Shop V2.2 - An Array of Product with a basic menu

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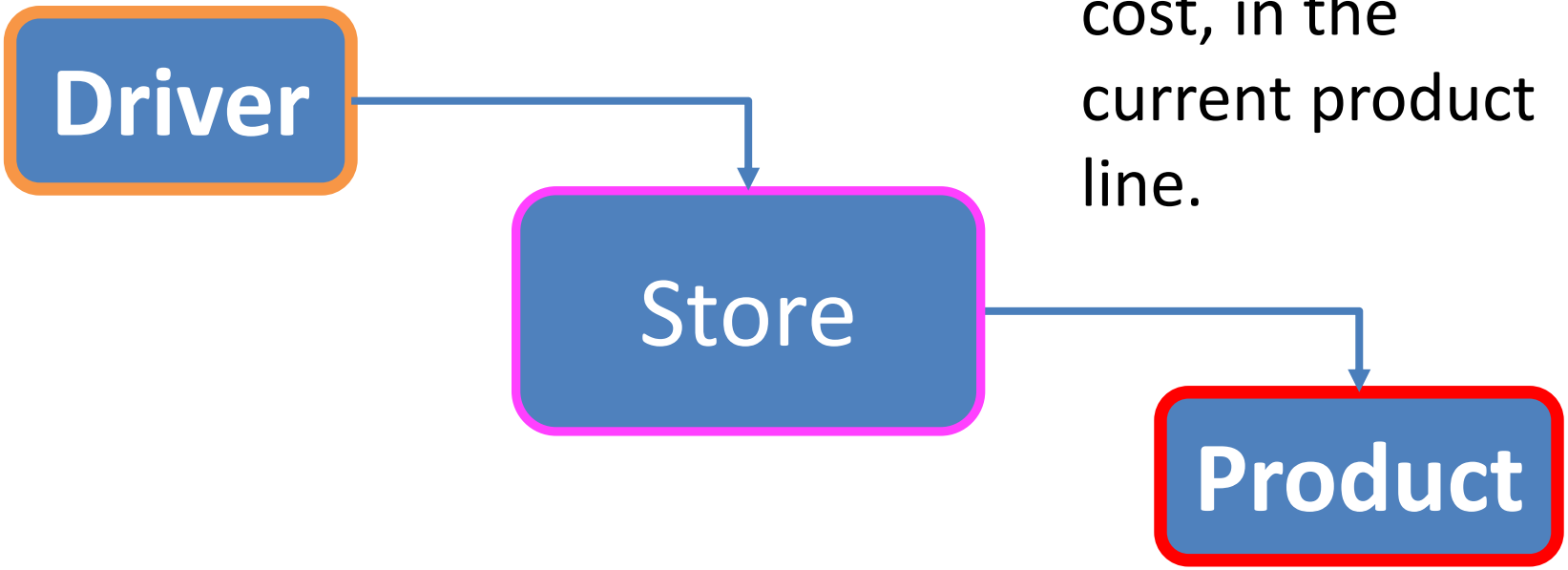
Shop V2.0

