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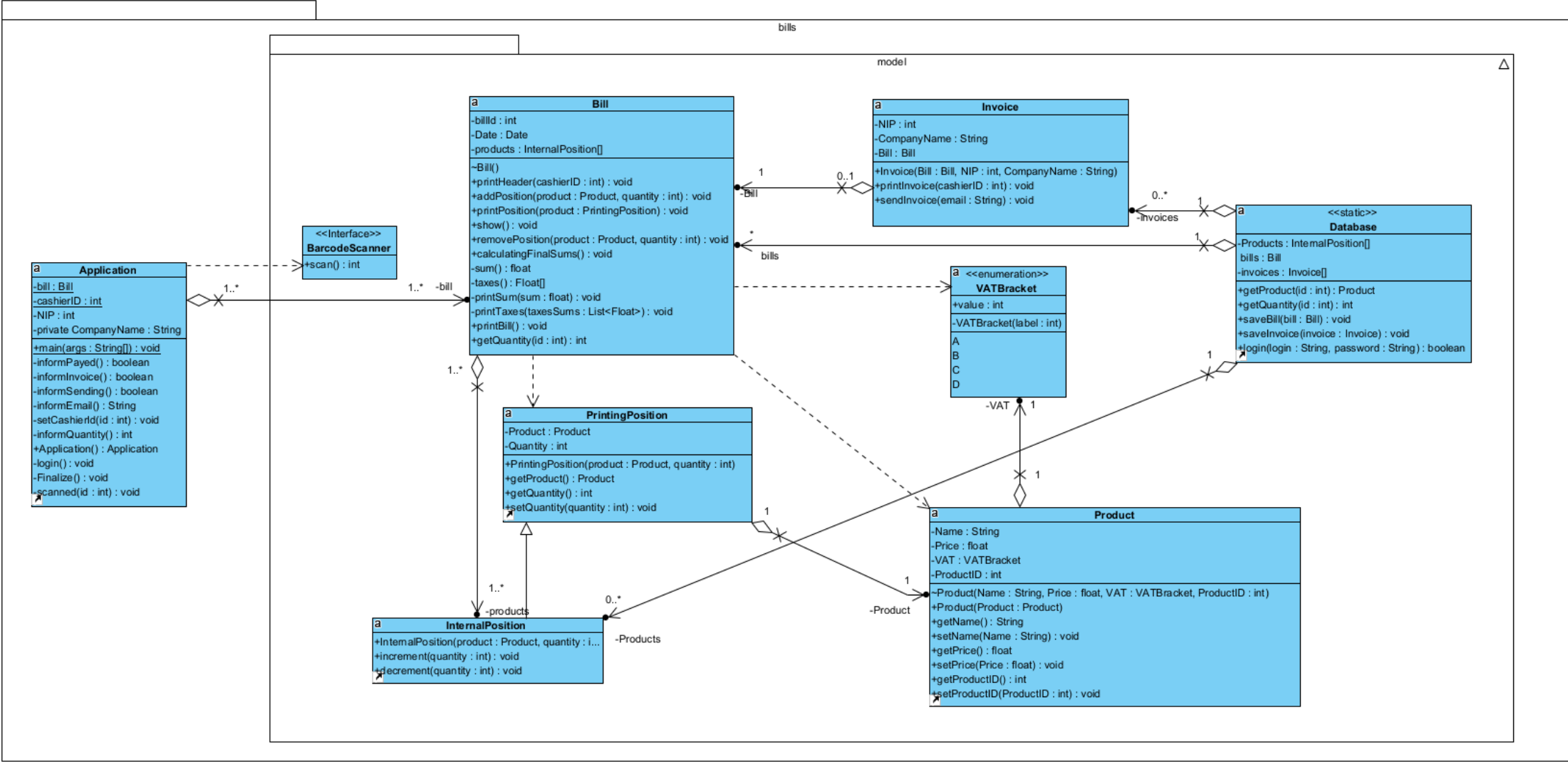
Michał Bernacki-Janson 264021

Inżynieria oprogramowania – etapy 5-7 Program wystawiający rachunki

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Diagram klas



Struktura klas

Application

```
public class Application {
    static Bill;
    private static int cashierID;
    private int NIP;
    private String CompanyName;

    Application() {}
    private int informQuantity() {return 0;}
    private void setCashierId(int id) {}
    private boolean informPayed() {return false;}
    private boolean informInvoice() {return false;}
    private boolean informSending() {return false;}
    private String informEmail() {return null;}
    private void login() {}
    private void Finalize() {}
    private void scanned(int id) {}
    public static void main(String[] args) {}
}
```

