# Exercise: Basic Syntax, Conditional Statements and Loops

Problems for exercises and homework for the ["Programming Fundamentals" course @ SoftUni.](https://softuni.bg/trainings/3951/programming-fundamentals-with-java-january-2023)

You can check your solutions in [Judge](https://judge.softuni.org/Contests/1226).

## Ages

Write a program that determines whether a person is based on the given age: baby, child, teenager, adult, or elder. The bounders are:

* **0-2 – baby;**
* **3-13 – child;**
* **14-19 – teenager;**
* **20-65 – adult;**
* **>=66 – elder;**
* All the values are **inclusive**.

### Examples

|  |  |
| --- | --- |
| **Input** | **Output** |
| 20 | adult |
| 1 | baby |
| 100 | elder |

import java.util.Scanner;  
  
public class main {  
 public static void main(String[] args) {  
 Scanner scan = new Scanner(System.*in*);  
  
 int age = Integer.*parseInt*(scan.nextLine());  
  
 String output = "";  
  
 if (age >= 0 && age <= 2){  
 output = "baby";  
 }else if (age >= 3 && age <= 13){  
 output = "child";  
 }else if (age >= 14 && age <= 19) {  
 output = "teenager";  
 }else if (age >= 20 && age <= 65) {  
 output = "adult";  
 }else if (age >= 66) {  
 output = "elder";  
 }  
  
 System.*out*.println(output);  
 }  
}

## Division

You will be given an integer, and you have to print on the console whether that number is divisible by the following numbers: 2, 3, 6, 7, 10. You should **always take the bigger division**. If the number is divisible by both **2** and **3** it is also divisible by **6**, and you should print only the division by 6. If a number is divisible by **2** it is sometimes also divisible by **10**, and you should print the division by 10. If the number is not divisible by any given number, print "**Not divisible**"**.** Otherwise, print "**The number is divisible by {number}**".

### Examples

|  |  |
| --- | --- |
| **Input** | **Output** |
| 30 | The number is divisible by 10 |
| 15 | The number is divisible by 3 |
| 12 | The number is divisible by 6 |
| 1643 | Not divisible |

import java.util.Scanner;  
  
public class main {  
 public static void main(String[] args) {  
 Scanner scan = new Scanner(System.*in*);  
  
 int number = Integer.*parseInt*(scan.nextLine());  
  
 if (number % 10 == 0){  
 System.*out*.println("The number is divisible by 10");  
 }else if (number % 7 == 0){  
 System.*out*.println("The number is divisible by 7");  
 }else if (number % 6 == 0){  
 System.*out*.println("The number is divisible by 6");  
 }else if (number % 3 == 0){  
 System.*out*.println("The number is divisible by 3");  
 }else if (number % 2 == 0){  
 System.*out*.println("The number is divisible by 2");  
 }else {  
 System.*out*.println("Not divisible");  
 }  
 }  
}

## Vacation

You are given a group of people, type of the group, on which day of the week they will stay. Based on that information, calculate how much they must pay and print that price on the console. Use the table below. In each cell is the price for a **single person**. The output should look like that: "**Total price: {price}**". The price should be formatted to the second decimal point.

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Friday** | **Saturday** | **Sunday** |
| **Students** | 8.45 | 9.80 | 10.46 |
| **Business** | 10.90 | 15.60 | 16 |
| **Regular** | 15 | 20 | 22.50 |

There are also discounts based on some conditions:

* **Students –** if the group is bigger than or equal to 30 people, you should reduce the **total** price by 15%
* **Business –** if the group is bigger than or equal to 100 people **10** of them can stay **for free.**
* **Regular –** if the group is bigger than or equal to 10 and less than or equal to 20 reduce the **total** price by 5%

