Welcome to the nursery. What would you like to buy?
We have in stock: Flowers = 10 Fruit = 10 Grain = 10 Vegetables = 10
Our prices are: Flowers = $12 Fruit = $25 Grain = $11 Vegetables = $8
Your available choices are: [fl = Flowers | fr = Fruit | g = Grain | v =
 ↪  Vegetable | l = leave]
Enter in the form 'v,3 fl,6' to buy 3 vegetables and 6 flowers
Choice: fl,3 fr,3 g,3 v,6
What would you like to do?
Your available choices are: [b = Buy Plant | p = Plant plants | t = Till
 ↪  Soil | e = End Round | q = Quit Game]
Choice: t
Which soil plots would you like to till?
Enter in the form '4,7 9,1' to till the soil plots in row 4, column 7 and
 ↪  row 9, column 1 | l = leave
Choice: 7,5 8,4 9,1
What would you like to do?
Your available choices are: [b = Buy Plant | p = Plant plants | t = Till
 ↪  Soil | e = End Round | q = Quit Game]
Choice: e
Round end
   0  1  2  3  4  5  6  7  8  9
0  .  .  .  .  .  .  .  .  .  .
1  .  .  .  .  .  .  .  .  .  .
2  .  .  .  .  .  .  .  .  .  .
3  .  .  .  .  .  .  .  .  .  .
4  .  .  .  .  .  .  .  .  .  .
5  .  .  .  .  .  .  .  .  .  .
6  .  .  .  .  .  .  .  .  .  .
7  .  .  .  .  .  .  .  .  .  .
8  .  .  .  .  .  .  .  .  .  .
9  .  .  .  .  .  .  .  .  .  .

Round number: 2 | 8 rounds until harvest | Funds: $8
What would you like to do?
```

```
Your available choices are: [b = Buy Plant | p = Plant plants | t = Till
↪  Soil | e = End Round | q = Quit Game]
Choice: p
What would you like to plant?
Your available seedlings are: Flowers = 3 Fruit = 3 Grain = 3 Vegetables = 6
Enter in the form 'v,2,5 fr,5,4' to plant a vegetable in plot row 2, column
↪  5 | l = leave
Choice: fl,0,0 fl,0,1 fl,0,2 fr,3,0 fr,3,1 fr,3,2 g,6,0 g,6,1 g,6,2 v,9,1
↪  v,9,2 v,9,3 v,9,4 v,9,5 v,9,0
What would you like to do?
Your available choices are: [b = Buy Plant | p = Plant plants | t = Till
↪  Soil | e = End Round | q = Quit Game]
Choice: b
Welcome to the nursery. What would you like to buy?
We have in stock: Flowers = 7 Fruit = 7 Grain = 7 Vegetables = 4
Our prices are: Flowers = $12 Fruit = $25 Grain = $11 Vegetables = $8
Your available choices are: [fl = Flowers | fr = Fruit | g = Grain | v =
↪  Vegetable | l = leave]
Enter in the form 'v,3 fl,6' to buy 3 vegetables and 6 flowers
Choice: v,1
What would you like to do?
Your available choices are: [b = Buy Plant | p = Plant plants | t = Till
↪  Soil | e = End Round | q = Quit Game]
Choice: p
What would you like to plant?
Your available seedlings are: Flowers = 0 Fruit = 0 Grain = 0 Vegetables = 1
Enter in the form 'v,2,5 fr,5,4' to plant a vegetable in plot row 2, column
↪  5 | l = leave
Choice: v,9,6
What would you like to do?
Your available choices are: [b = Buy Plant | p = Plant plants | t = Till
↪  Soil | e = End Round | q = Quit Game]
Choice: e
Round end
   0  1  2  3  4  5  6  7  8  9
0  *  *  *  .  .  .  .  .  .  .
1  .  .  .  .  .  .  .  .  .  .
2  .  .  .  .  .  .  .  .  .  .
3  @  @  @  .  .  .  .  .  .  .
4  .  .  .  .  .  .  .  .  .  .
5  .  .  .  .  .  .  .  .  .  .
6  !  !  !  .  .  .  .  .  .  .
7  .  .  .  .  .  .  .  .  .  .
8  .  .  .  .  .  .  .  .  .  .
9  ^  ^  ^  ^  ^  ^  ^  .  .  .
```

