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Inżynieria oprogramowania – etapy 5-7 Program wystawiający rachunki

Spis treści

Diagram klas

Struktura klas

Application

```
public class Application {
       static Bill bill= new Bill();
       static int cashierID = 32;
    public static void main(String[] args){

        bill.addPosition(Database.getProduct(2),2);
        bill.addPosition(Database.getProduct(2),2);
        bill.show();
        bill.calculatingFinalSums();
        System.out.println("\n\n\n");
        bill.addPosition(Database.getProduct(1),2);
        bill.removePosition(Database.getProduct(2),2);
        bill.show();
        bill.calculatingFinalSums();
        System.out.println("\n\n\n");
        Invoice x = new Invoice(bill,277277277,"Firma kox");
        x.printInvoice(cashierID);
    }

}
```

BarcodeScanner

```
public interface BarcodeScanner {
    public int scan();
}
```

VATBracket

```
public enum VATBracket {
   A(23),
   B(8),
   C(5),
   D(0);

   public final int value;
   private VATBracket(int label) {this.value = label;}
}
```

PrintingPosition

```
public class PrintingPosition {

   protected Product Product;
   protected int Quantity;

   public PrintingPosition(Product product, int quantity) {
      Product=product;
      Quantity=quantity;
   }
}
```

Product

```

public class Product {
   private String Name;
   private float Price;
```

```
    private VATBracket VAT;
    private int ProductID;

    Product(String Name, float Price, VATBracket VAT, int ProductID){
        this.Name=Name;
        this.Price=Price;
        this.VAT=VAT;
        this.ProductID=ProductID;
    }

    public Product(Product Product) {
        this.ProductID=Product.ProductID;
        this.Name=Product.Name;
        this.VAT=Product.VAT;
        this.Price=Product.Price;
    }

    public String getName() {
        return Name;
    }
    public void setName(String Name) {
        this.Name=Name;
    }

    public float getPrice() {
        return Price;
    }

    public void setPrice(float Price) {
        this.Price=Price;
    }

    public VATBracket getVAT() {
        return VAT;
    }

    public void setVAT(VATBracket VAT) {
        this.VAT=VAT;
    }

    public int getProductID() {
        return ProductID;
    }

    public void setProductID(int ProductID) {
    this.ProductID=ProductID;
    }

}
```

InternalPosition

```
public class InternalPosition extends PrintingPosition {

    public InternalPosition(Product product, int quantity) {
        super(product, quantity);
    }

    public void increment(int quantity) {
        this.Quantity+=quantity;
    }
    public void decrement(int quantity) {
        this.Quantity-=quantity;
```

```
    }
}
```

Database

```
public class Database {
    private static ArrayList<InternalPosition> Products;
    private ArrayList<Bill> bills;
    private ArrayList<Invoice> invoices;
    public static Product getProduct(int id){null;}
    public static int getQuantity(int id){return 0;}

    public void saveBill(Bill bill){}
    public void saveInvoice(Invoice invoice){}

}
```

