Shop V2.0 - An Array of Product

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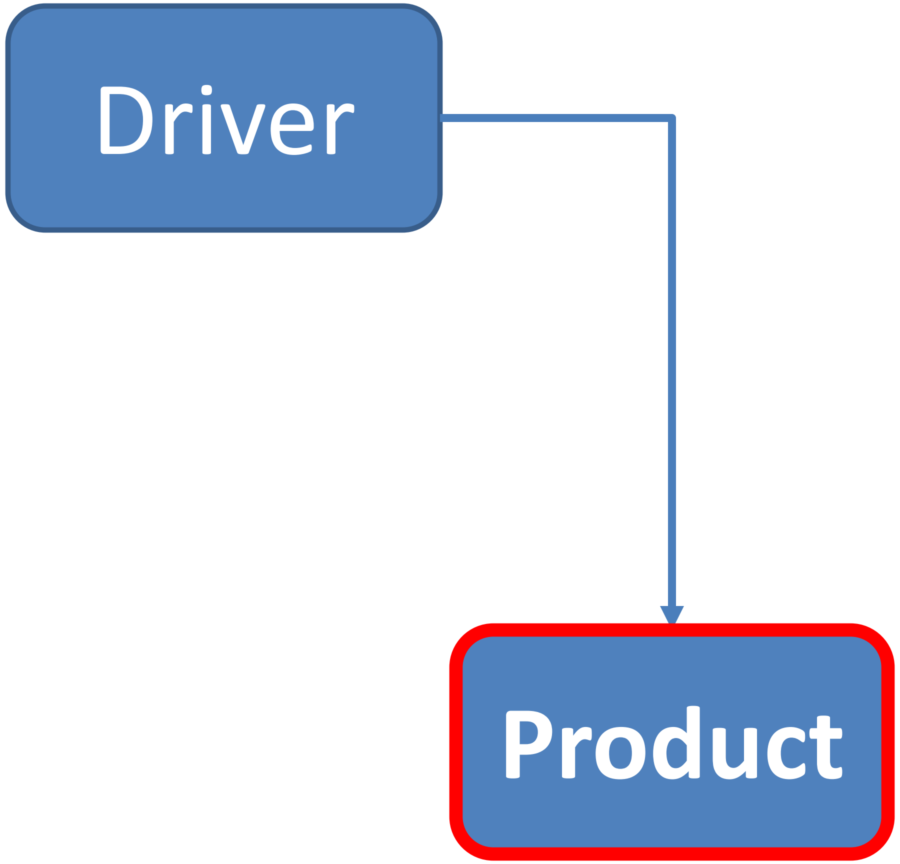
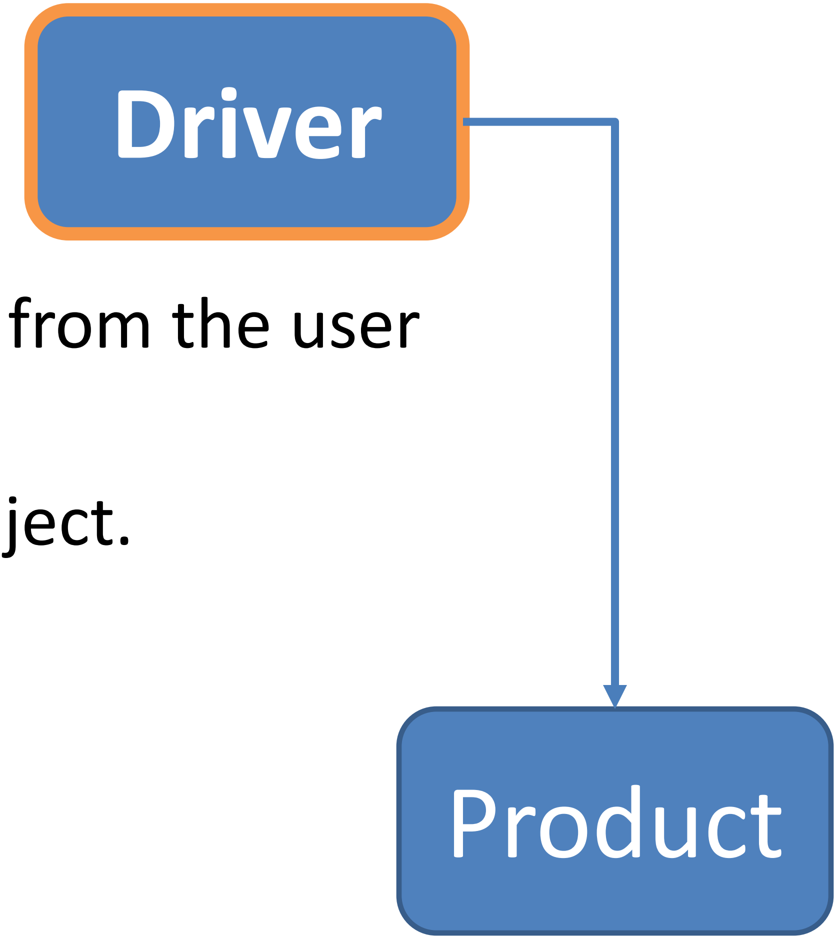
Recap: Shop V1.0 - **Product**



- The **Product** class stores **details** about a product
  - name
  - code
  - unit cost
  - in the current product line or not?