A Recap of the Classes

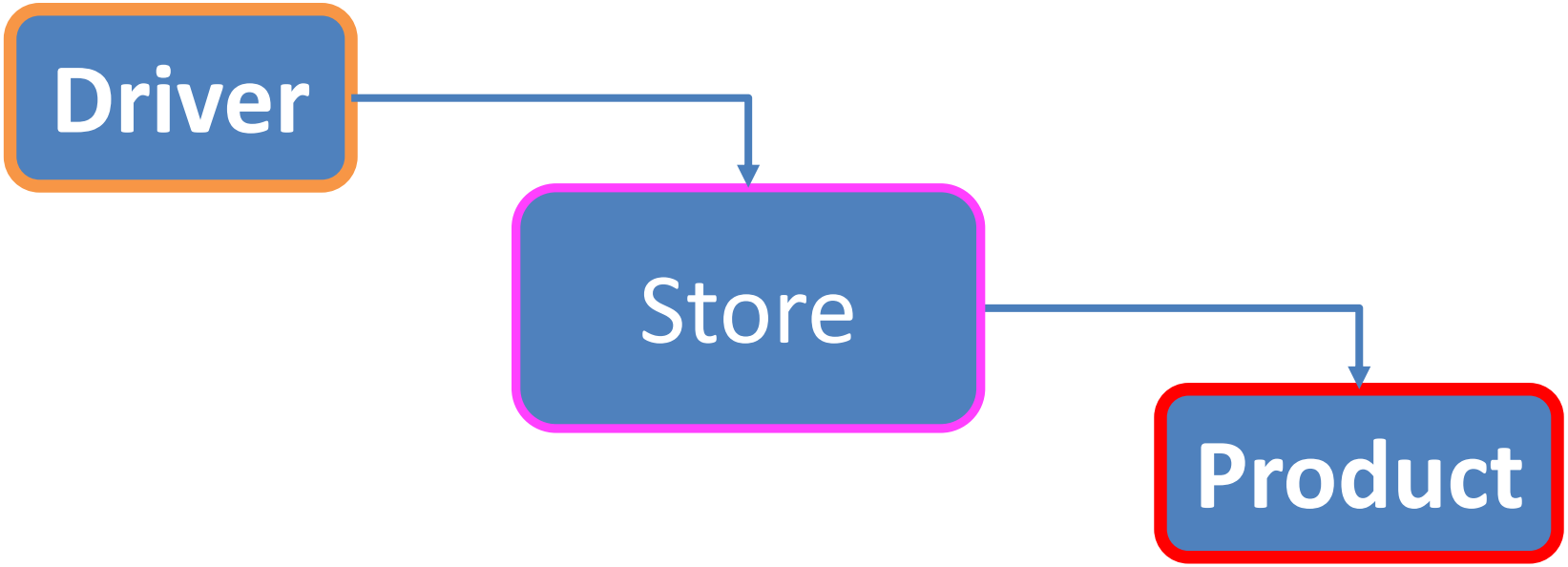
Recap - Shop **V2.0 - Product**

- The **Product** class stores **details** about a product
  - name, code, unit cost, in the current product line.



Recap - 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 V2.1

Version developed in Lab Exercises

Shop V2.1 – Lab Exercises

```
How many Products would you like to have in your Store?  3
Enter the Product Name:  Product1
Enter the Product Code:  1
Enter the Unit Cost:  45.99
Is this product in your current line (y/n): Y

Enter the Product Name:  Product2
Enter the Product Code:  2
Enter the Unit Cost:  12.99
Is this product in your current line (y/n): N

Enter the Product Name:  Product3
Enter the Product Code:  3
Enter the Unit Cost:  23.50
Is this product in your current line (y/n): Y

List of Products are:
0: Product description: Product1, product code: 1, unit cost: 45.99, currently in product line: true
1: Product description: Product2, product code: 2, unit cost: 12.99, currently in product line: false
2: Product description: Product3, product code: 3, unit cost: 23.5, currently in product line: true

List of CURRENT Products are:
0: Product description: Product1, product code: 1, unit cost: 45.99, currently in product line: true
2: Product description: Product3, product code: 3, unit cost: 23.5, currently in product line: true

The average product price is: 27.493333333333336
The cheapest product is:  Product2
View the product costing more than this price:  12.99
0: Product description: Product1, product code: 1, unit cost: 45.99, currently in product line: true
2: Product description: Product3, product code: 3, unit cost: 23.5, currently in product line: true
```

Shop V2.1 – Lab Exercises

```java
public class Driver{

    //code omitted

    public static void main(String[] args) {
        Driver c = new Driver();
        c.processOrder();
        c.printProduct();
        c.printCurrentProducts();
        c.printAverageProductPrice();
        c.printCheapestProduct();
        c.printProductsAboveAPrice();
    }

    //code omitted
}
```

```
How many Products would you like to have in your Store?  3
Enter the Product Name:  Product1
Enter the Product Code:  1
Enter the Unit Cost:  45.99
Is this product in your current line (y/n): Y

Enter the Product Name:  Product2
Enter the Product Code:  2
Enter the Unit Cost:  12.99
Is this product in your current line (y/n): N

Enter the Product Name:  Product3
Enter the Product Code:  3
Enter the Unit Cost:  23.50
Is this product in your current line (y/n): Y

List of Products are:
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2: Product description: Product3, product code: 3, unit cost: 23.5, currently in product line: true
```

