Exercise 1

A sales invoice contains an invoice number and a list of items. Each item has a product code, a price, and the quantity purchased. Sales invoice and purchase items are implemented by the Java classes `Invoice` and `Item`, whose skeletons are given below. In the `Invoice` class, `itemList` is an array of `Item` objects. When an `Invoice` object is instantiated, the number of items in the invoice (and thus the number of elements in `itemList`) is specified via the constructor parameter `itemNum`. The method `addItem()` creates an `Item` object instance and "saves" it in the array `itemList`.

```
public class Invoice {
    private String invNumber;
    private Item [] itemList;
    private int itemCount;

    public Invoice(String invNumber, int itemNum) {
        // 1. Set instance variable invNumber
        // 2. Create an array of Item with number of elements specified
        //    by parameter itemNum
        // 3. Set itemCount to 0, as there is no Item initially.
        …
    }

    public String getInvNumber() {
        return invNumber;
    }

    public _____________ getItemList() {
        return itemList;
    }

    public int getItemCount() {
        return itemCount;
    }

    public Item getItem(int index) {
        return itemList[index];
    }

    public void addItem(String productCode, double price, int quantity) {
        if (itemCount < itemList.length) {
            // create a new Item;
            // save item to appropriate element in itemList
            …
            itemCount++;
        } else {
            System.out.println("Failed to add new item; max already");
        }
    }
}
```

```
public class Item {
    private String productCode;
    private double price;
```

```
    private int quantity;

    public Item(String productCode, double price, int quantity) {
        …
    }

    public double getItemTotal() {
        …
    }

    public String toString() {
        …
    }
}
```

Complete the Java classes `Invoice` and `Item`. To assist your understanding, the program `Purchase` below and its execution output are given.

```
public class Purchase {
    public static void main(String [] args) {
        Invoice inv = new Invoice("A123", 4);
        double total=0;

        inv.addItem("U-231", 34.5, 10);
        inv.addItem("J-994", 124.5, 5);
        inv.addItem("K-674", 4.5, 100);

        for (int i=0; i<inv.getItemCount(); i++) {
            System.out.println(inv.getItem(i));
            total += inv._____(i)._____();
        }
        System.out.println("Invoice Total = " + total);
    }
}
```

```
C:\> java Purchase
U-231:34.5*10=345.0
J-994:124.5*5=622.5
K-674:4.5*100=450.0
Invoice Total = 1417.5
```

END.