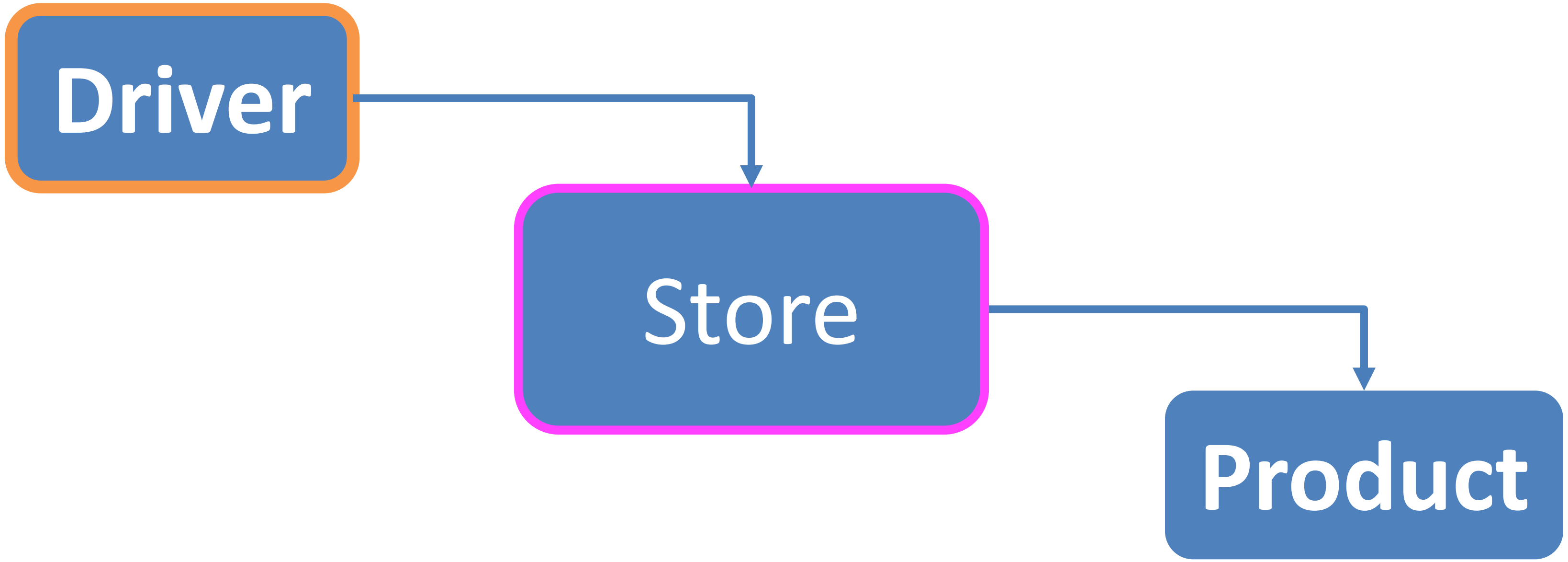
Recap: Shop V1.0 - **Driver**

- The Driver class
  - has the **main()** method.
  - **reads** the product details from the user (via the console)
  - **creates** a new Product object.
  - **prints** the product object (to the console)

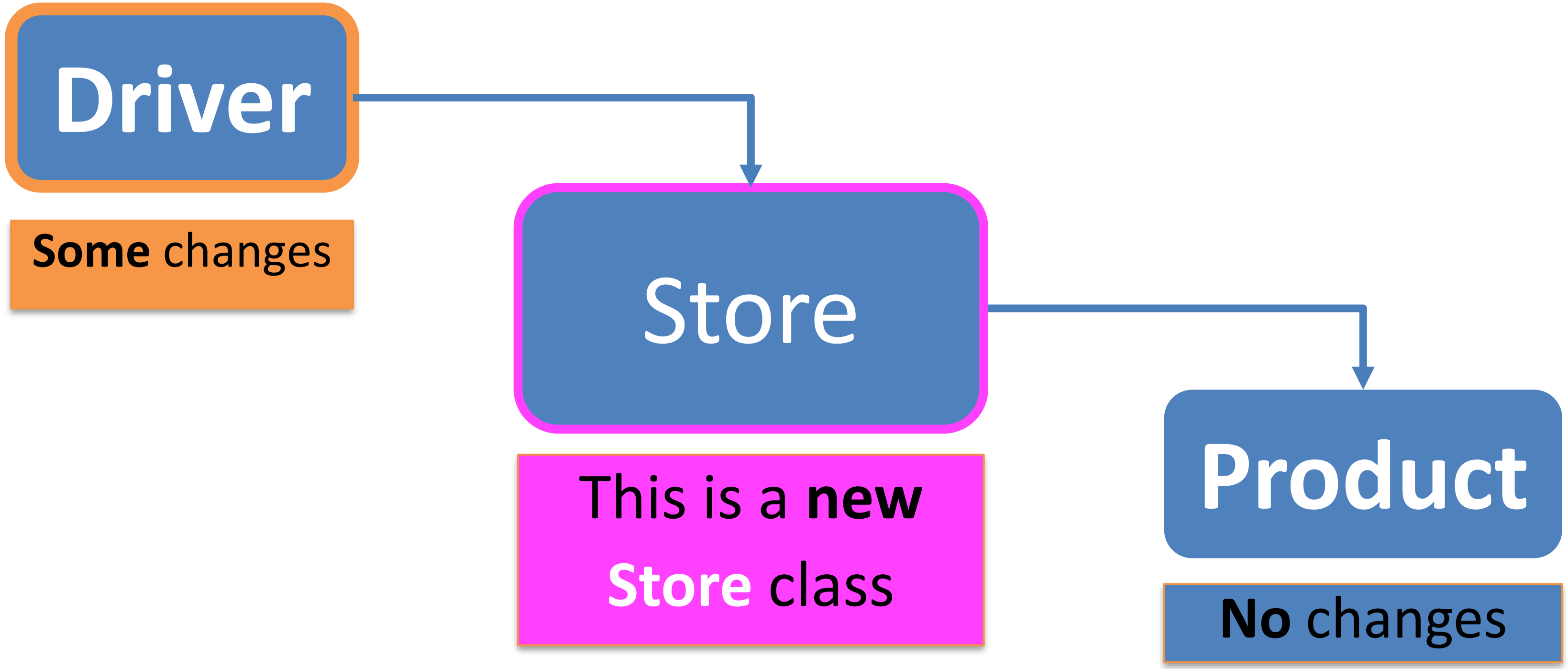


Shop **V2.0**

- New **Store** class is responsible for maintaining a collection of Products
  - i.e. an **array of Products**.
- **Driver** will now allow the user to decide **how many product** details they want to store.