Shop V2.1 – Lab Exercises

Our users have no control of the system; they cannot **choose** to do anything!

```java
public class Driver{

    //code omitted

    public static void main(String[] args) {
        Driver c = new Driver();
        c.processOrder();
        c.printProduct();
        c.printCurrentProducts();
        c.printAverageProductPrice();
        c.printCheapestProduct();
        c.printProductsAboveAPrice();
    }

    //code omitted
}
```

```
How many Products would you like to have in your Store?  3
Enter the Product Name:  Product1
Enter the Product Code:  1
Enter the Unit Cost:  45.99
Is this product in your current line (y/n): Y

Enter the Product Name:  Product2
Enter the Product Code:  2
Enter the Unit Cost:  12.99
Is this product in your current line (y/n): N

Enter the Product Name:  Product3
Enter the Product Code:  3
Enter the Unit Cost:  23.50
Is this product in your current line (y/n): Y

List of Products are:
0: Product description: Product1, product code: 1, unit cost: 45.99, currently in product line: true
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0: Product description: Product1, product code: 1, unit cost: 45.99, currently in product line: true
2: Product description: Product3, product code: 3, unit cost: 23.5, currently in product line: true
```

Shop V2.2

Adding a menu system

Shop V2.2 – Control with menu

```
How many Products would you like to have in your Store?  3
Enter the Product Name:  Product 1
Enter the Product Code:  1234
Enter the Unit Cost:  12.99
Is this product in your current line (y/n): y
Enter the Product Name:  Product 2
Enter the Product Code:  2345
Enter the Unit Cost:  7.99
Is this product in your current line (y/n): n
Enter the Product Name:  Product 3
Enter the Product Code:  6745
Enter the Unit Cost:  49.99
Is this product in your current line (y/n): y
Shop Menu
---------
  1) List the Products
  2) List the current products
  3) Display average product unit cost
  4) Display cheapest product
  5) List products that are more expensive than a given price
  0) Exit
==>>
```

We are going to add a simple menu that will allow us to view details about the entered products.

Shop V2.2 – Control with menu

Option 1:

List the products

```
Shop Menu
---------
  1) List the Products
  2) List the current products
  3) Display average product unit cost
  4) Display cheapest product
  5) List products that are more expensive than a given price
  0) Exit
==>> 1
List of Products are:
0: Product description: Product 1, product code: 1234, unit cost: 12.99, currently in product line: true
1: Product description: Product 2, product code: 2345, unit cost: 7.99, currently in product line: false
2: Product description: Product 3, product code: 6745, unit cost: 49.99, currently in product line: true


Press any key to continue...
```

Shop V2.2 – Control with menu

Option 2:

List the **current** products

```
Shop Menu
---------
  1) List the Products
  2) List the current products
  3) Display average product unit cost
  4) Display cheapest product
  5) List products that are more expensive than a given price
  0) Exit
==>> 2
List of CURRENT Products are:
0: Product description: Product 1, product code: 1234, unit cost: 12.99, currently in product line: true
2: Product description: Product 3, product code: 6745, unit cost: 49.99, currently in product line: true


Press any key to continue...
```

Shop V2.2 – Control with menu

```
Shop Menu
---------
  1) List the Products
  2) List the current products
  3) Display average product unit cost
  4) Display cheapest product
  5) List products that are more expensive than a given price
  0) Exit
==>> 3
The average product price is: 23.656666666666666

Press any key to continue...
```

Option 3:

Display average cost

Shop V2.2 – Control with menu

```
Shop Menu
---------
  1) List the Products
  2) List the current products
  3) Display average product unit cost
  4) Display cheapest product
  5) List products that are more expensive than a given price
  0) Exit
==>> 4
The cheapest product is:  Product 2

Press any key to continue...
```

Option 4:

Display cheapest product

Shop V2.2 – Control with menu

```
Shop Menu
---------
  1) List the Products
  2) List the current products
  3) Display average product unit cost
  4) Display cheapest product
  5) List products that are more expensive than a given price
  0) Exit
==>> 5
View the product costing more than this price:  15
2: Product description: Product 3, product code: 6745, unit cost: 49.99, currently in product line: true


Press any key to continue...
```

Option 5:

List products that are more expensive than a given price

Shop V2.2 – Control with menu

```
Shop Menu
---------
  1) List the Products
  2) List the current products
  3) Display average product unit cost
  4) Display cheapest product
  5) List products that are more expensive than a given price
  0) Exit
==>> 6
Invalid option entered: 6

Press any key to continue...
```

Invalid Option

Menu is redisplayed once you press the enter key.