Invoice

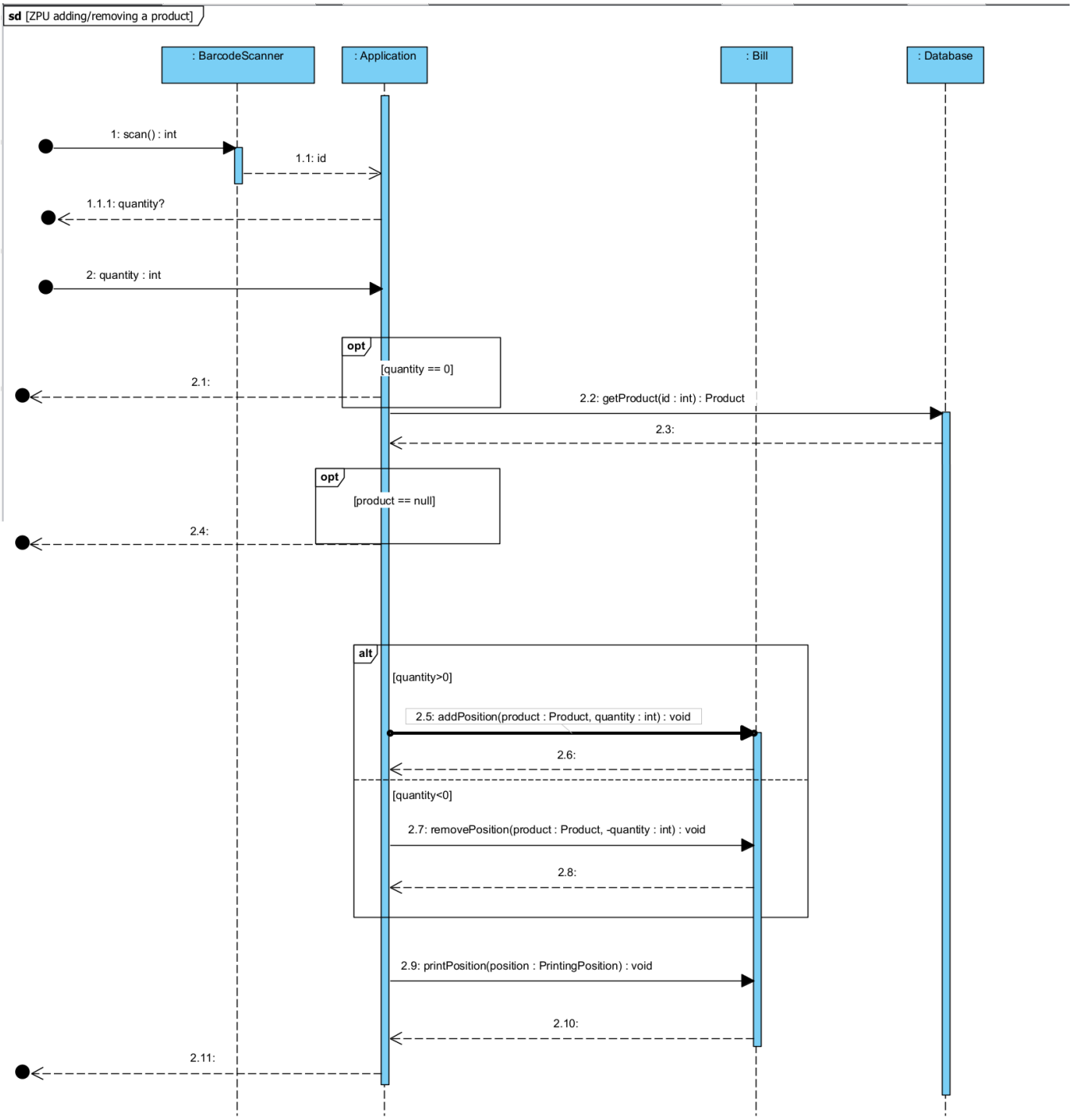
```
public class Invoice extends Bill {
    Bill Bill;
    int NIP;
    String CompanyName;

    public Invoice(Bill Bill,int NIP,String CompanyName){
        this.Bill=Bill;
        this.NIP = NIP;
        this.CompanyName = CompanyName;

    }

    public void printInvoice(int cashierID){}
    public void sendInvoice(String email){}

}
```

Bill

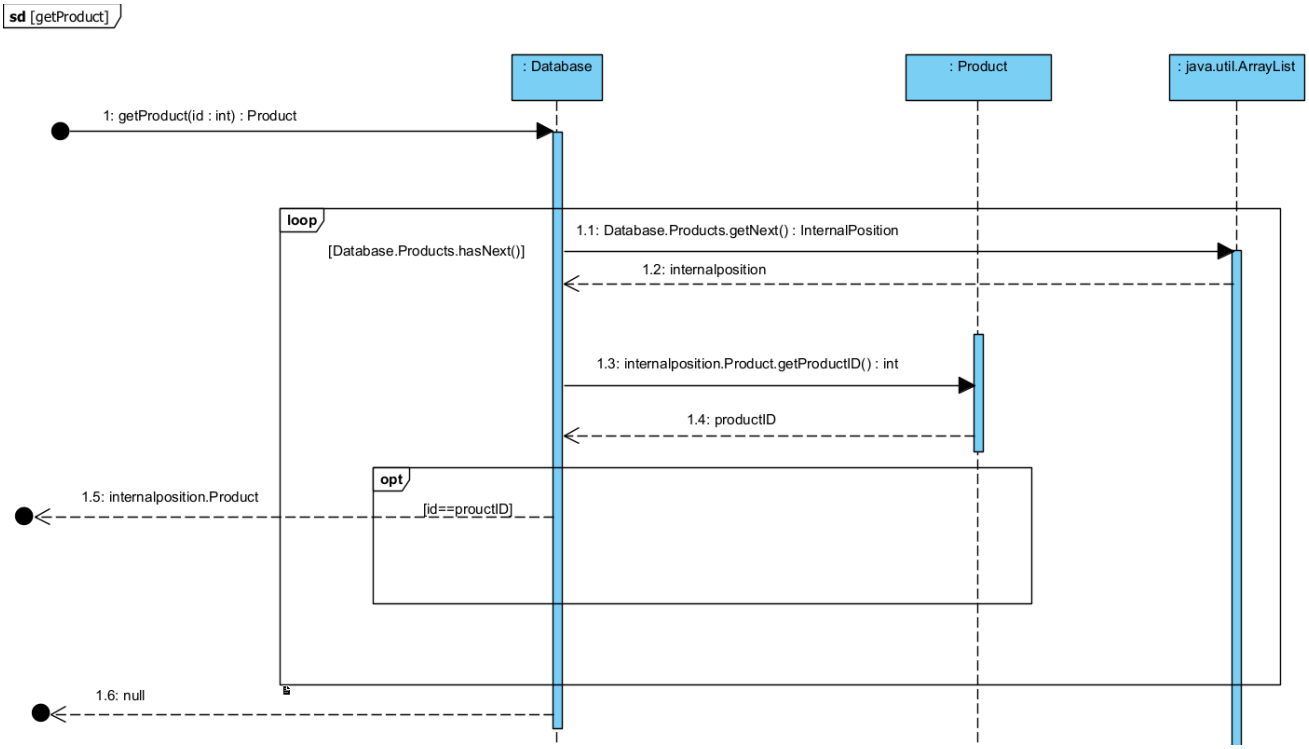
```
import java.text.SimpleDateFormat;
import java.util.ArrayList;
import java.util.Date;
public class Bill {

   private ArrayList<InternalPosition> products;
   private int billId;
   private Date Date;

   Bill(){
      products=new ArrayList<InternalPosition>();
      billId  = (int) new Date().getTime();
      Date = new Date();
   }

   public void printHeader(int cashierID){}
 public void addPosition(Product product, int quantity) {}

   public void printPosition(PrintingPosition product) {}

   public void show() {}

   public void removePosition(Product product, int quantity) {}

   public void calculatingFinalSums(){}

   private float sum(){return 0.0f}
   private ArrayList<Float> taxes() {return null;}
   private void printSum(float sum){}
   private void printTaxes(ArrayList<Float> taxesSums){}
   public void printBill(){}

}
```