**You should reduce the prices in that EXACT order.**

### Examples

|  |  |
| --- | --- |
| **Input** | **Output** |
| 30  Students  Sunday | Total price: 266.73 |
| 40  Regular  Saturday | Total price: 800.00 |
| 50  Business  Friday | Total price: 545.00 |

import java.util.Scanner;  
  
public class main {  
 public static void main(String[] args) {  
 Scanner scan = new Scanner(System.*in*);  
  
 int numberOfPeople = Integer.*parseInt*(scan.nextLine());  
 String groupOfPeople = scan.nextLine();  
 String dayOfWeek = scan.nextLine();  
  
 double totalPrice = 0;  
 double discount = 0;  
  
 if (groupOfPeople.equalsIgnoreCase("Students")){  
 discount = 0.15;  
 if (dayOfWeek.equalsIgnoreCase("Friday")){  
 totalPrice = 8.45 \* numberOfPeople;  
 if (numberOfPeople >= 30){  
 totalPrice = totalPrice - (totalPrice \* discount);  
 }  
 }else if (dayOfWeek.equalsIgnoreCase("Saturday")){  
 totalPrice = 9.8 \* numberOfPeople;  
 if (numberOfPeople >= 30){  
 totalPrice = totalPrice - (totalPrice \* discount);  
 }  
 }else if (dayOfWeek.equalsIgnoreCase("Sunday")){  
 totalPrice = 10.46 \* numberOfPeople;  
 if (numberOfPeople >= 30){  
 totalPrice = totalPrice - (totalPrice \* discount);  
 }  
 }  
  
 }else if (groupOfPeople.equalsIgnoreCase("Business")){  
 if (dayOfWeek.equalsIgnoreCase("Friday")){  
 totalPrice = 10.9 \* numberOfPeople;  
 if (numberOfPeople >= 100){  
 totalPrice = totalPrice - (10.9 \* 10);  
 }  
 }else if (dayOfWeek.equalsIgnoreCase("Saturday")){  
 totalPrice = 15.6 \* numberOfPeople;  
 if (numberOfPeople >= 100){  
 totalPrice = totalPrice - (15.6 \* 10);  
 }  
 }else if (dayOfWeek.equalsIgnoreCase("sunday")){  
 totalPrice = 16 \* numberOfPeople;  
 if (numberOfPeople >= 100){  
 totalPrice = totalPrice - (16 \* 10);  
 }  
 }  
 }else if (groupOfPeople.equalsIgnoreCase("Regular")) {  
 discount = 0.05;  
 if (dayOfWeek.equalsIgnoreCase("friday")) {  
 totalPrice = 15 \* numberOfPeople;  
 if (numberOfPeople >= 10 && numberOfPeople <= 20) {  
 totalPrice = totalPrice - (totalPrice \* discount);  
 }  
 } else if (dayOfWeek.equalsIgnoreCase("saturday")) {  
 totalPrice = 20 \* numberOfPeople;  
 if (numberOfPeople >= 10 && numberOfPeople <= 20) {  
 totalPrice = totalPrice - (totalPrice \* discount);  
 }  
 } else if (dayOfWeek.equalsIgnoreCase("sunday")) {  
 totalPrice = 22.5 \* numberOfPeople;  
 if (numberOfPeople >= 10 && numberOfPeople <= 20) {  
 totalPrice = totalPrice - (totalPrice \* discount);  
 }  
 }  
 }  
 System.*out*.printf("Total price: %.2f", totalPrice);  
  
 }  
}

## Print and Sum

Write a program to display numbers from given start to given end and their sum. All the numbers will be integers. On the first line, you will receive the start number, on the second the end number.

### Examples

|  |  |
| --- | --- |
| **Input** | **Output** |
| 5  10 | 5 6 7 8 9 10  Sum: 45 |
| 0  26 | 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26  Sum: 351 |
| 50  60 | 50 51 52 53 54 55 56 57 58 59 60  Sum: 605 |

import java.util.Scanner;  
  
public class main {  
 public static void main(String[] args) {  
 Scanner scan = new Scanner(System.*in*);  
  
 int numberOne = Integer.*parseInt*(scan.nextLine());  
 int numberTwo = Integer.*parseInt*(scan.nextLine());  
  
 int sum = 0;  
 for (int i = numberOne; i <= numberTwo; i++) {  
 System.*out*.print(i + " ");  
 sum += i;  
 }  
 System.*out*.printf("%nSum: %d", sum);  
  
 }  
}

## Login

You will be given a string representing a username. The password will be that username reversed. Until you receive the correct password, print on the console "**Incorrect password. Try again.**". When you receive the correct password, print "**User {username} logged in.**" However, on the fourth try, if the password is still not correct, print "**User {username} blocked!**" and end the program.