Shop V2.2 – Control with menu

```
Press any key to continue...

Shop Menu
---------
  1) List the Products
  2) List the current products
  3) Display average product unit cost
  4) Display cheapest product
  5) List products that are more expensive than a given price
  0) Exit
==>> 0
Exiting... bye

Process finished with exit code 0
```

Option 0:

Exit the system

switch Statement

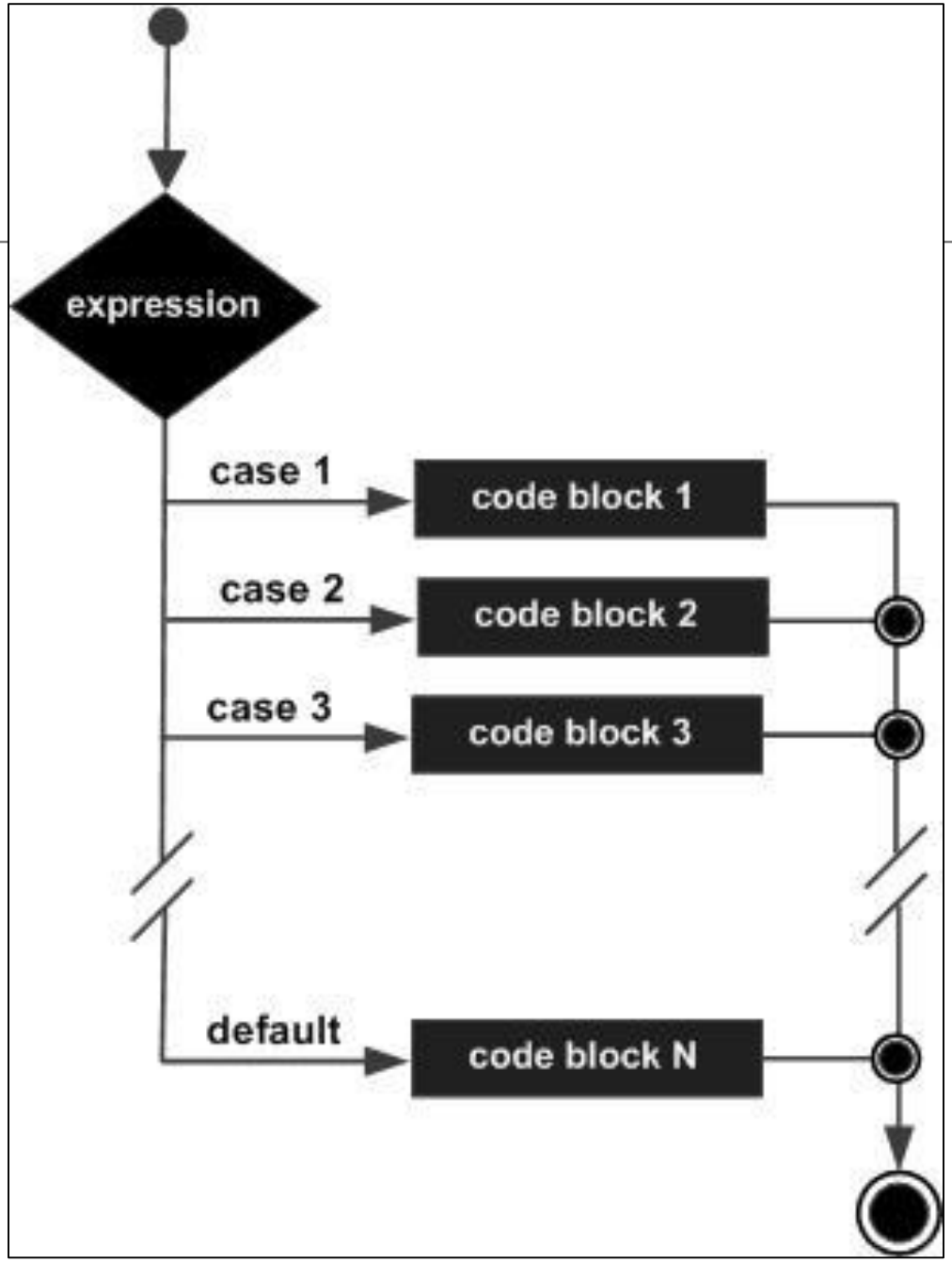
A brief introduction (more later!)