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 {

    private Product Product;
    private int Quantity;

    public PrintingPosition(Product product, int quantity) {}
    public Product getProduct() {return Product;}
    public int getQuantity() {return Quantity;}
    public void setQuantity(int 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){}

public Product(Product Product) {}

public String getName() {
    return Name;
}

public float getPrice() {
    return Price;
}

public VATBracket getVAT() {
    return VAT;
}

public int getProductID() {
    return ProductID;
}
}

```

InternalPosition

```

public class InternalPosition extends PrintingPosition {

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

    public void increment(int quantity) {}
    public void decrement(int 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){}
    public boolean login(String login, String password){ return false;}
}

```

Invoice

```

public class Invoice{
    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(){}

    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(){}

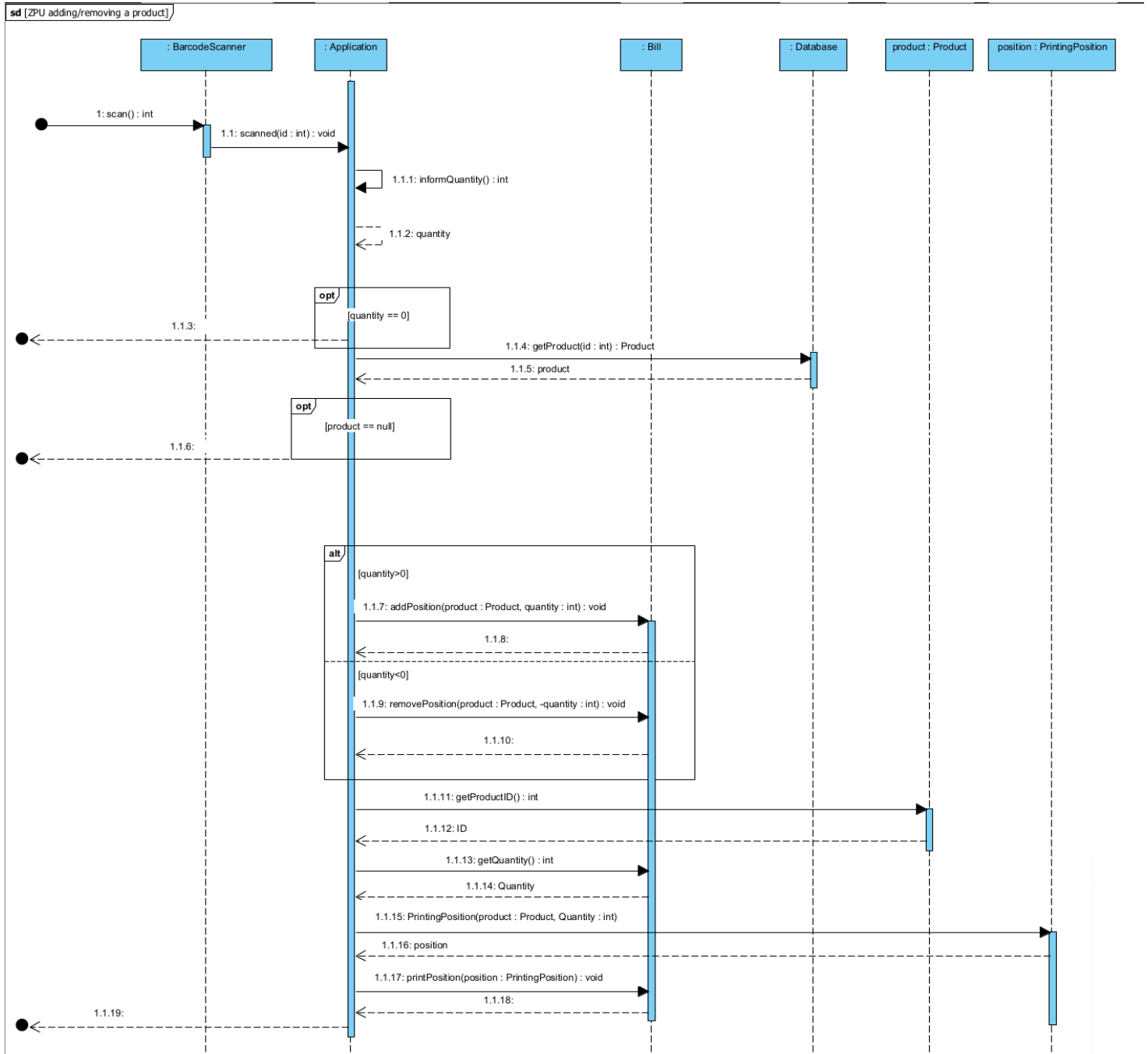
    private float sum(){return 0.0f}
    private ArrayList<Float> taxes() { return null;}
    private void printSum(float sum){}
    private void printTaxes(ArrayList<Float> taxesSums){}
    public void printBill(){}
    public int getQuantity(int id){ return 0;}