```
Round number: 3 | 7 rounds until harvest | Funds: $0
What would you like to do?
Your available choices are: [b = Buy Plant | p = Plant plants | t = Till
 ↪  Soil | e = End Round | q = Quit Game]
Choice: e
Round end
   0  1  2  3  4  5  6  7  8  9
0  *  *  *  .  .  .  .  .  .  .
1  .  .  .  .  .  .  .  .  .  .
2  .  .  .  .  .  .  .  .  .  .
3  @  @  @  .  .  .  .  .  .  .
4  .  .  .  .  .  .  .  .  .  .
5  .  .  .  .  .  .  .  .  .  .
6  !  !  !  .  .  .  .  .  .  .
7  .  .  .  .  .  .  .  .  .  .
8  .  .  .  .  .  .  .  .  .  .
9  ^  ^  ^  ^  ^  ^  ^  .  .  .

Round number: 4 | 6 rounds until harvest | Funds: $0
What would you like to do?
Your available choices are: [b = Buy Plant | p = Plant plants | t = Till
 ↪  Soil | e = End Round | q = Quit Game]
Choice: e
Round end
   0  1  2  3  4  5  6  7  8  9
0  *  *  *  .  .  .  .  .  .  .
1  .  .  .  .  .  .  .  .  .  .
2  .  .  .  .  .  .  .  .  .  .
3  @  @  @  .  .  .  .  .  .  .
4  .  .  .  .  .  .  .  .  .  .
5  .  .  .  .  .  .  .  .  .  .
6  !  !  !  .  .  .  .  .  .  .
7  .  .  .  .  .  .  .  .  .  .
8  .  .  .  .  .  .  .  .  .  .
9  ^  ^  ^  ^  ^  ^  ^  .  .  .

Round number: 5 | 5 rounds until harvest | Funds: $0
What would you like to do?
Your available choices are: [b = Buy Plant | p = Plant plants | t = Till
 ↪  Soil | e = End Round | q = Quit Game]
Choice: e
Round end
   0  1  2  3  4  5  6  7  8  9
0  *  *  *  .  .  .  .  .  .  .
```

```
1 . . . . . . . . . .
2 . . . . . . . . . .
3 @ @ @ . . . . . . .
4 . . . . . . . . . .
5 . . . . . . . . . .
6 ! ! ! . . . . . . .
7 . . . . . . . . . .
8 . . . . . . . . . .
9 ^ ^ ^ ^ ^ ^ ^ . . .

Round number: 6 | 4 rounds until harvest | Funds: $0
What would you like to do?
Your available choices are: [b = Buy Plant | p = Plant plants | t = Till
 ↪ Soil | e = End Round | q = Quit Game]
Choice: e
Round end
  0 1 2 3 4 5 6 7 8 9
0 * * * . . . . . . .
1 . . . . . . . . . .
2 . . . . . . . . . .
3 @ @ @ . . . . . . .
4 . . . . . . . . . .
5 . . . . . . . . . .
6 ! ! ! . . . . . . .
7 . . . . . . . . . .
8 . . . . . . . . . .
9 ^ ^ ^ ^ ^ ^ ^ . . .

Round number: 7 | 3 rounds until harvest | Funds: $0
What would you like to do?
Your available choices are: [b = Buy Plant | p = Plant plants | t = Till
 ↪ Soil | e = End Round | q = Quit Game]
Choice: e
Round end
  0 1 2 3 4 5 6 7 8 9
0 * * * . . . . . . .
1 . . . . . . . . . .
2 . . . . . . . . . .
3 @ @ @ . . . . . . .
4 . . . . . . . . . .
5 . . . . . . . . . .
6 ! ! ! . . . . . . .
7 . . . . . . . . . .
8 . . . . . . . . . .
9 ^ ^ ^ ^ ^ ^ ^ . . .
```

```
Round number: 8 | 2 rounds until harvest | Funds: $0
What would you like to do?
Your available choices are: [b = Buy Plant | p = Plant plants | t = Till
 ↪  Soil | e = End Round | q = Quit Game]
Choice: e
Round end
   0  1  2  3  4  5  6  7  8  9
0  *  *  *  .  .  .  .  .  .  .
1  .  .  .  .  .  .  .  .  .  .
2  .  .  .  .  .  .  .  .  .  .
3  @  @  @  .  .  .  .  .  .  .
4  .  .  .  .  .  .  .  .  .  .
5  .  .  .  .  .  .  .  .  .  .
6  !  !  !  .  .  .  .  .  .  .
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9  ^  ^  ^  ^  ^  ^  ^  .  .  .