The **switch** statement

- The switch statement works in exactly the same way as a **set of if** statements, but is more compact and readable.

- The *switch statement* switches on a single **value** to one of an arbitrary number of **cases**.

The **switch** statement



The switch statement

- A *switch* statement can have any number of **case** labels.

```
switch(expression) {
    case value: statements;
                break;
    case value: statements;
                break;
    further cases possible
    default: statements;
             break;
}
```

The switch statement

- The **break** statement after every case is needed…

  ..otherwise the execution *"falls through"* into the next label's statements.

```
switch(expression) {
    case value: statements;
                break;
    case value: statements;
                break;
    further cases possible
    default: statements;
             break;
}
```

The switch statement

- The **default** case is optional.
- If no default is given, it may happen that no case is executed.

```
switch(expression) {
    case value: statements;
                break;
    case value: statements;
                break;
    further cases possible
    default: statements;
             break;
}
```

The switch statement

- The **break** statement after the default is not needed but is considered good style.

```
switch(expression) {
    case value: statements;
                break;
    case value: statements;
                break;
    further cases possible
    default: statements;
                break;
}
```

The switch statement

- Pre Java 7,
  the **expression** used to switch on, and the case **labels (value)** are **char** or **int**.

```
switch(expression) {
    case value: statements;
                break;
    case value: statements;
                break;
    further cases possible
    default: statements;
             break;
}
```

- From Java 7 onwards, you can switch on **String**.

switch statement

A simple menu

A simple menu using switch

```
public void run()
{
    System.out.println("Choose a number between 1 and 3");
    int choice = input.nextInt();

    switch(choice)
    {
        case 1:
            System.out.println("You chose 1");
            break;
        case 2:
            System.out.println("You chose 2");
            break;
        case 3:
            System.out.println("You chose 3");
            break;
        default:
            System.out.println("You chose an invalid number");
            break;
    }
}
```

Now loop on the switch statement

```
public void run()
{
    System.out.println("Choose a number between 1 and 3");
    int choice = input.nextInt();

    while (choice != 0)
    {
        switch(choice)
        {
            case 1:
                System.out.println("You chose 1");
                break;
            case 2:
                System.out.println("You chose 2");
                break;
            case 3:
                System.out.println("You chose 3");
                break;
            default:
                System.out.println("You chose an invalid number");
                break;
        }
        System.out.println("Choose a number between 1 and 3");
        choice = input.nextInt();
    }
}
```