Diagramy sekwencji

Diagram PU adding/removing a product

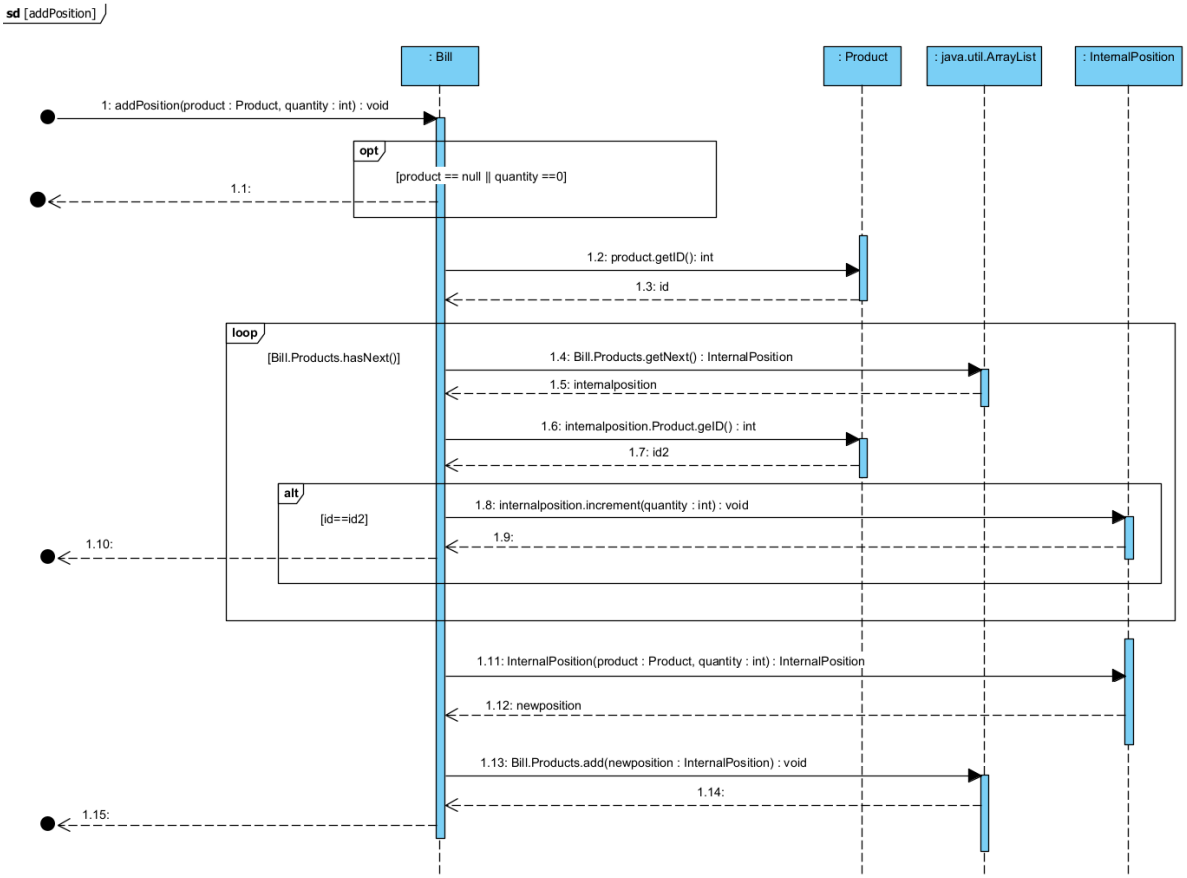


Subdiagram getProduct()




```java
public static Product getProduct(int id){
    Product product;
    for (InternalPosition x:Products) {
        if(x.Product.getProductID()==id){
            product=x.Product;
            return product;
        }
    }
    return null;
}
```