Round number: 9 | 1 rounds until harvest | Funds: $0
What would you like to do?
Your available choices are: [b = Buy Plant | p = Plant plants | t = Till
 ↪  Soil | e = End Round | q = Quit Game]
Choice: e
Round end
   0  1  2  3  4  5  6  7  8  9
0  *  *  *  .  .  .  .  .  .  .
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Round number: 10 | Harvest day!
Harvest receipt:
Flowers: $90
Fruit: $0
Grain: $96
Vegetables: $154

Total sales: $340
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Round end
   0  1  2  3  4  5  6  7  8  9
0  .  #  .  .  .  .  .  .  .  .
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Round number: 11 | 9 rounds until harvest | Funds: $340
What would you like to do?
Your available choices are: [b = Buy Plant | p = Plant plants | t = Till
 ↪  Soil | e = End Round | q = Quit Game]
Choice: t
Which soil plots would you like to till?
Enter in the form '4,7 9,1' to till the soil plots in row 4, column 7 and
 ↪  row 9, column 1 | l = leave
Choice: 0,1 1,4 2,4 2,5 3,5 4,2 4,8 5,6 5,7 6,2 6,3 6,4 7,0 7,2
What would you like to do?
Your available choices are: [b = Buy Plant | p = Plant plants | t = Till
 ↪  Soil | e = End Round | q = Quit Game]
Choice: b
Welcome to the nursery. What would you like to buy?
We have in stock: Flowers = 6 Fruit = 5 Grain = 5 Vegetables = 8
Our prices are: Flowers = $11 Fruit = $21 Grain = $15 Vegetables = $6
Your available choices are: [fl = Flowers | fr = Fruit | g = Grain | v =
 ↪  Vegetable | l = leave]
Enter in the form 'v,3 fl,6' to buy 3 vegetables and 6 flowers
Choice: fl,6 fr,5
What would you like to do?
Your available choices are: [b = Buy Plant | p = Plant plants | t = Till
 ↪  Soil | e = End Round | q = Quit Game]
Choice: p
What would you like to plant?
Your available seedlings are: Flowers = 6 Fruit = 5 Grain = 0 Vegetables = 0
Enter in the form 'v,2,5 fr,5,4' to plant a vegetable in plot row 2, column
 ↪  5 | l = leave
Choice: fr,3,0
Field space [3, 0] not empty
What would you like to do?
```

```
Your available choices are: [b = Buy Plant | p = Plant plants | t = Till
 ↪  Soil | e = End Round | q = Quit Game]
Choice: b
Welcome to the nursery. What would you like to buy?
We have in stock: Flowers = 0 Fruit = 0 Grain = 5 Vegetables = 8
Our prices are: Flowers = $11 Fruit = $21 Grain = $15 Vegetables = $6
Your available choices are: [fl = Flowers | fr = Fruit | g = Grain | v =
 ↪  Vegetable | l = leave]
Enter in the form 'v,3 fl,6' to buy 3 vegetables and 6 flowers
Choice: fr,1
You have requested more fruit than we have in stock.
What would you like to do?
Your available choices are: [b = Buy Plant | p = Plant plants | t = Till
 ↪  Soil | e = End Round | q = Quit Game]
Choice: b
Welcome to the nursery. What would you like to buy?
We have in stock: Flowers = 0 Fruit = 0 Grain = 5 Vegetables = 8
Our prices are: Flowers = $11 Fruit = $21 Grain = $15 Vegetables = $6
Your available choices are: [fl = Flowers | fr = Fruit | g = Grain | v =
 ↪  Vegetable | l = leave]
Enter in the form 'v,3 fl,6' to buy 3 vegetables and 6 flowers
Choice: fl,2
You have requested more flowers than we have in stock.
What would you like to do?
Your available choices are: [b = Buy Plant | p = Plant plants | t = Till
 ↪  Soil | e = End Round | q = Quit Game]
Choice: b
Welcome to the nursery. What would you like to buy?
We have in stock: Flowers = 0 Fruit = 0 Grain = 5 Vegetables = 8
Our prices are: Flowers = $11 Fruit = $21 Grain = $15 Vegetables = $6
Your available choices are: [fl = Flowers | fr = Fruit | g = Grain | v =
 ↪  Vegetable | l = leave]
Enter in the form 'v,3 fl,6' to buy 3 vegetables and 6 flowers
Choice: v,8
What would you like to do?
Your available choices are: [b = Buy Plant | p = Plant plants | t = Till
 ↪  Soil | e = End Round | q = Quit Game]
Choice: b
Welcome to the nursery. What would you like to buy?
We have in stock: Flowers = 0 Fruit = 0 Grain = 5 Vegetables = 0
Our prices are: Flowers = $11 Fruit = $21 Grain = $15 Vegetables = $6
Your available choices are: [fl = Flowers | fr = Fruit | g = Grain | v =
 ↪  Vegetable | l = leave]
Enter in the form 'v,3 fl,6' to buy 3 vegetables and 6 flowers
Choice: g,5
```