Note the use of the **Loop Control Variable**

This gives the following output

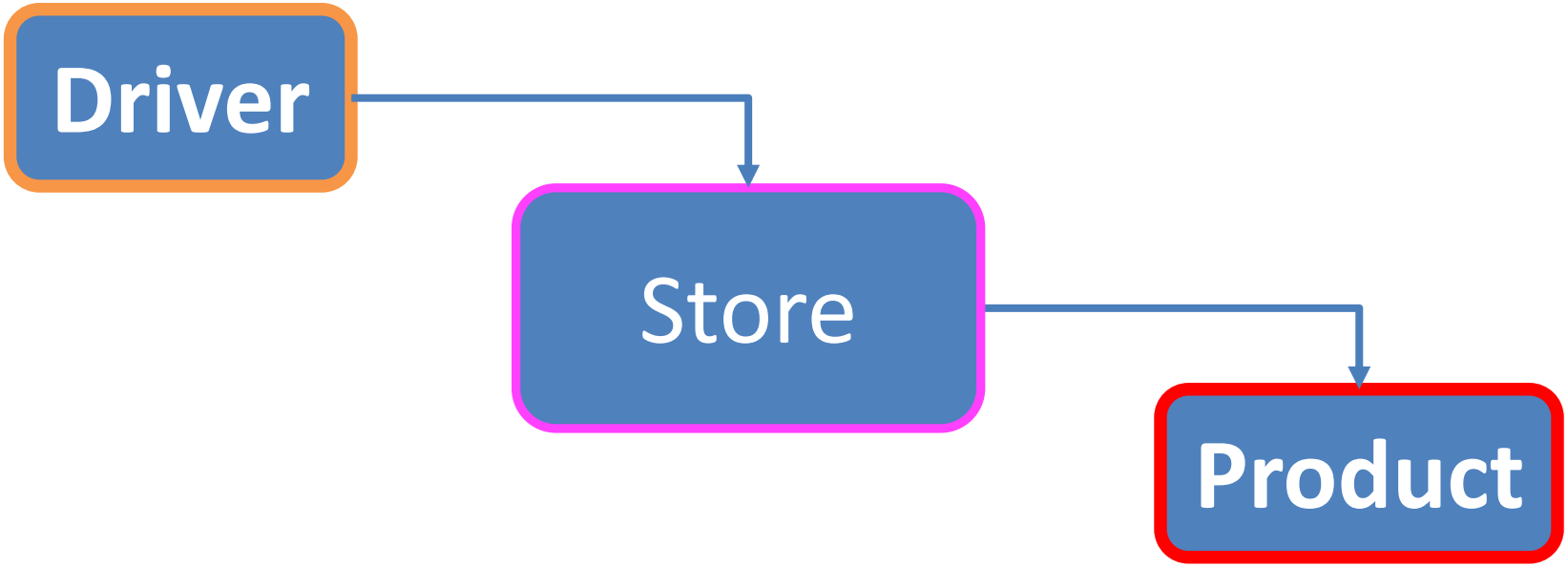
```
Choose a number between 1 and 3
2
You chose 2
Choose a number between 1 and 3
3
You chose 3
Choose a number between 1 and 3
9
You chose an invalid number
Choose a number between 1 and 3
0
```

Shop V2.2

Incorporating a menu

Shop V2.2

- **Product** – no changes
- **Store** – no changes
- **Driver** will be changed to allow the user to choose options from a menu.



Shop V2.1

Shop V2.2

Driver

- main(String[]): void
- processOrder(): void
- addProduct(): void
- printProduct(): void
- printCurrentProducts(): void
- printAverageProductPrice(): void
- printCheapestProduct(): void
- printProductsAboveAPrice(): void
- input: Scanner = new Scanner(...)
- store: Store

Shop V2.1

Driver

- main(String[]): void
- processOrder(): void
- addProduct(): void
- printProduct(): void
- printCurrentProducts(): void
- printAverageProductPrice(): void
- printCheapestProduct(): void
- printProductsAboveAPrice(): void
- input: Scanner = new Scanner(...)
- store: Store

Shop V2.2

Driver

- Driver()
- main(String[]): void
- mainMenu(): int
- runMenu(): void
- processOrder(): void
- addProduct(): void
- printProduct(): void
- printCurrentProducts(): void
- printAverageProductPrice(): void
- printCheapestProduct(): void
- printProductsAboveAPrice(): void
- input: Scanner = new Scanner(...)
- store: Store

Shop V2.1 – main method

```
public static void main(String[] args) {
    Driver c = new Driver();
    c.processOrder();
    c.printProduct();
    c.printCurrentProducts();
    c.printAverageProductPrice();
    c.printCheapestProduct();
    c.printProductsAboveAPrice();
}
```