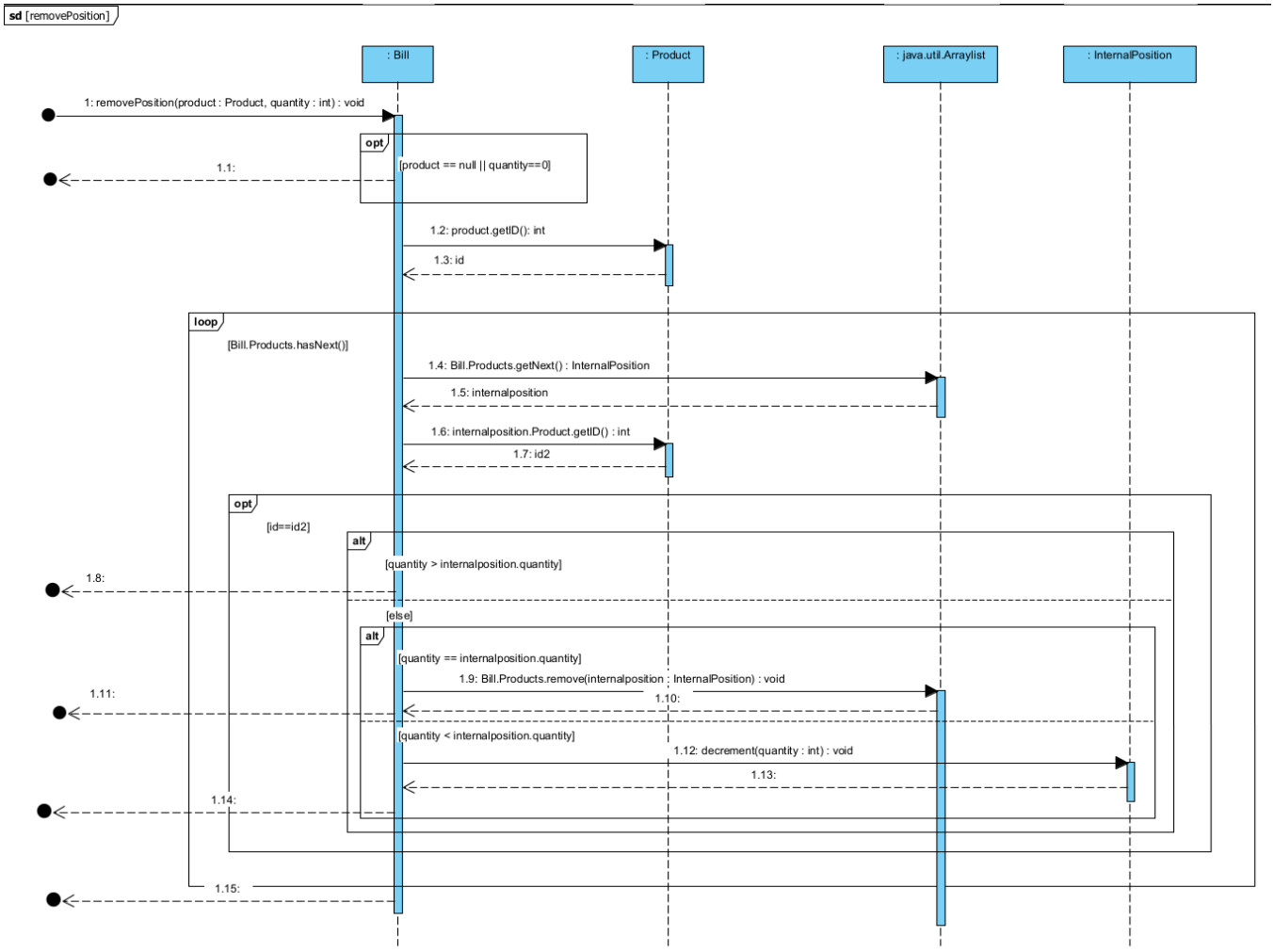
Subdiagram addPosition()




```java
public void addPosition(Product product, int quantity) {

    for (var produt : products) {

        if(produt.Product.getProductID()==product.getProductID()){
            produt.increment(quantity);
            return;
        }
    }
    products.add(new InternalPosition(product,quantity));
}
```