### Examples

|  |  |
| --- | --- |
| **Input** | **Output** |
| Acer  login  go  let me in  recA | Incorrect password. Try again.  Incorrect password. Try again.  Incorrect password. Try again.  User Acer logged in. |
| momo  omom | User momo logged in. |
| sunny  rainy  cloudy  sunny  not sunny | Incorrect password. Try again.  Incorrect password. Try again.  Incorrect password. Try again.  User sunny blocked! |

import java.util.Scanner;  
  
public class main {  
 public static void main(String[] args) {  
 Scanner scan = new Scanner(System.*in*);  
  
 String username = scan.nextLine();  
 String password = "";  
  
 for (int i = username.length() - 1; i >= 0; i--) {  
 char currentSymbol = username.charAt(i);  
 password += currentSymbol;  
 }  
  
 int counter = 0;  
 String currentPassword = scan.nextLine();  
  
 while (!currentPassword.equals(password)){  
 counter ++;  
  
 if (counter == 4){  
 System.*out*.printf("User %s blocked!", username);  
 break;  
 }  
 System.*out*.println("Incorrect password. Try again.");  
 currentPassword = scan.nextLine();  
 }  
  
 if (currentPassword.equals(password)){  
 System.*out*.printf("User %s logged in.", username);  
 }  
  
 }  
}

## Strong Number

Write a program to check whether or not a given number is strong. A number is strong if the sum of the Factorial of each digit is equal to the number. For example 145 is a strong number, because **1! + 4! + 5! = 145.** Print "**yes**" if the number is strong and "**no**" if the number is not strong.

|  |  |
| --- | --- |
| **Input** | **Output** |
| 2 | yes |
| 3451 | no |
| 40585 | yes |

### Examples

import java.util.Scanner;  
  
public class main {  
 public static void main(String[] args) {  
 Scanner scan = new Scanner(System.*in*);  
  
 int number = Integer.*parseInt*(scan.nextLine());  
 int factNumber = number;  
  
 int sumFact = 0;  
  
 while (number > 0){  
 int lastNumber = number % 10;  
  
 int factorial = 1;  
 for (int i = 1; i <= lastNumber; i++) {  
 factorial = factorial \* i;  
 }  
  
 sumFact += factorial;  
  
 number = number / 10;  
 }  
 if (sumFact == factNumber){  
 System.*out*.println("yes");  
 }else {  
 System.*out*.println("no");  
 }  
  
 }  
}

## Vending Machine

Your task is to calculate the total purchase price from a vending machine. Until you receive "**Start**" you will be given different coins that are being inserted into the machine. You have to sum them to have the total money inserted. There is a problem though. Your vending machine only works with **0.1**, **0.2**, **0.5, 1, and 2** coins. If someone tries to insert some other coins, you have to display "**Cannot accept {money}**", where the value is **formatted to the second digit after the decimal point** and **not** add it to the total money. On the next few lines until you receive "**End**" you will be given products to purchase. Your machine has, however, only "**Nuts**", "**Water**", "**Crisps**", "**Soda**", "**Coke**". The prices are: **2.0**, **0.7**, **1.5**, **0.8**, **1.0** respectively. If the person tries to purchase a not existing product, print "**Invalid product**". Be careful that the person may try to purchase a product for which he doesn't have money. In that case, print "**Sorry, not enough money**". If the person purchases a product successfully print "**Purchased {product name}**". After the "**End**" command, print the money that is left formatted to the second decimal point in the format "**Change: {money left}**".