}

```

Diagramy sekwencji

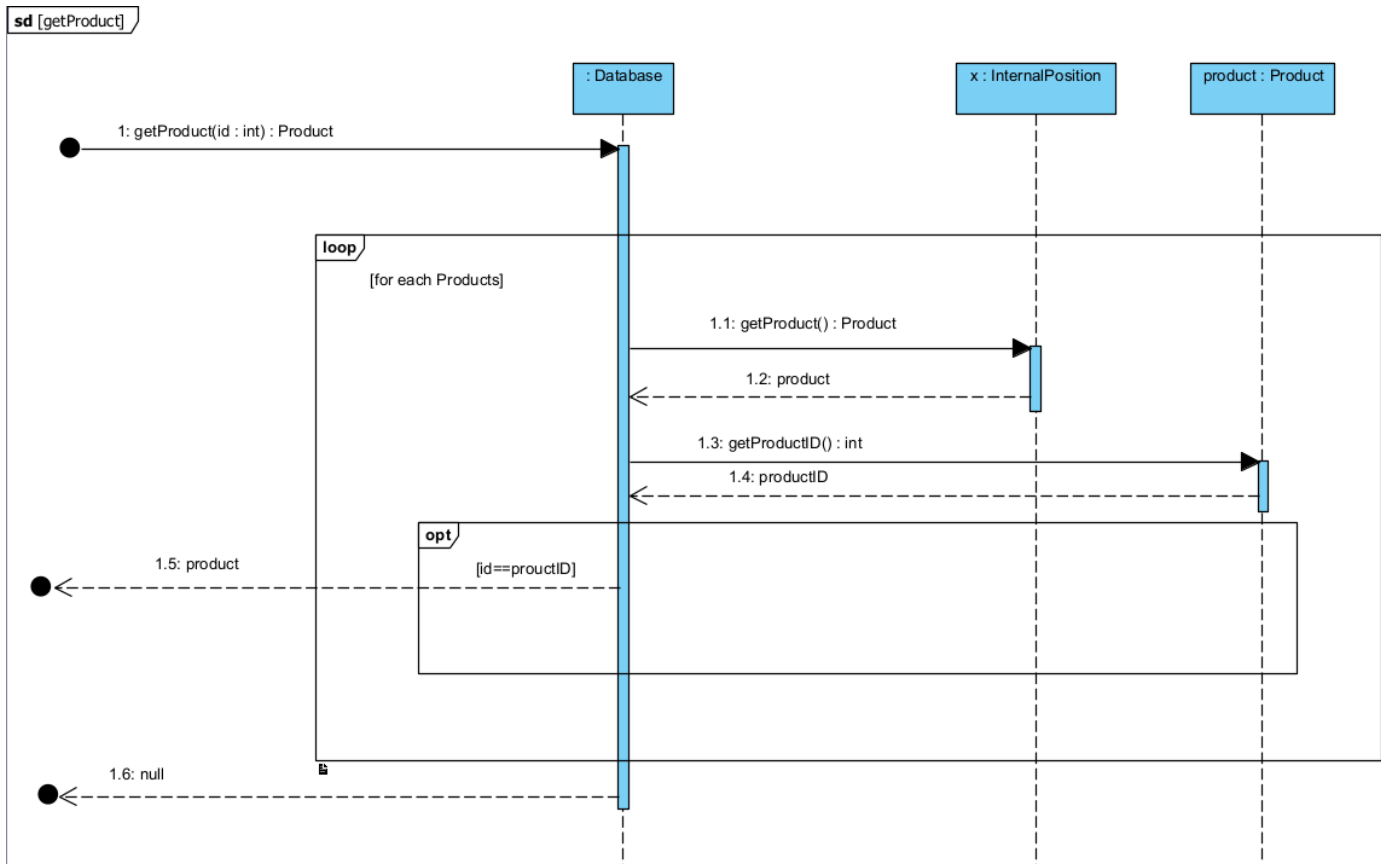
Diagram PU adding/removing a product