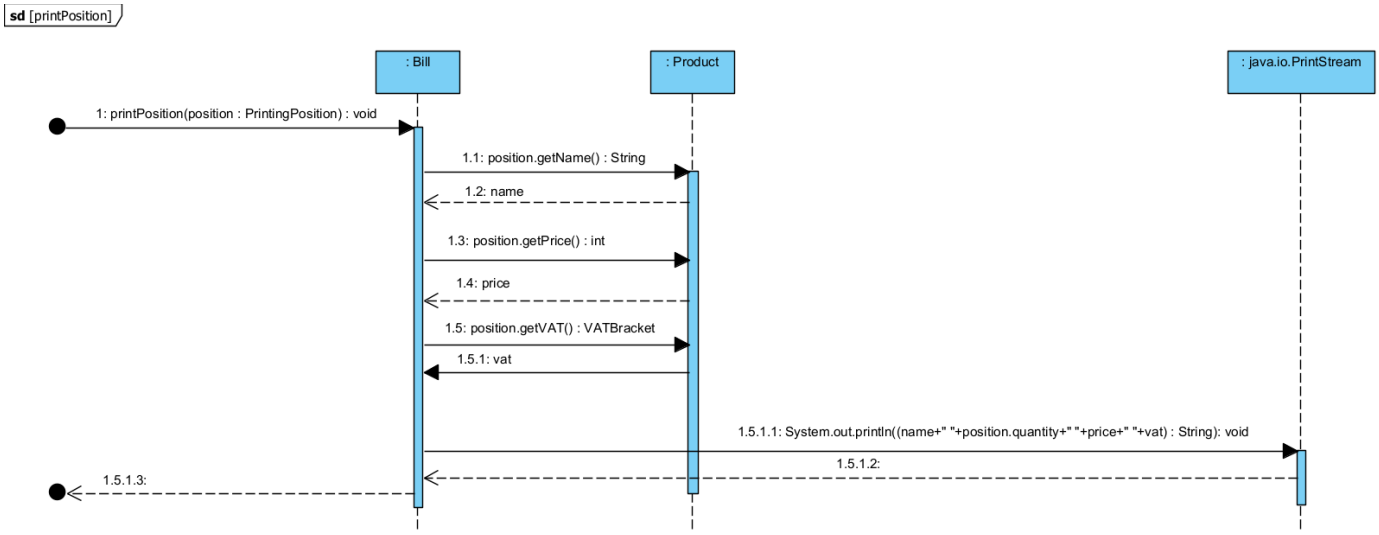
```java
public void increment(int quantity) {
    this.Quantity+=quantity;
}
```

Subdiagram removePosition()



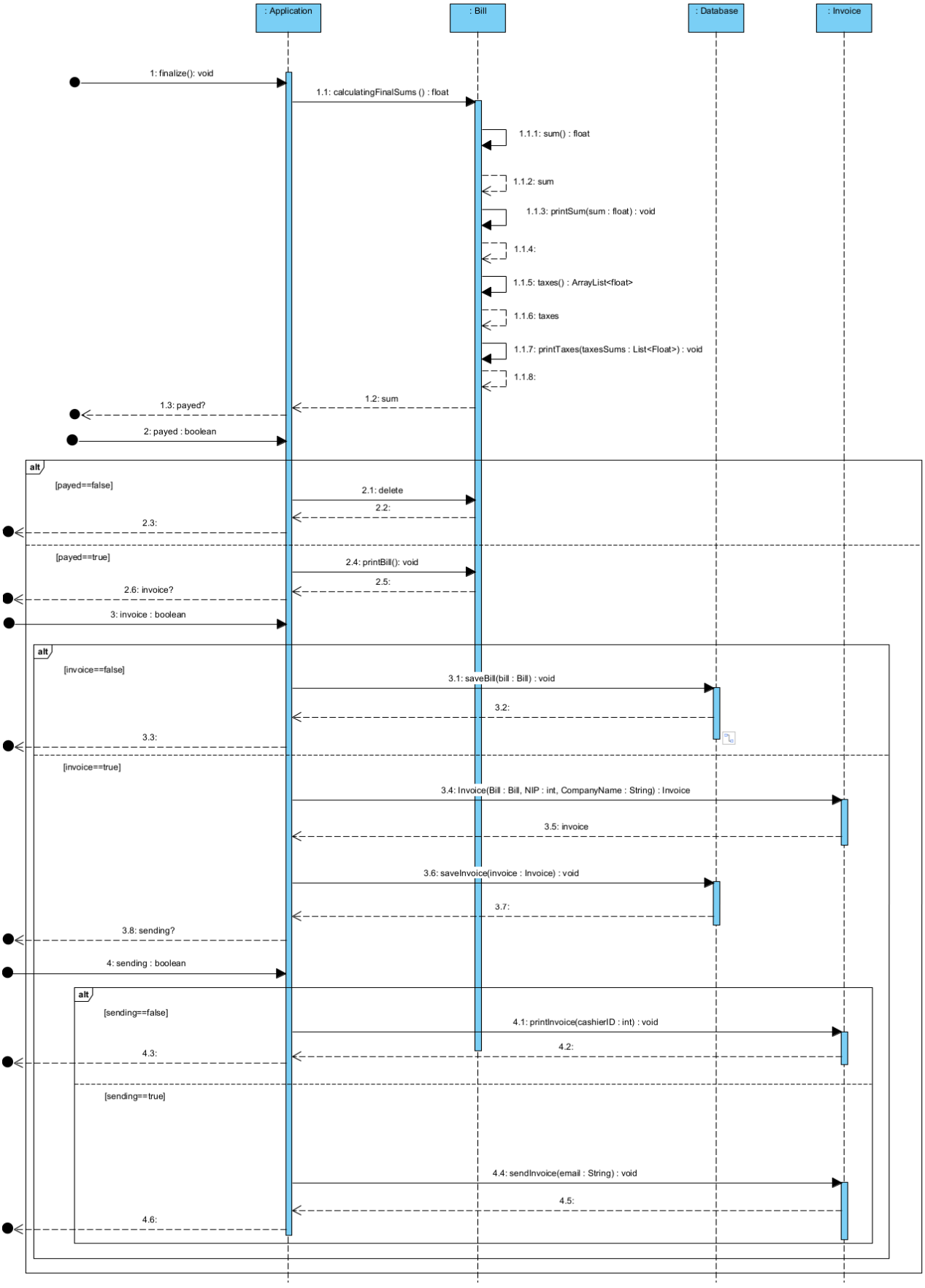

```
public void removePosition(Product product, int quantity) {
   for (var produt : products) {
      if (produt.Product.getProductID() == product.getProductID()) {
         if(quantity> produt.Quantity) return;
         else {
            if (produt.Quantity > quantity)
               produt.decrement(quantity);
            else {
               products.remove(produt);
            }
         }
         return;
      }
   }
}
```