Shop **V2.0** – **changes** to classes



Driver

Some changes

Store

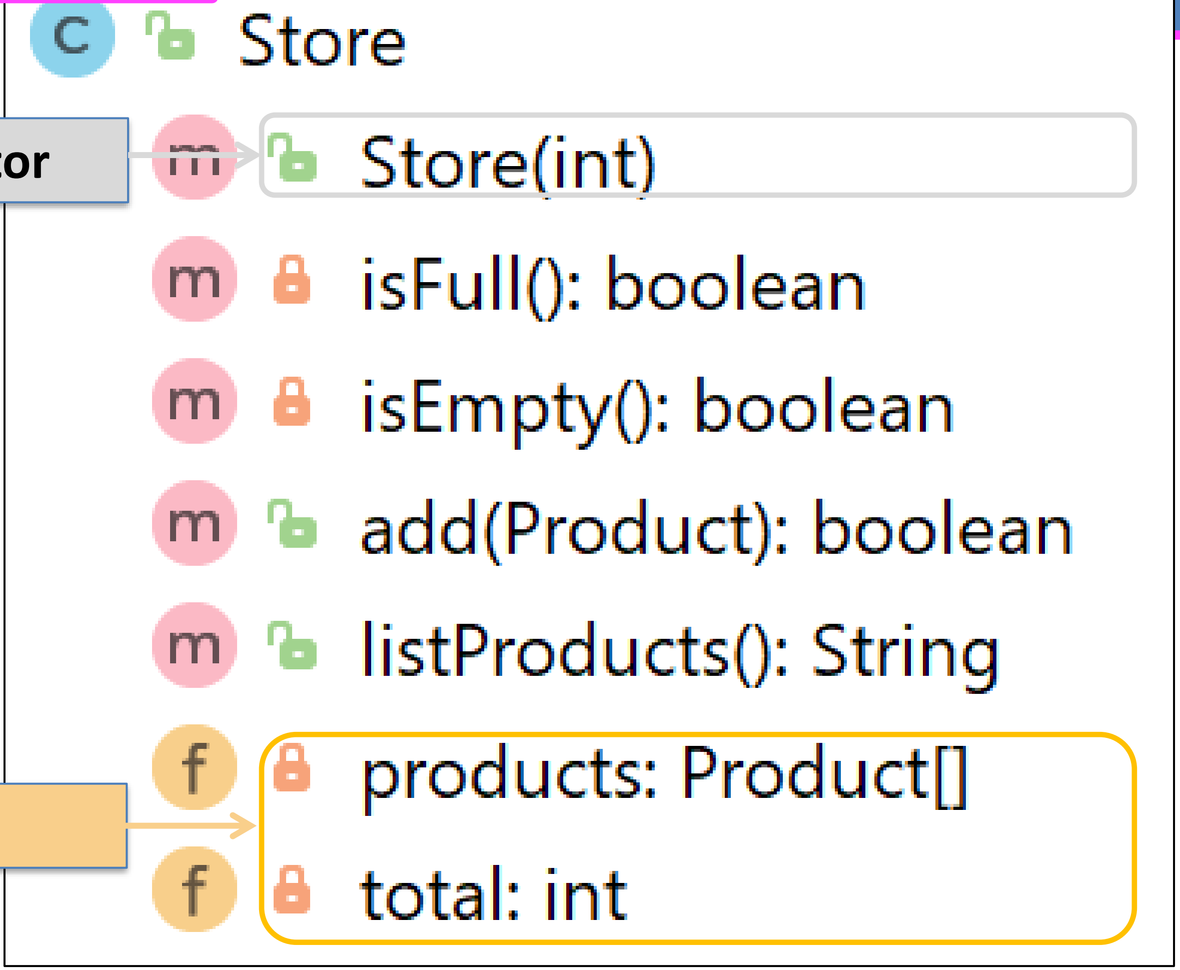
This is a **new**

Store class

Product

No changes

Store – new class



C Store

m Store(int)