```

private void scanned(int id) {
    int quantity;
    quantity = informQuantity();
    if (quantity == 0) return;
    Product product = Database.getProduct(id);
    if (product == null) return;
    if (quantity > 0) bill.addPosition(product, quantity);
    else if (quantity < 0) bill.removePosition(product, quantity);
    int ID = product.getProductID();
    int Quantity = bill.getQuantity(ID);
    PrintingPosition position = new PrintingPosition(product, Quantity);
    bill.printPosition(position);
}
  
```

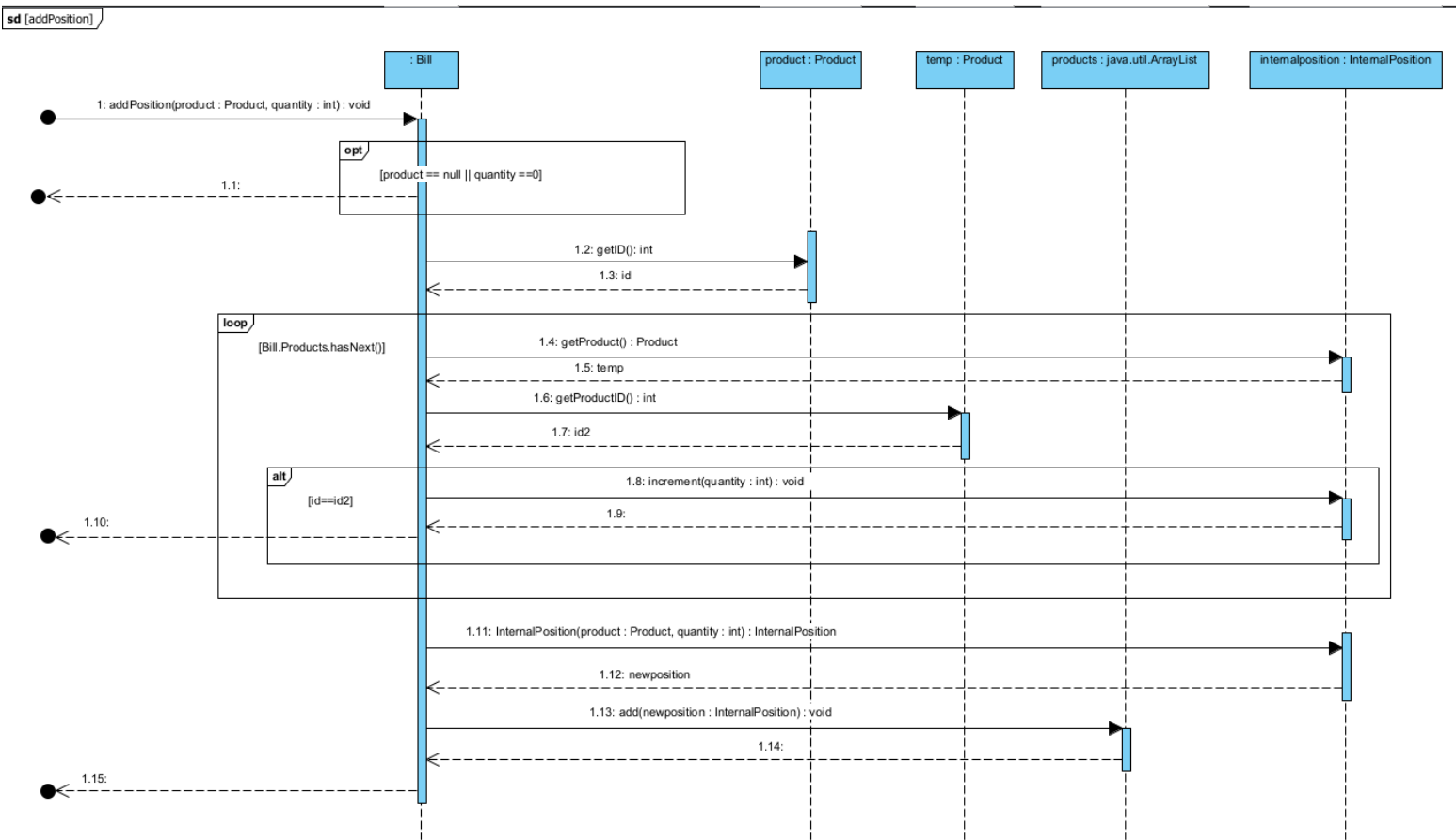
Subdiagram getProduct()



```

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

Subdiagram addPosition()