Subdiagram printPosition()




```
public void printPosition(PrintingPosition product) {
System.out.println(product.Product.getName()+" "+product.Quantity+"
"+product.Product.getPrice()+" "+product.Product.getVAT());
}
```

Diagram PU Finalzaing the bill

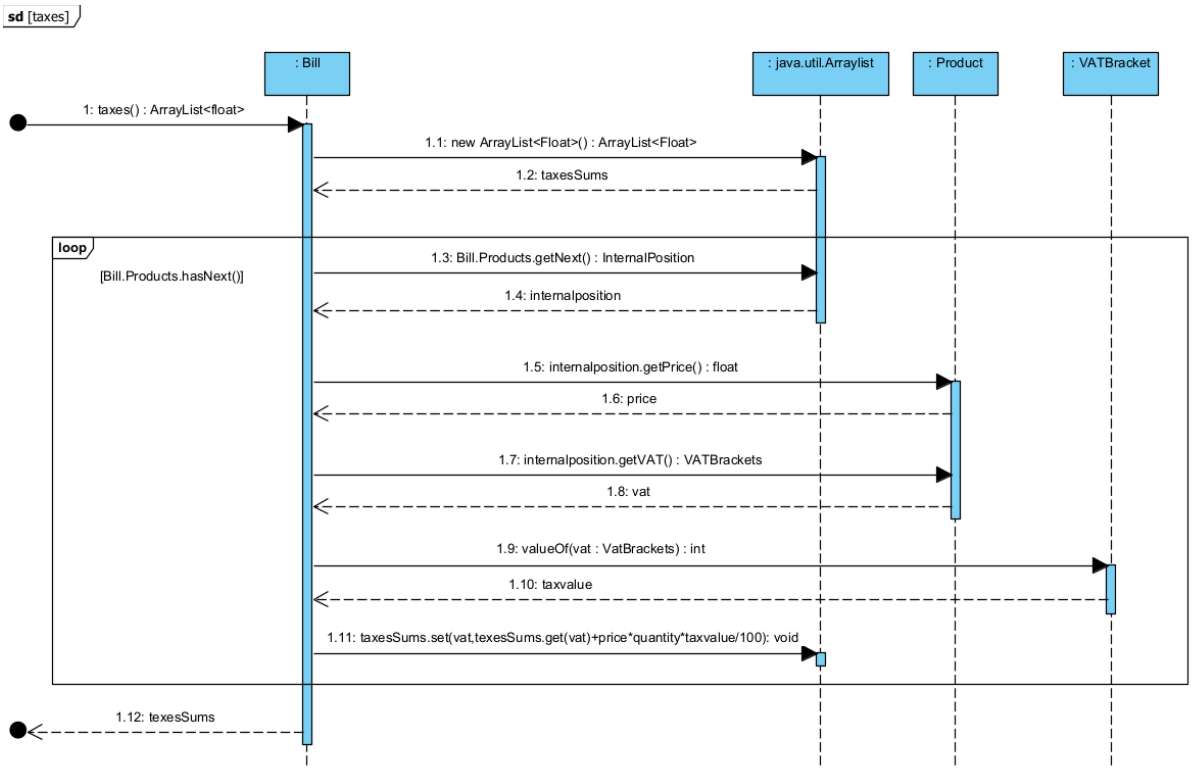


```
public void calculatingFinalSums(){
   printSum(sum());;
   printTaxes(taxes());

}
private float sum(){
   float sum = 0;
   for (var product : products){
      sum += product.Product.getPrice() * product.Quantity;
   }
   return sum;
}


private void printSum(float sum){
   System.out.println("Suma: "+sum);
}
private void printTaxes(ArrayList<Float> taxesSums){

   for(int i=0;i<4;i++)
   System.out.println(VATBracket.getBracketForValue(i)+"
"+taxesSums.get(i));


}
public void printBill(){
   System.out.println("Dziekujemy za zakupy");
}
```

```
public void saveBill(Bill bill){
    bills.add(bill);
}
public void saveInvoice(Invoice invoice){
    invoices.add(invoice);
}
```

```
public void printInvoice(int cashierID){
    System.out.print("Data : ");
    Bill.printHeader(cashierID);
    System.out.println("NAZWA FIRMY : " + CompanyName);
    System.out.println("NIP : " + NIP);
    Bill.show();
    Bill.calculatingFinalSums();
}
public void sendInvoice(String email){
    System.out.println("Wysylanie faktury na adres email: " + email);
}
```