### Examples

|  |  |
| --- | --- |
| **Input** | **Output** |
| 1  1  0.5  0.6  Start  Coke  Soda  Crisps  End | Cannot accept 0.60  Purchased Coke  Purchased Soda  Sorry, not enough money  Change: 0.70 |
| 1  Start  Nuts  Coke  End | Sorry, not enough money  Purchased Coke  Change: 0.00 |

import java.util.Locale;  
import java.util.Scanner;  
  
public class vendingMachine\_07 {  
 public static void main(String[] args) {  
 Scanner scan = new Scanner(System.*in*);  
  
 double sum = 0;  
  
 String input = scan.nextLine();  
 while (true){  
 if (input.equals("Start")) {  
 break;  
 }  
 double currentCoin = Double.*parseDouble*(input);  
 if (currentCoin == 0.1 || currentCoin == 0.2 || currentCoin == 0.5 || currentCoin == 1 || currentCoin == 2){  
 sum += currentCoin;  
 }else {  
 System.*out*.printf("Cannot accept %.2f%n", currentCoin);  
 }  
 input = scan.nextLine();  
 }  
  
 double price = 0;  
 String output ;  
 boolean flag = false;  
 while (true){  
 output = scan.nextLine();  
 if (output.equals("End")){  
 break;  
 }  
 switch (output.toLowerCase()){  
 case "nuts":  
 price = 2;  
 flag = true;  
 break;  
 case "water":  
 price = 0.7;  
 flag = true;  
 break;  
 case "crisps":  
 price = 1.5;  
 flag = true;  
 break;  
 case "soda":  
 price = 0.8;  
 flag = true;  
 break;  
 case "coke":  
 price = 1;  
 flag = true;  
 break;  
 }  
  
 if (sum < price){  
 System.*out*.println("Sorry, not enough money");  
 }else if (flag){  
 sum -= price;  
 System.*out*.printf("Purchased %s%n", output);  
 }else {  
 System.*out*.println("Invalid product");  
 }  
 }  
 System.*out*.printf("Change: %.2f", sum);  
 }  
}

## Triangle of Numbers

Write a program that receives a number – **n** and prints a triangle from **1 to n** as in the examples.

### Constraints

* **n** will be in the interval **[1...20]**.

### Examples

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Input** | **Output** |  | **Input** | **Output** |  | **Input** | **Output** |
| 3 | 1  2 2  3 3 3 | 5 | 1  2 2  3 3 3  4 4 4 4  5 5 5 5 5 | 6 | 1  2 2  3 3 3  4 4 4 4  5 5 5 5 5  6 6 6 6 6 6 |

import java.util.Scanner;  
  
public class triangleOfNumbers\_08 {  
 public static void main(String[] args) {  
 Scanner scan = new Scanner(System.*in*);  
  
 int number = Integer.*parseInt*(scan.nextLine());  
  
 for (int i = 1; i <= number ; i++) {  
 for (int j = 1; j <= i ; j++) {  
 System.*out*.print(i + " ");  
 }  
 System.*out*.println();  
 }  
 }  
}

## Orders

We are placing **N** orders at a time. You need to calculate the price on the following formula:

((daysInMonth \* capsulesCount) \* pricePerCapsule)

### Input / Constraints

* On the first line, you will receive integer **N** – the count of orders the shop will receive.
* For each order, you will receive the following information:
  + Price per capsule - **floating-point number** in the range **[0.00…1000.00].**
  + Days – **integer** in the range **[1…31].**
  + Capsules count - **integer** in the range **[0…2000].**

The input will be in the described format, there is no need to check it explicitly.

### Output

The output should consist of **N + 1** line. For each order, you must print a single line in the following format:

* **"The price for the coffee is: ${price}"**

On the last line, you need to print the total price in the following format:

* **"Total: ${**totalP**rice}"**

The **price must be formatted** to 2 decimal places.

### Examples

|  |  |  |
| --- | --- | --- |
| **Input** | **Output** | **Comments** |
| 1  1.53  30  8 | The price for the coffee is: $367.20  Total: $367.20 | We are given only 1 order. Then we use the formulas:  **orderPrice** = 30 \* 8 \* 1.53 = 367.20 |
| 2  4.99  31  3  0.35  31  5 | The price for the coffee is: $464.07  The price for the coffee is: $54.25  Total: $518.32 |  |

import java.util.Scanner;  
  
public class Orders\_09 {  
 public static void main(String[] args) {  
 Scanner scanner = new Scanner(System.*in*);  
   
 int orders = Integer.*parseInt*(scanner.nextLine());  
 double allMoney = 0;  
   
 for (int order = 1; order <= orders; order++) {  
   
 double pricePerCapsule = Double.*parseDouble*(scanner.nextLine());  
 int daysInMonth = Integer.*parseInt*(scanner.nextLine());  
 int capsulesCount = Integer.*parseInt*(scanner.nextLine());  
   
 double moneyForOrder = ((daysInMonth \* capsulesCount) \* pricePerCapsule);  
   