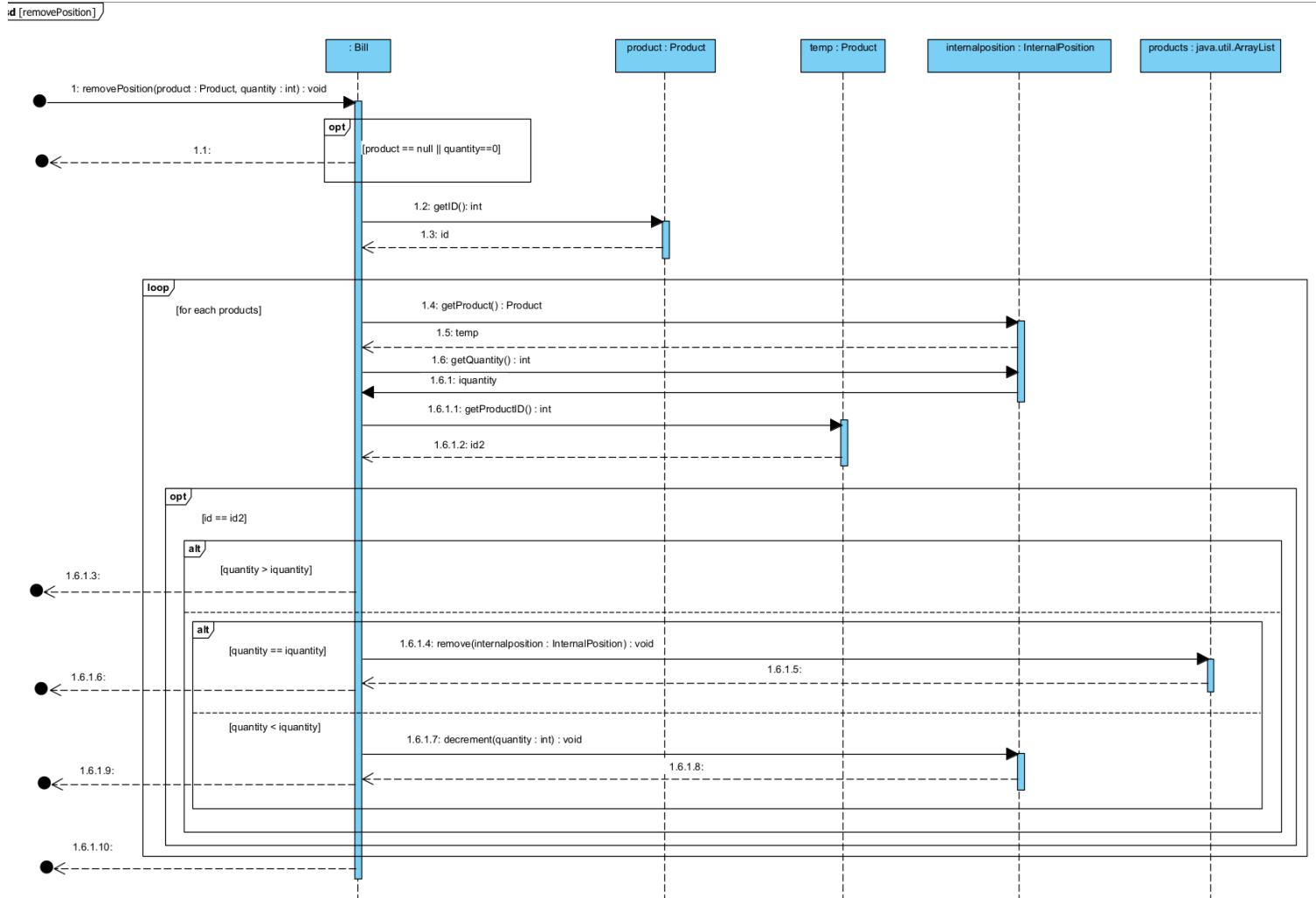
```

public void addPosition(Product product, int quantity) {
    if(product == null || quantity==0) return;
    Product temp;
    int id = product.getProductID();
    for (InternalPosition internalposition : products) {
        temp=internalposition.getProduct();
        int id2=temp.getProductID();
        if(id==id2){
            internalposition.increment(quantity);
            return;
        }
    }
    products.add(new InternalPosition(product,quantity));
}
  