Subdiagram taxes()




```
private ArrayList<Float> taxes() {
   ArrayList<Float> taxesSums = new ArrayList<Float>();
   taxesSums.add(0.0f);
   taxesSums.add(0.0f);
   taxesSums.add(0.0f);
   taxesSums.add(0.0f);

   for (var product : products) {
      int index = switch (product.Product.getVAT()) {
         case A -> 0;
         case B -> 1;
         case C -> 2;
         case D -> 3;
      };

      taxesSums.set(index, taxesSums.get(index) +
product.Product.getPrice() * product.Quantity *
VATBracket.valueOf(product.Product.getVAT().name()).value / 100);
   }

   return taxesSums;
}
```

Uzyskany kod

BarcodeScanner

```
public interface BarcodeScanner {
    public int scan();
}
```

VATBracket

```
public enum VATBracket {
   A(23),
   B(8),
   C(5),
   D(0);
   public final int value;
   private VATBracket(int label) {this.value = label;}
}
```

Invoice

```
import java.util.ArrayList;
public class Invoice extends sklep.Bill {
    Bill Bill;
    int NIP;
    String CompanyName;

    public Invoice(Bill Bill,int NIP,String CompanyName){
        this.Bill=Bill;
        this.NIP = NIP;
        this.CompanyName = CompanyName;

    }
public void printInvoice(int cashierID){
    Bill.printHeader(cashierID);
    System.out.println("NAZWA FIRMY : " + CompanyName);
    System.out.println("NIP : " + NIP);
    Bill.show();
    Bill.calculatingFinalSums();
}

    public void sendInvoice(String email){
        System.out.println("Wysylanie faktury na adres email: " + email);
    }
}
```

PrintingPosition

```
public class PrintingPosition {

   protected Product Product;
   protected int Quantity;

   public PrintingPosition(Product product, int quantity) {

      Product=product;
      Quantity=quantity;
   }
}
```

Database

```
import java.util.ArrayList;
public class Database {
    private static ArrayList<InternalPosition> Products;
    static{
        Products=new ArrayList<InternalPosition>();
        Products.add(new InternalPosition(new Product("Chleb
pszenny",3.49f, VATBracket.B,1),36));
        Products.add(new InternalPosition(new Product("Mleko muuu",3.99f,
VATBracket.B,2),314));
        Products.add(new InternalPosition(new Product("Telewizor
32''",1299.99f, VATBracket.A,3),4));
        Products.add(new InternalPosition(new Product("Radioodbiornik
Rydzunio",333.33f, VATBracket.A,4),12));
    }
    private ArrayList<Bill> bills = new ArrayList<Bill>();
    private ArrayList<Invoice> invoices= new ArrayList<Invoice>();
    public static Product getProduct(int id){
        Product product;
        for (InternalPosition x:Products) {
            if(x.Product.getProductID()==id){
                product=x.Product;
                return product;
            }
        }
        return null;
    }
    public static int getQuantity(int id){

        int quantity = -1;
        for (InternalPosition x:Products) {
            if(x.Product.getProductID()==id){
                quantity=x.Quantity;
            }
        }
        return quantity;
    }

    public void saveBill(Bill bill){
        bills.add(bill);
    }
    public void saveInvoice(Invoice invoice){
        invoices.add(invoice);
    }

}
```