```
What would you like to do?
Your available choices are: [b = Buy Plant | p = Plant plants | t = Till
 ↪  Soil | e = End Round | q = Quit Game]
Choice: e
Round end
   0  1  2  3  4  5  6  7  8  9
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Round number: 12 | 8 rounds until harvest | Funds: $46
What would you like to do?
Your available choices are: [b = Buy Plant | p = Plant plants | t = Till
 ↪  Soil | e = End Round | q = Quit Game]
Choice: e
Round end
   0  1  2  3  4  5  6  7  8  9
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Round number: 13 | 7 rounds until harvest | Funds: $46
What would you like to do?
Your available choices are: [b = Buy Plant | p = Plant plants | t = Till
 ↪  Soil | e = End Round | q = Quit Game]
Choice: e
Round end
   0  1  2  3  4  5  6  7  8  9
0  .  .  .  .  .  .  .  .  .  .
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Round number: 14 | 6 rounds until harvest | Funds: $46
What would you like to do?
Your available choices are: [b = Buy Plant | p = Plant plants | t = Till
 ↪  Soil | e = End Round | q = Quit Game]
Choice: e
Round end
   0  1  2  3  4  5  6  7  8  9
0  .  .  .  .  .  .  .  .  .  .
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Round number: 15 | 5 rounds until harvest | Funds: $46
What would you like to do?
Your available choices are: [b = Buy Plant | p = Plant plants | t = Till
 ↪  Soil | e = End Round | q = Quit Game]
Choice: e
Round end
   0  1  2  3  4  5  6  7  8  9
0  .  .  .  .  .  .  .  .  .  .
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Round number: 16 | 4 rounds until harvest | Funds: $46
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What would you like to do?
Your available choices are: [b = Buy Plant | p = Plant plants | t = Till
 ↪  Soil | e = End Round | q = Quit Game]
Choice: e
Round end
   0  1  2  3  4  5  6  7  8  9
0  .  .  .  .  .  .  .  .  .  .
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Round number: 17 | 3 rounds until harvest | Funds: $46
What would you like to do?
Your available choices are: [b = Buy Plant | p = Plant plants | t = Till
 ↪  Soil | e = End Round | q = Quit Game]
Choice: e
Round end
   0  1  2  3  4  5  6  7  8  9
0  .  .  .  .  .  .  .  .  .  .
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Round number: 18 | 2 rounds until harvest | Funds: $46
What would you like to do?
Your available choices are: [b = Buy Plant | p = Plant plants | t = Till
 ↪  Soil | e = End Round | q = Quit Game]
Choice: e
Round end
   0  1  2  3  4  5  6  7  8  9
0  .  .  .  .  .  .  .  .  .  .
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Round number: 19 | 1 rounds until harvest | Funds: $46
What would you like to do?
Your available choices are: [b = Buy Plant | p = Plant plants | t = Till
↪  Soil | e = End Round | q = Quit Game]
Choice: e
Round end
   0  1  2  3  4  5  6  7  8  9
0  .  .  .  .  .  .  .  .  .  .
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Round number: 20 | Harvest day!
Harvest receipt:
Flowers: $0
Fruit: $144
Grain: $0
Vegetables: $0