```

```

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


Subdiagram removePosition()



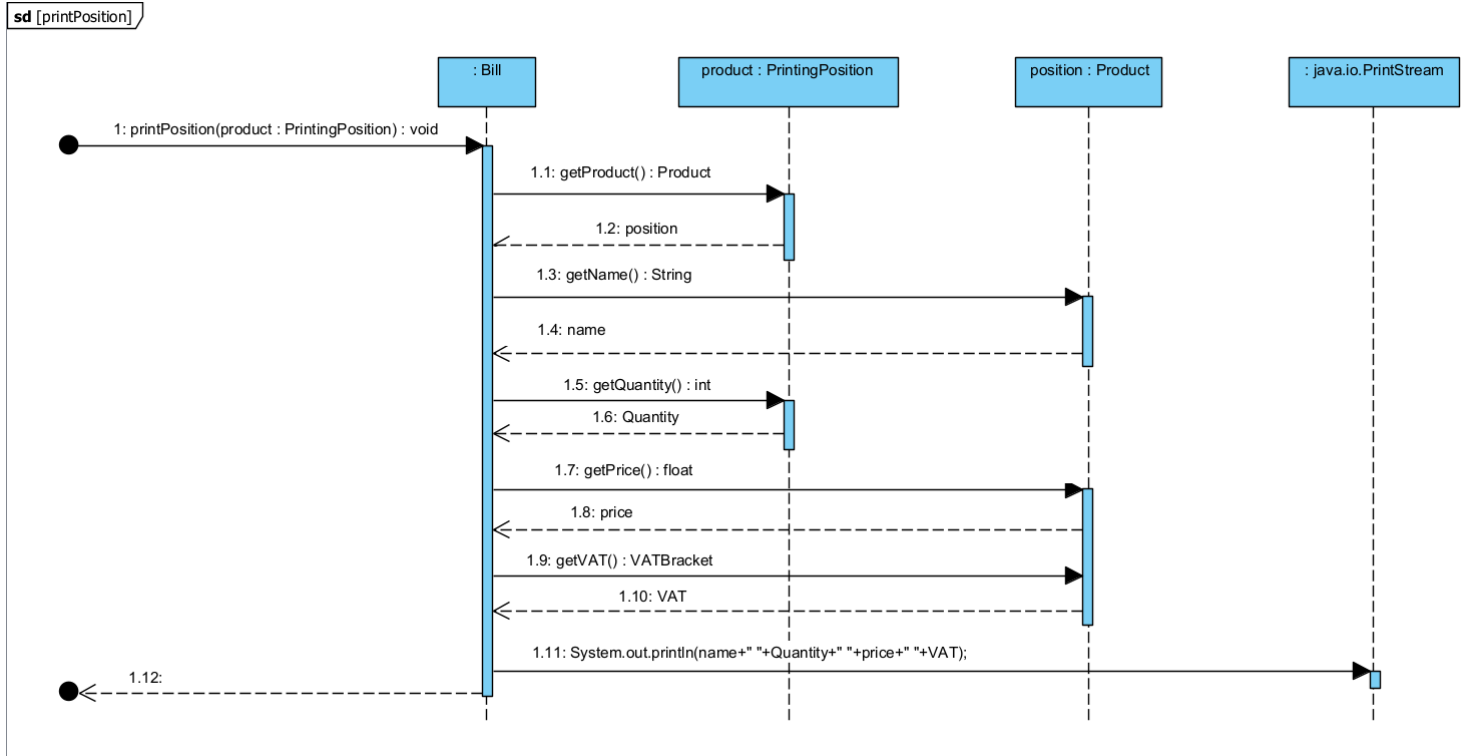
```

public void removePosition(Product product, int quantity) {
    if(product == null || quantity==0) return;
    Product temp;
    int id = product.getProductID();
    for (InternalPosition internalposition : products) {
        temp=internalposition.getProduct();
        int iquantity = internalposition.getQuantity();
        int id2=temp.getProductID();
        if(id==id2) {