m isFull(): boolean

m isEmpty(): boolean

m add(Product): boolean

m listProducts(): String

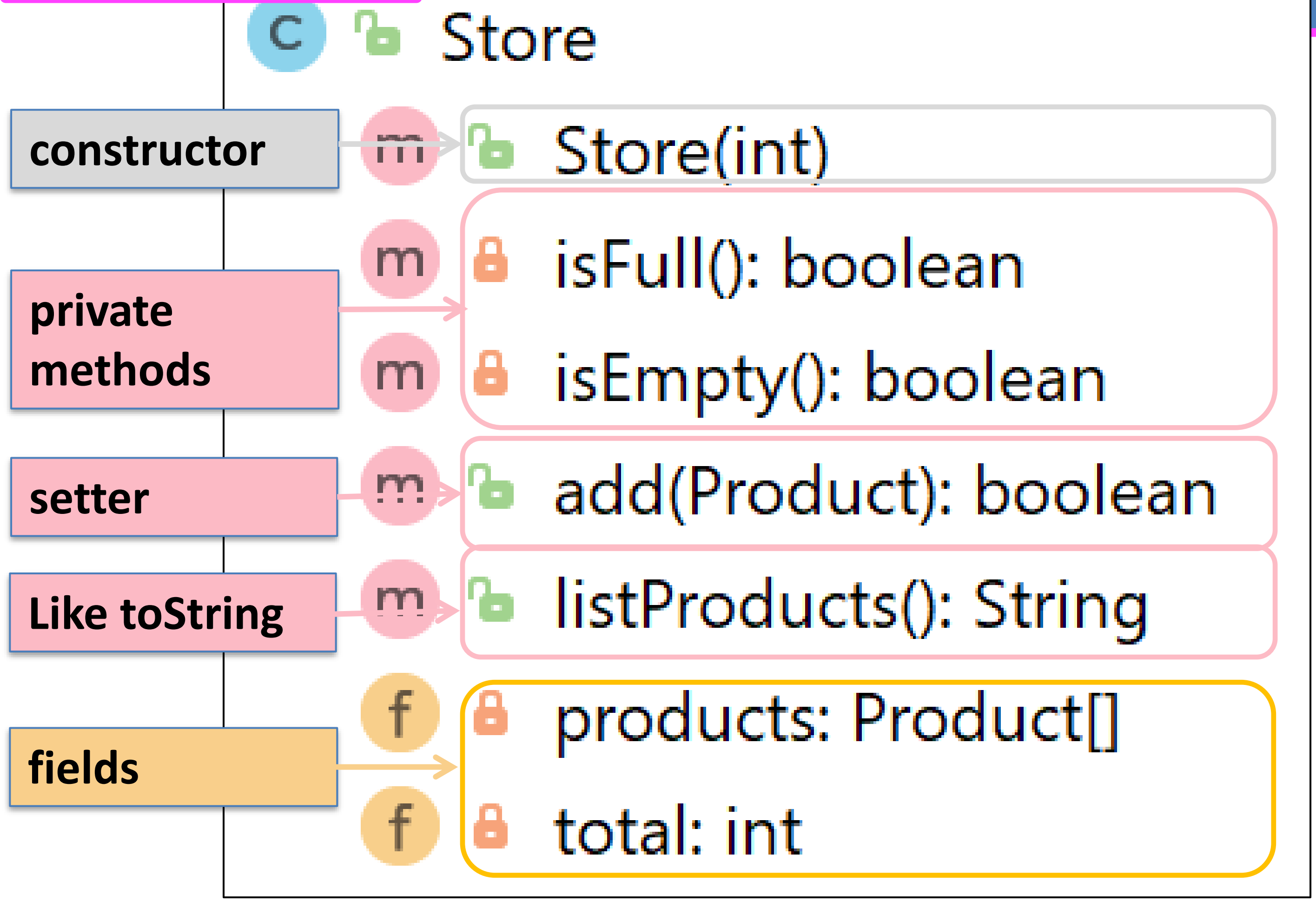
f products: Product[]

f total: int

constructor

fields

Store – new class



```
C Store
m Store(int)
m isFull(): boolean
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m add(Product): boolean
m listProducts(): String
f products: Product[]
f total: int
```
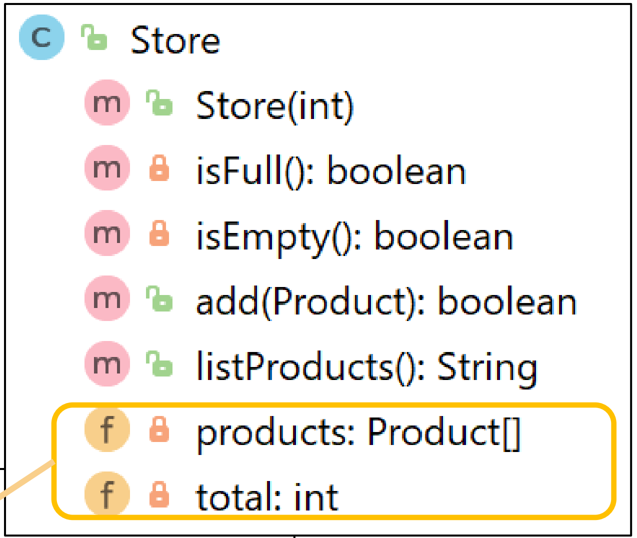

constructor

private methods

setter

Like toString

fields

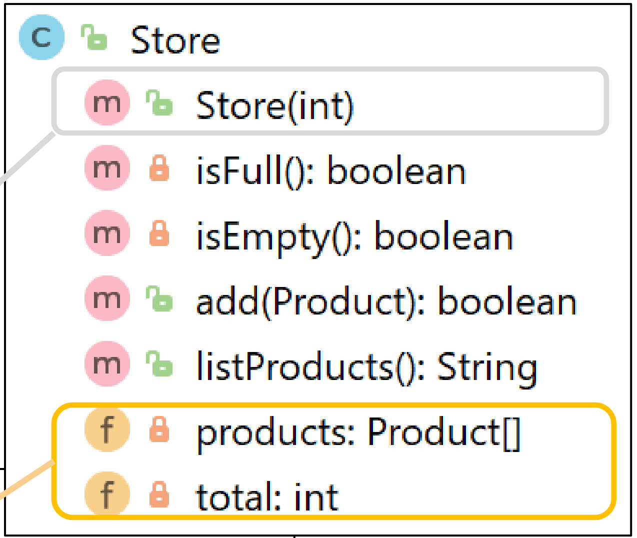


C Store
- m Store(int)
- m isFull(): boolean
- m isEmpty(): boolean
- m add(Product): boolean
- m listProducts(): String
- f products: Product[]
- f total: int

```
public class Store {

    private Product[] products;
    private int total = 0;

    public Store(int numberItems){
        products = new Product[numberItems];
    }

    //other methods
}
```

fields

Why private?



```
Store
    Store(int)
    isFull(): boolean
    isEmpty(): boolean
    add(Product): boolean
    listProducts(): String
    products: Product[]
    total: int
```