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

Shop V2.1 – main method

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

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

Console Output

```
How many Products would you like to have in your Store?  3
Enter the Product Name:  Product1
Enter the Product Code:  1
Enter the Unit Cost:  45.99
Is this product in your current line (y/n): Y

Enter the Product Name:  Product2
Enter the Product Code:  2
Enter the Unit Cost:  12.99
Is this product in your current line (y/n): N

Enter the Product Name:  Product3
Enter the Product Code:  3
Enter the Unit Cost:  23.50
Is this product in your current line (y/n): Y

List of Products are:
0: Product description: Product1, product code: 1, unit cost: 45.99, currently in product line: true
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Shop V2.1 – main method

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}
```
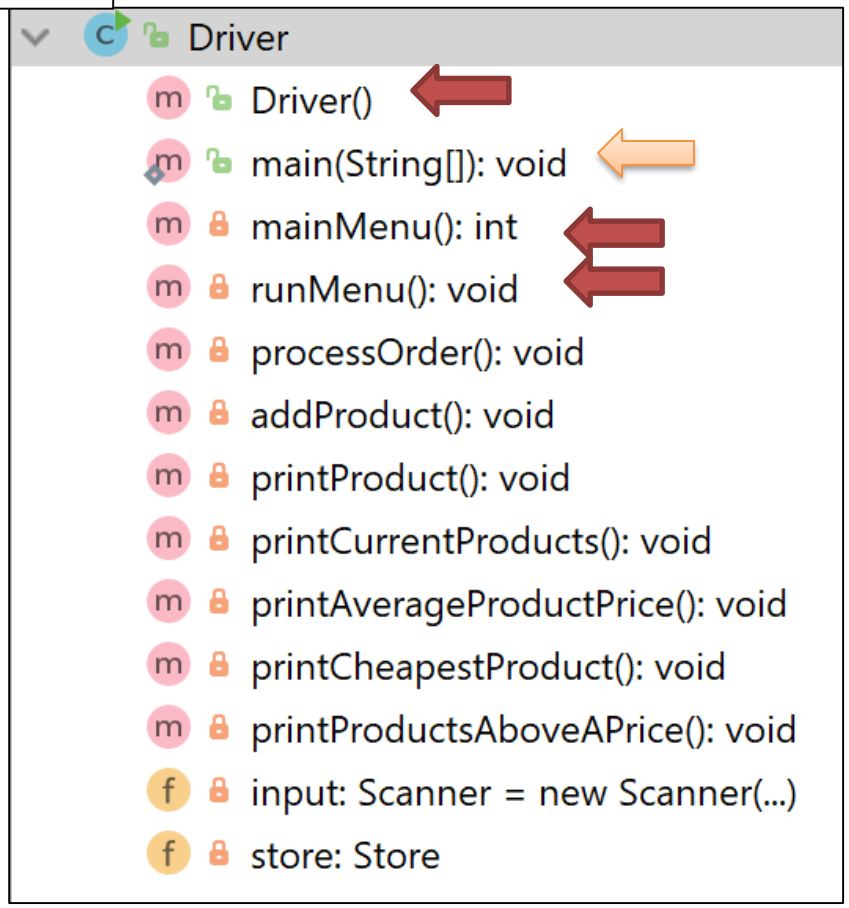

- Driver
  - main(String[]): void
  - processOrder(): void
  - addProduct(): void
  - printProduct(): void
  - printCurrentProducts(): void
  - printAverageProductPrice(): void
  - printCheapestProduct(): void
  - printProductsAboveAPrice(): void
  - input: Scanner = new Scanner(...)
  - store: Store

These methods will be in a menu system in **V2.2**

```java
public Driver() {
    processOrder();
    runMenu();
}

public static void main(String[] args) {
    new Driver();
}
```