            if(quantity>iquantity) return;
            else{
                if(quantity==iquantity){
                    products.remove(internalposition);
                    return;
                }
                else if(quantity < iquantity){
                    internalposition.decrement(-quantity);
                    return;
                }
            }
        }
    }
}
  
```

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

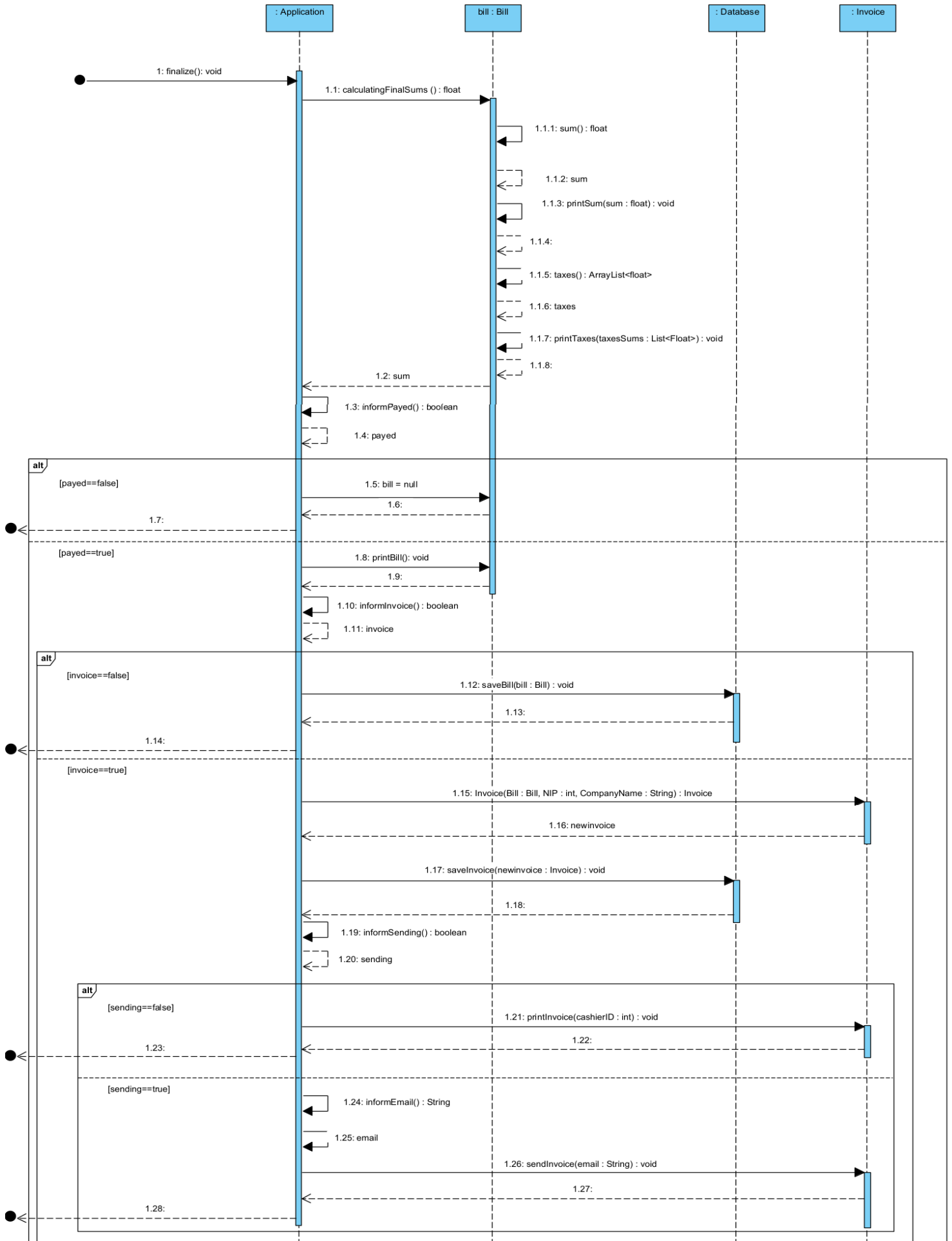
Subdiagram printPosition()



```
public void printPosition(PrintingPosition product) {
    Product position = product.getProduct();
    int Quantity = product.getQuantity();
    String name = position.getName();
    float price = position.getPrice();
    VATBracket VAT = position.getVAT();
    System.out.println(name+" "+Quantity+" "+price+" "+VAT);
}
```

Diagram PU Finalzing the bill

sd [ZPU Finalzing the bill]



```

private void Finalize() {
    bill.calculatingFinalSums();
    boolean payed = informPayed();
    if(payed == false){
        bill=null;
        return;
    }
    else{
        bill.printBill();
        boolean invoice = informInvoice();
        if(invoice == false){
            Database.saveBill(bill);
            return;
        }
        else{
            Invoice newinvoice = new Invoice(bill,NIP,CompanyName);
            Database.saveInvoice(newinvoice);
            boolean sending;
            sending=informSending();
            if(sending==false){
                newinvoice.printInvoice(cashierID);
            }
            else{
                String email;
                email=informEmail();
                newinvoice.sendInvoice(email);
            }
        }
    }
}
}

```

```

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);
}
```

```
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

```

public class Invoice{
    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 {

    private Product Product;
    private int Quantity;

    public PrintingPosition(Product product, int quantity) {

        Product=product;
        Quantity=quantity;
    }
    public Product getProduct(){
        return Product;
    }
    public int getQuantity(){
        return Quantity;
    }
    public void setQuantity(int quantity){
        Quantity=quantity;
    }
}

```

Database

```

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 static ArrayList<Bill> bills = new ArrayList<Bill>();
    private static ArrayList<Invoice> invoices= new ArrayList<Invoice>();

    public static Product getProduct(int id){
        Product product;
        int productID;
        for (InternalPosition x:Products) {
            product = x.getProduct();
            productID = product.getProductID();
            if(id==productID){
                return product;
            }
        }
        return null;
    }
    public static void saveBill(Bill bill){
        bills.add(bill);
    }
    public static 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) {
        if(product == null || quantity==0) return;
        Product temp;
        int id = product.getProductID();
        for (InternalPosition internalposition : products) {