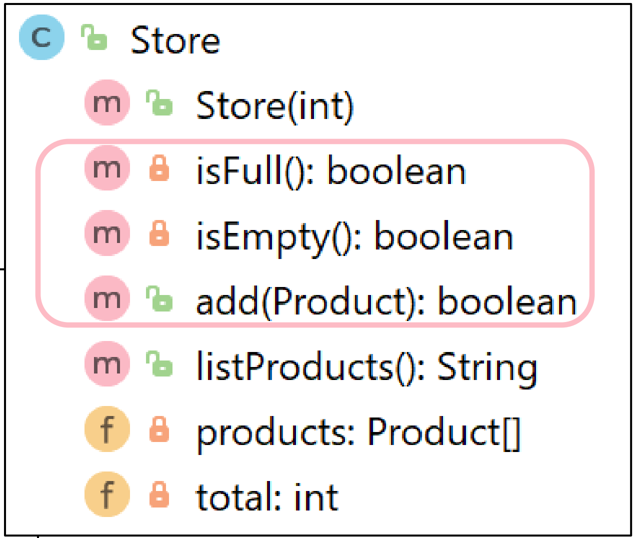
```
public class Store {

    private Product[] products;
    private int total = 0;

    public Store(int numberItems){
        products = new Product[numberItems];
    }

    //other methods
}
```

fields

Why private?

constructor

```
private boolean isFull(){
     return (total == products.length);
}

private boolean isEmpty(){
     return (total == 0);
}

public boolean add(Product product){
     if (isFull()){
          return false;
     }
     else{
          products[total] = product;
          total++;
          return true;
     }
}
```



C Store

m Store(int)

m isFull(): boolean

m isEmpty(): boolean

m add(Product): boolean

m listProducts(): String

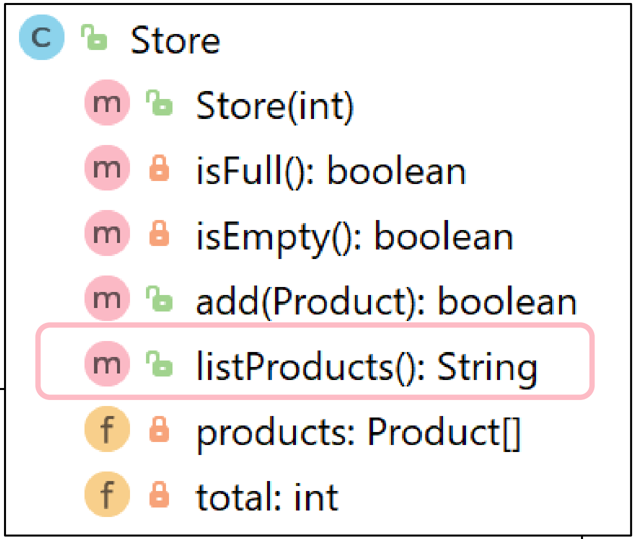
f products: Product[]

f total: int

getters
isFull() & **isEmpty()**
return state of fields.

They are private
member methods

setter
add() makes use of
private method **isFull()**



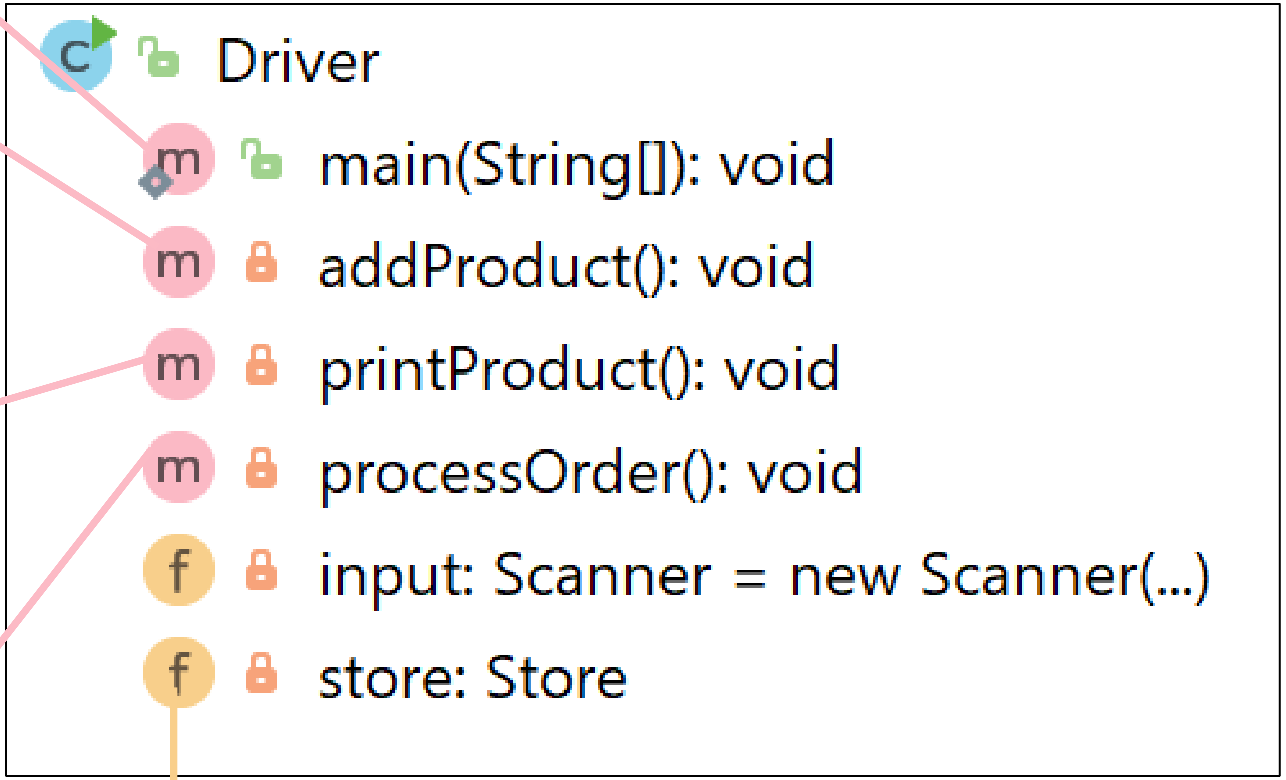
- C Store
  - m Store(int)
  - m isFull(): boolean
  - m isEmpty(): boolean
  - m add(Product): boolean
  - m listProducts(): String
  - f products: Product[]
  - f total: int

```
public String listProducts(){
   if (isEmpty()){
      return "No products";
   }
   else{
       String listOfProducts = "";
       for (int i = 0; i < total; i++){
          listOfProducts += i + ": " + products[i] + "\n";
       }
       return listOfProducts;
   }
}
```