Total sales: $144
Round end
   0  1  2  3  4  5  6  7  8  9
0  .  .  .  .  #  .  .  .  .  .
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Round number: 21 | 9 rounds until harvest | Funds: $190
What would you like to do?
Your available choices are: [b = Buy Plant | p = Plant plants | t = Till
 ↪  Soil | e = End Round | q = Quit Game]
Choice: b
Welcome to the nursery. What would you like to buy?
We have in stock: Flowers = 6 Fruit = 7 Grain = 6 Vegetables = 5
Our prices are: Flowers = $14 Fruit = $24 Grain = $10 Vegetables = $10
Your available choices are: [fl = Flowers | fr = Fruit | g = Grain | v =
 ↪  Vegetable | l = leave]
Enter in the form 'v,3 fl,6' to buy 3 vegetables and 6 flowers
Choice: fl,6 f,7
You have requested more f than we have in stock.
What would you like to do?
Your available choices are: [b = Buy Plant | p = Plant plants | t = Till
 ↪  Soil | e = End Round | q = Quit Game]
Choice: b
Welcome to the nursery. What would you like to buy?
We have in stock: Flowers = 0 Fruit = 7 Grain = 6 Vegetables = 5
Our prices are: Flowers = $14 Fruit = $24 Grain = $10 Vegetables = $10
Your available choices are: [fl = Flowers | fr = Fruit | g = Grain | v =
 ↪  Vegetable | l = leave]
Enter in the form 'v,3 fl,6' to buy 3 vegetables and 6 flowers
Choice: fr,7
You are trying to pay $168, but only have 106
What would you like to do?
Your available choices are: [b = Buy Plant | p = Plant plants | t = Till
 ↪  Soil | e = End Round | q = Quit Game]
Choice: p
What would you like to plant?
Your available seedlings are: Flowers = 12 Fruit = 4 Grain = 5 Vegetables =
 ↪  8
Enter in the form 'v,2,5 fr,5,4' to plant a vegetable in plot row 2, column
 ↪  5 | l = leave
Choice: l
What would you like to do?
Your available choices are: [b = Buy Plant | p = Plant plants | t = Till
 ↪  Soil | e = End Round | q = Quit Game]
Choice: p
What would you like to plant?
Your available seedlings are: Flowers = 12 Fruit = 4 Grain = 5 Vegetables =
 ↪  8
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Enter in the form 'v,2,5 fr,5,4' to plant a vegetable in plot row 2, column
 ↪  5 | l = leave
Choice: fr,0,0 fr,0,1 fr,0,2 fr,0,3
What would you like to do?
Your available choices are: [b = Buy Plant | p = Plant plants | t = Till
 ↪  Soil | e = End Round | q = Quit Game]
Choice: e
Round end
   0  1  2  3  4  5  6  7  8  9
0  @  @  @  @  #  .  .  .  .  .
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Round number: 22 | 8 rounds until harvest | Funds: $106
What would you like to do?
Your available choices are: [b = Buy Plant | p = Plant plants | t = Till
 ↪  Soil | e = End Round | q = Quit Game]
Choice: t
Which soil plots would you like to till?
Enter in the form '4,7 9,1' to till the soil plots in row 4, column 7 and
 ↪  row 9, column 1 | l = leave
Choice: 0,4
What would you like to do?
Your available choices are: [b = Buy Plant | p = Plant plants | t = Till
 ↪  Soil | e = End Round | q = Quit Game]
Choice: e
Round end
   0  1  2  3  4  5  6  7  8  9
0  @  @  @  @  .  .  .  .  .  .
1  .  .  .  .  .  .  .  #  .  #
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Round number: 23 | 7 rounds until harvest | Funds: $106
What would you like to do?
Your available choices are: [b = Buy Plant | p = Plant plants | t = Till
 ↪  Soil | e = End Round | q = Quit Game]
Choice: p
What would you like to plant?
Your available seedlings are: Flowers = 12 Fruit = 0 Grain = 5 Vegetables =
 ↪  8
Enter in the form 'v,2,5 fr,5,4' to plant a vegetable in plot row 2, column
 ↪  5 | l = leave
Choice: fr,0,4
No available seedlings of type: fr
What would you like to do?
Your available choices are: [b = Buy Plant | p = Plant plants | t = Till
 ↪  Soil | e = End Round | q = Quit Game]
Choice: q

Process finished with exit code 0
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