```

```

        temp=internalposition.getProduct();
        int id2=temp.getProductID();
        if(id==id2){
            internalposition.increment(quantity);
            return;
        }
    }
    products.add(new InternalPosition(product,quantity));
}

public void printPosition(PrintingPosition product) {
    Product position = product.getProduct();
    int Quantity = product.getQuantity();
    String name = position.getName();

    float price = position.getPrice();
    VATBracket VAT = position.getVAT();
    System.out.println(name+" "+Quantity+" "+price+" "+VAT);
}

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

public void removePosition(Product product, int quantity) {
    if(product == null || quantity==0) return;
    Product temp;
    int id = product.getProductID();
    for (InternalPosition internalposition : products) {
        temp=internalposition.getProduct();
        int iquantity = internalposition.getQuantity();
        int id2=temp.getProductID();
        if(id==id2){
            if(quantity>iquantity) return;
            else{
                if(quantity==iquantity){
                    products.remove(internalposition);
                    return;
                }
                else if(quantity < iquantity){
                    internalposition.decrement(-quantity);
                    return;
                }
            }
        }
    }
}

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

private float sum(){
    float sum = 0;

```



```

        for (var product : products){
            sum += product.getProduct().getPrice() * product.getQuantity();
        }
        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.getProduct().getVAT()) {
                case A -> 0;
                case B -> 1;
                case C -> 2;
                case D -> 3;
            };

            taxesSums.set(index, taxesSums.get(index) +
product.getProduct().getPrice() * product.getQuantity() *
VATBracket.valueOf(product.getProduct().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");
    }

    public int getQuantity(int id){
        Product product;
        int productID;
        for (InternalPosition x:products) {
            product = x.getProduct();
            productID = product.getProductID();
            if(id==productID){
                return x.getQuantity();
            }
        }

        return 0;
    }
}

```

InternalPosition

```
public class InternalPosition extends PrintingPosition {

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

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

Application

```
public class Application {
    private static Bill bill;
    private static int cashierID;
    private int NIP;
    private String CompanyName;
    Application(){ //ustawione dane do przetestowania
        bill = new Bill();
        setCashierId(32);
        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);
    }
    private void setCashierId(int id){
        cashierID = id;
    }
    private int informQuantity(){return 0;}
    private boolean informPayed(){return false;}
    private boolean informInvoice(){return false;}
    private boolean informSending(){return false;}
    private String informEmail(){return null;}
    private void Finalize(){
        bill.calculatingFinalSums();
        boolean payed = informPayed();
        if(payed == false){
            bill=null;
            return;
        }
        else{
            bill.printBill();
            boolean invoice = informInvoice();
            if(invoice == false){
                Database.saveBill(bill);
                return;
            }
        }
    }
}
```

```

        else{
            Invoice newinvoice = new Invoice(bill,NIP,CompanyName);
            Database.saveInvoice(newinvoice);
            boolean sending;
            sending=informSending();
            if(sending==false){
                newinvoice.printInvoice(cashierID);
            }
            else{
                String email;
                email=informEmail();
                newinvoice.sendInvoice(email);
            }
        }
        scanned(2);
    }
}

private void scanned(int id){
    int quantity;
    quantity = informQuantity();
    if(quantity==0)return;
    Product product=Database.getProduct(id);
    if(product==null)return;
    if(quantity>0)bill.addPosition(product,quantity);
    else if(quantity<0)bill.removePosition(product,quantity);
    int ID = product.getProductID();
    int Quantity = bill.getQuantity(ID);
    PrintingPosition position=new PrintingPosition(product,Quantity
);
    bill.printPosition(position);
}

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

```

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 String getName() {
        return Name;
    }

    public float getPrice() {
        return Price;
    }

    public VATBracket getVAT() {

```

```
        return VAT;
    }

    public int getProductID() {
        return ProductID;
    }
}
```

Wynik działania testowego

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

```
Mleko muuu 6 3.99 B
Chleb pszenny 2 3.49 B
Suma: 30.92
A 0.0
B 2.4736
C 0.0
D 0.0
```

```
Sklep Fajny
NIP 328957834275
Kasjer : 32
2024-01-05 09:47
NAZWA FIRMY : Firma kox
NIP : 277277277
Mleko muuu 6 3.99 B
Chleb pszenny 2 3.49 B
Suma: 30.92
A 0.0
B 2.4736
C 0.0
D 0.0
```