toString type method **listProducts()** makes use of private method **isEmpty()**

Driver

5 changes



```
Driver
main(String[]): void
addProduct(): void
printProduct(): void
processOrder(): void
input: Scanner = new Scanner(...)
store: Store
```

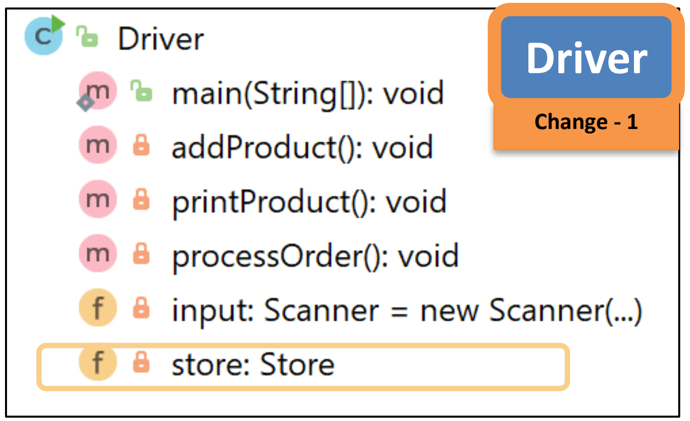
1) **Product** object removed and replaced with **Store** object.

2) **addProduct()** changed to add the entered product to the array.

3) New method, **processOrder()**, reads in products from the user.

4) **main()** changed to call **processOrder()**

5) **printProduct()** changed to print out all products in the array.



Driver

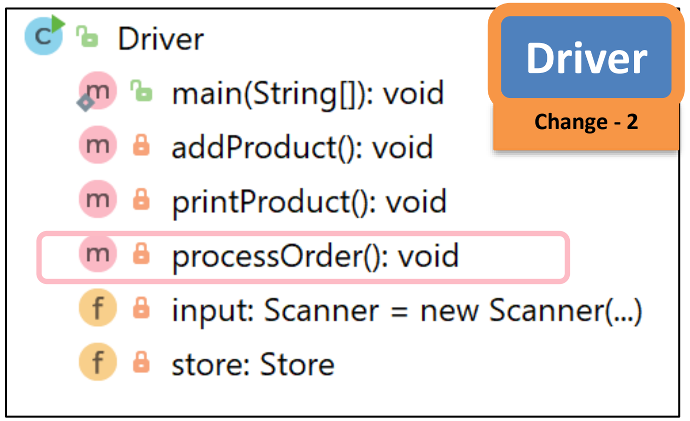
Change - 1

Driver
- main(String[]): void
- addProduct(): void
- printProduct(): void
- processOrder(): void
- input: Scanner = new Scanner(...)
- store: Store

```
import java.util.Scanner;

public class Driver{

    private Scanner input = new Scanner(System.in);
    private Store store;

    //code omitted
}
```

1) Product object removed and replaced with **Store** object.

2) New method, **processOrder()**, reads in products from the user.



Driver
main(String[]): void
addProduct(): void
printProduct(): void
processOrder(): void
input: Scanner = new Scanner(...)
store: Store

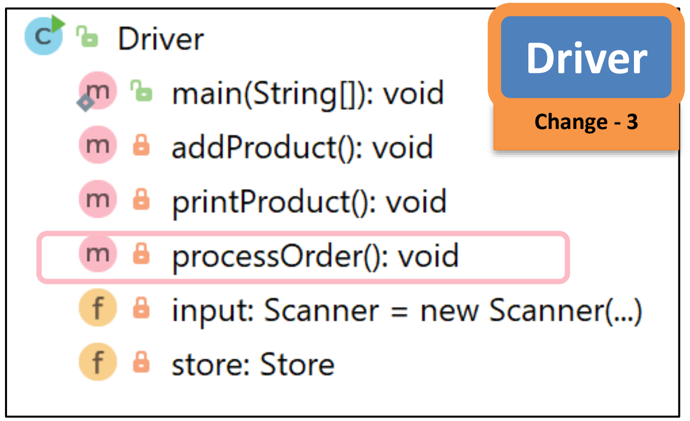
Driver

Change - 2

```java
private void processOrder(){
    //find out from the user how many products they would like to order
    System.out.print("How many Products would you like to have in your Store? ");
    int numberProducts = input.nextInt();

    store = new Store(numberProducts);

    //ask the user for the details of the products and add them to the order
    for (int i = 0; i < numberProducts; i++){
       addProduct();
    }
}
```