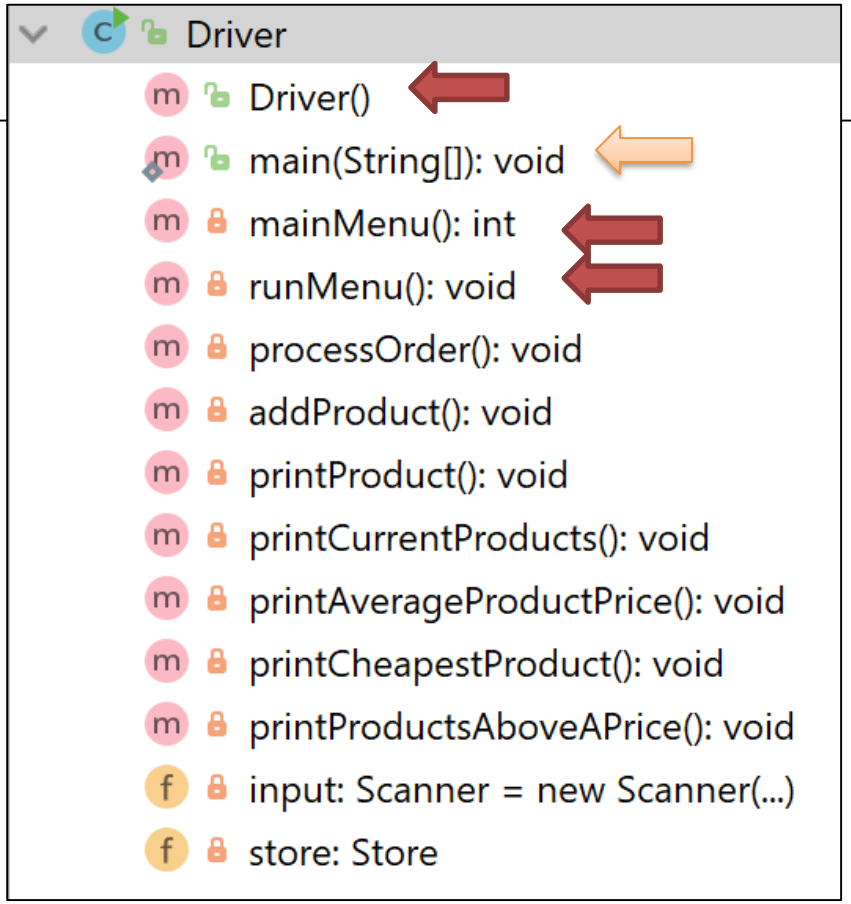


Shop V2.2:

- new Driver constructor
- changes to the main method

1

```java
private int mainMenu(){
    System.out.println("Shop Menu");
    System.out.println("---------");
    System.out.println("  1) List the Products");
    System.out.println("  2) List the current products");
    System.out.println("  3) Display average product unit cost");
    System.out.println("  4) Display cheapest product");
    System.out.println("  5) List products that are more expensive than a given price");
    System.out.println("  0) Exit");
    System.out.print("==>> ");
    int option = input.nextInt();
    return option;
}
```



Shop V2.2 – new ***mainMenu*** method

2

V2.2

```java
private void runMenu(){
    int option = mainMenu();
    while (option != 0){

        switch (option){
            case 1:    printProduct();
                break;
            case 2:    printCurrentProducts();
                break;
            case 3:    printAverageProductPrice();
                break;
            case 4:    printCheapestProduct();
                break;
            case 5:    printProductsAboveAPrice();
                break;
            default:    System.out.println("Invalid option entered: " + option);
                break;
        }

        //pause the program so that the user can read the terminal window contents
        System.out.println("\nPress any key to continue...");
        input.nextLine();
        input.nextLine();  //bug in Scanner class

        //display the main menu again
        option = mainMenu();
    }

    //the user chose option 0, so exit the program
    System.out.println("Exiting... bye");
    System.exit(0);
}
```

3

Shop V2.2 – new **runMenu** method

V2.2

```
private void runMenu(){
    int option = mainMenu();
    while (option != 0){

        switch (option){
            case 1:    printProduct();
                break;
            case 2:    printCurrentProducts();
                break;
            case 3:    printAverageProductPrice();
                break;
            case 4:    printCheapestProduct();
                break;
            case 5:    printProductsAboveAPrice();
                break;
            default:    System.out.println("Invalid option entered: " + option);
                break;
        }

        //pause the program so that the user can read the terminal window contents
        System.out.println("\nPress any key to continue...");
        input.nextLine();
        input.nextLine();  //bug in Scanner class

        //display the main menu again
        option = mainMenu();
    }

    //the user chose option 0, so exit the program
    System.out.println("Exiting... bye");
    System.exit(0);
}
```

LCV initialised

LCV tested

LCV changed

Loop Control Variable is **option**

V2.2

```java
private void runMenu(){
    int option = mainMenu();
    while (option != 0){

        switch (option){
            case 1:    printProduct();
                break;
            case 2:    printCurrentProducts();
                break;
            case 3:    printAverageProductPrice();
                break;
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                break;
            case 5:    printProductsAboveAPrice();
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        //pause the program so that the user can read the terminal window contents
        System.out.println("\nPress any key to continue...");
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        input.nextLine();  //bug in Scanner class

        //display the main menu again
        option = mainMenu();
    }

    //the user chose option 0, so exit the program
    System.out.println("Exiting... bye");
    System.exit(0);
}
```

V2.1

```java
public static void main(String[] args)
{
    Driver c = new Driver();
    c.processOrder();
    c.printProduct();
    c.printCurrentProducts();
    c.printAverageProductPrice();
    c.printCheapestProduct();
    c.printProductsAboveAPrice();
}
```

Note the methods in the switch statement are those that were in the main method in V2.1

Menus and switch statement

- We will be revisiting this content in the next week or so!

Questions?