Bill

```
import java.text.SimpleDateFormat;
import java.util.ArrayList;
import java.util.Date;
public class Bill {

   private ArrayList<InternalPosition> products;
   private int billId;
   private Date Date;

   Bill(){
      products=new ArrayList<InternalPosition>();
      billId  = (int) new Date().getTime();
      Date = new Date();
```

```
    }

    public void printHeader(int cashierID){
        SimpleDateFormat f = new SimpleDateFormat("yyyy-MM-dd hh:mm");
    System.out.println("Sklep Fajny");
    System.out.println("NIP 328957834275");
    System.out.println("Kasjer : "+cashierID);
    System.out.println(f.format(Date));

    }
    public void addPosition(Product product, int quantity) {

        for (var produt : products) {

            if(produt.Product.getProductID()==product.getProductID()){
                produt.increment(quantity);
                return;
            }
        }
        products.add(new InternalPosition(product,quantity));
    }

    public void printPosition(PrintingPosition product) {
    System.out.println(product.Product.getName()+" "+product.Quantity+"
"+product.Product.getPrice()+" "+product.Product.getVAT());
    }

    public void show() {
        for (InternalPosition product:products) {
            System.out.println(product.Product.getName()+"
"+product.Quantity+"    "+product.Product.getPrice()+"
"+product.Product.getVAT());
        }
    }

    public void removePosition(Product product, int quantity) {
        for (var produt : products) {
            if (produt.Product.getProductID() == product.getProductID()) {
                if(quantity> produt.Quantity) return;
                else {
                    if (produt.Quantity > quantity)
                        produt.decrement(quantity);
                    else {
                        products.remove(produt);
                    }
                }
                return;
            }
        }
    }

    public void calculatingFinalSums(){
        printSum(sum());;
        printTaxes(taxes());

    }

    private float sum(){
        float sum = 0;
        for (var product : products){
            sum += product.Product.getPrice() * product.Quantity;
```

```
        }
        return sum;
    }
    private ArrayList<Float> taxes() {
        ArrayList<Float> taxesSums = new ArrayList<Float>();
        taxesSums.add(0.0f);
        taxesSums.add(0.0f);
        taxesSums.add(0.0f);
        taxesSums.add(0.0f);

        for (var product : products) {
            int index = switch (product.Product.getVAT()) {
                case A -> 0;
                case B -> 1;
                case C -> 2;
                case D -> 3;
            };

            taxesSums.set(index, taxesSums.get(index) +
product.Product.getPrice() * product.Quantity *
VATBracket.valueOf(product.Product.getVAT().name()).value / 100);
        }

        return taxesSums;
    }

    private void printSum(float sum){
        System.out.println("Suma: "+sum);
    }
private void printTaxes(ArrayList<Float> taxesSums){
    char v = 'A';
    for(int i=0;i<4;i++){
        System.out.println(v+" "+taxesSums.get(i));
        v++;
    }

}

    public void printBill(){
        System.out.println("Dziekujemy za zakupy");
    }

}
```

InternalPosition

```
public class InternalPosition extends PrintingPosition {

   public InternalPosition(Product product, int quantity) {
      super(product, quantity);
   }

   public void increment(int quantity) {
      this.Quantity+=quantity;
   }
   public void decrement(int quantity) {
      this.Quantity-=quantity;
   }
}
```

Application

```
public class Application {
       static Bill bill= new Bill();
       static int cashierID = 32;
    public static void main(String[] args){

        bill.addPosition(Database.getProduct(2),2);
        bill.addPosition(Database.getProduct(2),2);
        bill.show();
        bill.calculatingFinalSums();
        System.out.println("\n\n\n");
        bill.addPosition(Database.getProduct(1),2);
        bill.removePosition(Database.getProduct(2),2);
        bill.show();
        System.out.println("\n\n\n");
        Invoice x = new Invoice(bill,277277277,"Firma kox");
        x.printInvoice(cashierID);
    }
}
```

Product

```
public class Product {
   private String Name;
   private float Price;
   private VATBracket VAT;
   private int ProductID;

   Product(String Name, float Price, VATBracket VAT, int ProductID){
      this.Name=Name;
      this.Price=Price;
      this.VAT=VAT;
      this.ProductID=ProductID;
   }

   public Product(Product Product) {
      this.ProductID=Product.ProductID;
      this.Name=Product.Name;
      this.VAT=Product.VAT;
      this.Price=Product.Price;


   }
```

```
    public String getName() {
        return Name;
    }


    public void setName(String Name) {
        this.Name=Name;
    }

    public float getPrice() {
        return Price;
    }

    public void setPrice(float Price) {
        this.Price=Price;
    }

    public VATBracket getVAT() {
        return VAT;
    }

    public void setVAT(VATBracket VAT) {
        this.VAT=VAT;
    }

    public int getProductID() {
        return ProductID;
    }

    public void setProductID(int ProductID) {
    this.ProductID=ProductID;
    }

}
```

Wyniki testów

```
bill.addPosition(Database.getProduct(2),2);
bill.addPosition(Database.getProduct(2),2);
bill.show();
bill.calculatingFinalSums();
```

```
Mleko muuu  4   3.99    B
Suma: 15.96
A   0.0
B   1.2768
C   0.0
D   0.0
```

```
bill.addPosition(Database.getProduct(1),2);
bill.removePosition(Database.getProduct(2),2);
bill.show();
bill.calculatingFinalSums();
```

```
Mleko muuu  2   3.99    B
Chleb pszenny   2   3.49    B
Suma: 14.96
A   0.0
B   1.1968
C   0.0
D   0.0
```

```
Invoice x = new Invoice(bill,277277277,"Firma kox");
x.printInvoice(cashierID);
```

```
Sklep Fajny
NIP 328957834275
Kasjer : 32
2023-12-08 05:43
NAZWA FIRMY : Firma kox
NIP : 277277277
Mleko muuu 2  3.99   B
Chleb pszenny  2  3.49   B
Suma: 14.96
A  0.0
B  1.1968
C  0.0
D  0.0
```