- Asks how many?
- Pass into Store constructor to initialise an array to that size
- Calls addProduct() for each one

3) main() changed to call **processOrder()**



Driver
- main(String[]): void
- addProduct(): void
- printProduct(): void
- processOrder(): void
- input: Scanner = new Scanner(...)
- store: Store

Driver

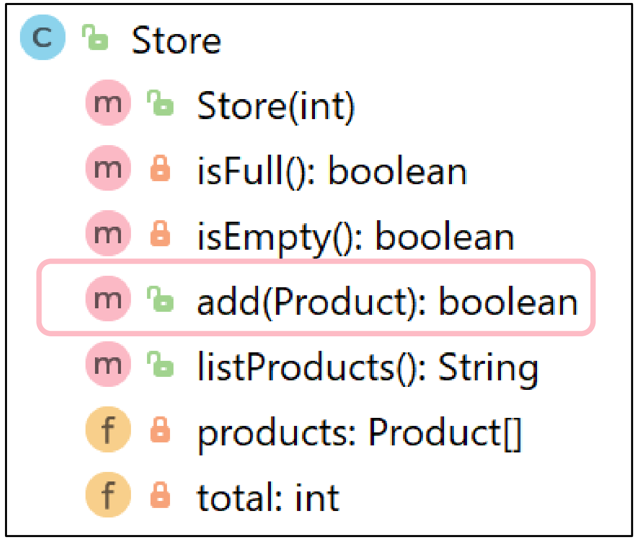
Change - 3

```
public static void main(String[] args) {
    Driver driver = new Driver();
    driver.processOrder();
    driver.printProduct();
}
```

Store

If there is space in the Array, the Product, passed as a parameter is added to the Primitive Array.

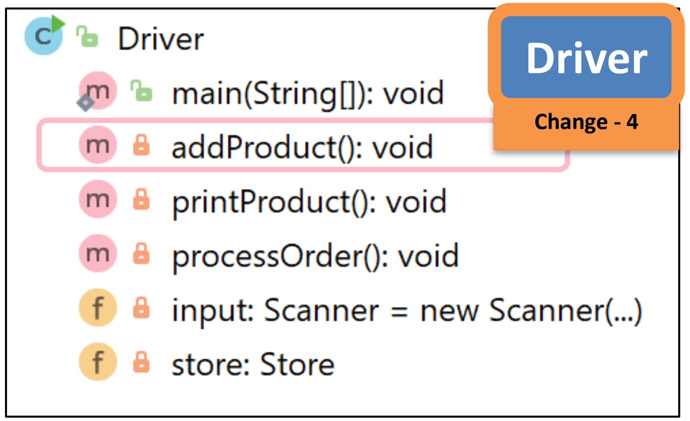
A boolean result is returned indicating whether the product was added successfully or not.



```
c Store
    m Store(int)
    m isFull(): boolean
    m isEmpty(): boolean
    m add(Product): boolean
    m listProducts(): String
    f products: Product[]
    f total: int
```

```
public boolean add(Product product){
   if (isFull()){
      return false;
   }
   else{
      products[total] = product;
      total++;
      return true;
   }
}
```

4) addProduct() changed to add the entered product to the array.



Driver
- main(String[]): void
- addProduct(): void
- printProduct(): void
- processOrder(): void
- input: Scanner = new Scanner(...)
- store: Store

Driver

Change - 4

Driver

The addProduct() method needs to be updated to:

1. Add the product object to the array of products in Store
2. Interrogate the Boolean result returned to let the user know if the update was successful or not.

```java
private void addProduct(){
   input.nextLine();  //dummy read of String to clear the buffer - bug in Scanner class.

  System.out.print("Enter the Product Name:  ");
   String productName = input.nextLine();
   System.out.print("Enter the Product Code:  ");
   int productCode = input.nextInt();
   System.out.print("Enter the Unit Cost:  ");
   double unitCost = input.nextDouble();

   //Ask the user to type in either a Y or an N then convert to boolean value
  System.out.print("Is this product in your current line (y/n): ");
  char currentProduct = input.next().charAt(0);
  boolean inCurrentProductLine = false;
  if ((currentProduct == 'y') || (currentProduct == 'Y'))
    inCurrentProductLine = true;

   boolean isAdded = store.add(new Product(productName, productCode, unitCost, inCurrentProductLine));
   if (isAdded){
      System.out.println("Product Added Successfully");
   }
   else{
      System.out.println("No Product Added");
   }
}
```

```
private void addProduct(){
   input.nextLine();  //dummy read of String to clear the buffer - bug in Scanner class.

  System.out.print("Enter the Product Name:  ");
   String productName = input.nextLine();
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  System.out.print("Is this product in your current line (y/n): ");
  char currentProduct = input.next().charAt(0);
  boolean inCurrentProductLine = false;
  if ((currentProduct == 'y') || (currentProduct == 'Y'))
    inCurrentProductLine = true;

   boolean isAdded = store.add(new Product(productName, productCode, unitCost, inCurrentProductLine));
   if (isAdded){
      System.out.println("Product Added Successfully");
   }
   else{
      System.out.println("No Product Added");
   }
}
```

Read in a **string**

Read in an **int**

Read in an **double**

Read in an **char**

Set **boolean**
based on char value

```java
private void addProduct(){
    input.nextLine();  //dummy read of String to clear the buffer - bug in Scanner class.

   System.out.print("Enter the Product Name:  ");
    String productName = input.nextLine();
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    int productCode = input.nextInt();
    System.out.print("Enter the Unit Cost:  ");
    double unitCost = input.nextDouble();

    //Ask the user to type in either a Y or an N then convert to boolean value
   System.out.print("Is this product in your current line (y/n): ");
   char currentProduct = input.next().charAt(0);
   boolean inCurrentProductLine = false;
   if ((currentProduct == 'y') || (currentProduct == 'Y'))
      inCurrentProductLine = true;

    boolean isAdded = store.add(new Product(productName, productCode, unitCost, inCurrentProductLine));
    if (isAdded){
       System.out.println("Product Added Successfully");
    }
    else{
       System.out.println("No Product Added");
    }
}
```

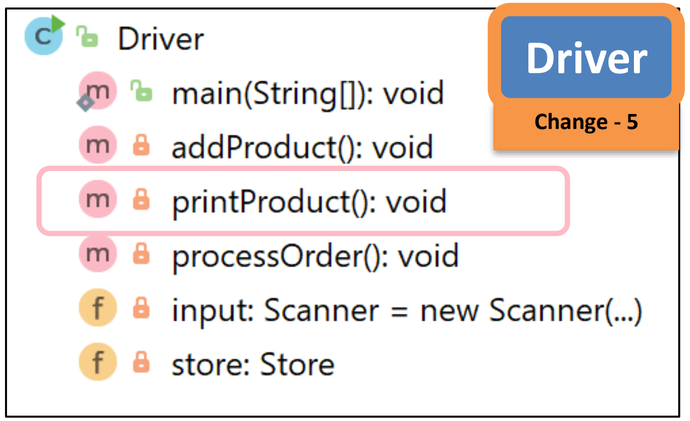
The Store add method is called to add the product to the primitive array, if space is available.

Console response if add was successful

Console response if add was unsuccessful

Driver

Change - 5



```
Driver
    main(String[]): void
    addProduct(): void
    printProduct(): void
    processOrder(): void
    input: Scanner = new Scanner(...)
    store: Store
```

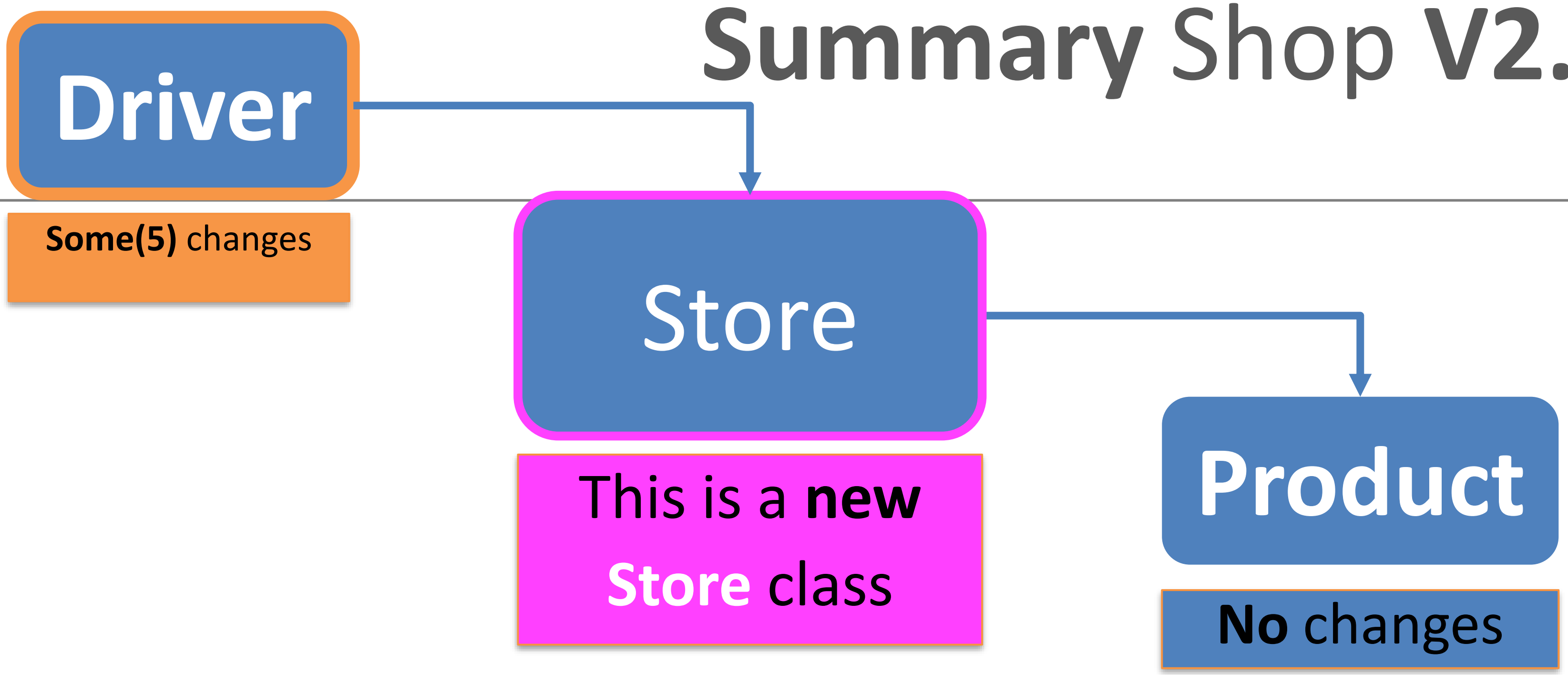
5) printProduct() changed to print out all products in the array.

```java
private void printProduct(){

    System.out.println(store.listProducts());

}
```

Summary Shop **V2.0**



- Store class maintains a collection of Products i.e. an **array of Products**; store.Products[]

- Driver allows the user to decide **how many product** details they want to store. Methods updated to work with this new **store.Products[]** array

Questions?