 System.*out*.printf("The price for the coffee is: $%.2f%n", moneyForOrder);  
   
 allMoney += moneyForOrder;  
 }  
   
 System.*out*.printf("Total: $%.2f", allMoney);  
 }  
}

## \*Padawan Equipment

Yoda is starting his newly created Jedi academy. So, he asked Master George Lucas to **buy** the **needed equipment**. The number of **items** depends on **how many students will sign up**. The equipment for the Padawan contains **lightsabers, belts, and robes**.

You will be given **the amount of money George Lucas has**, the **number of students,** and the **prices of each item**. You have to help George Lucas **calculate** if the **money** he has is **enough to buy all of the equipment** or how much more money he needs.   
Because the lightsabers sometimes break, George Lucas should **buy 10% more**, **rounded up** to the next integer. Also, every **sixth belt is free**.

### Input / Constraints

The input data should be read from the console. It will consist of **exactly 5 lines**:

* The **amount of money** George Lucas has – the **floating-point number** in the **range [0.00…1,000.00].**
* The **count of students – integer in the range [0…100].**
* The **price of lightsabers** for a **single saber – the floating-point number** in the **range [0.00…100.00].**
* The **price of robes** for a **single robe – the floating-point number** in the **range [0.00…100.00].**
* The **price of belts** for a **single** **belt – the floating-point number** in the **range [0.00…100.00].**

The **input data will always be valid**. **There is no need to check it explicitly**.

### Output

The output should be printed on the console.

* **If the calculated price of the equipment is less or equal to the money George Lucas has:**

"The money is enough - it would cost {the cost of the equipment}lv."

* **If the calculated price of the equipment is more than the money George Lucas has:**

"George Lucas will need {neededMoney}lv more."

* **All prices** must be **rounded to two digits after the decimal point.**

### Examples

|  |  |  |
| --- | --- | --- |
| **Input** | **Output** | **Comments** |
| 100  2  1.0  2.0  3.0 | The money is enough - it would cost 13.00lv. | Needed equipment for **2** padawans:  **sabresPrice** \* (**studentsCount** + 10%) + **robesPrice** \* (**studentsCount**) + **beltsPrice** \* (**studentsCount - freeBelts**)  1\*(3) + 2\*(2) + 3\*(2) = 13.00  13.00 <= 100 – the money will be enough. |
| 100  42  12.0  4.0  3.0 | George Lucas will need 737.00lv more. | Needed equipment for **42** padawans:  12\*47 + 4\*42 + 3\*35 = 837.00  837 > 100 – need 737.00 lv. more. |

import java.util.Scanner;  
  
public class test {  
  
 public static void main(String[] args) {  
 Scanner scan = new Scanner(System.*in*);  
  
 double budgetIvanCho = Double.*parseDouble*(scan.nextLine());  
 int padawanStudents = Integer.*parseInt*(scan.nextLine());  
 double lightsaberPriceForOne = Double.*parseDouble*(scan.nextLine());  
 double robePriceForOne = Double.*parseDouble*(scan.nextLine());  
 double beltPriceForOne = Double.*parseDouble*(scan.nextLine());  
  
 double totalPriceLightsabers = Math.*ceil*(padawanStudents \* 1.1) \* lightsaberPriceForOne;  
 double totalPriceRobes = robePriceForOne \* padawanStudents;  
 int freeBelt = padawanStudents / 6;  
 double totalPriceBelts = beltPriceForOne \* (padawanStudents - freeBelt);  
  
 double finalPrice = totalPriceLightsabers + totalPriceRobes + totalPriceBelts;  
  
 if (finalPrice > budgetIvanCho){  
 double moneyNeed = finalPrice - budgetIvanCho;  
 System.*out*.printf("George Lucas will need %.2flv more.", moneyNeed);  
 }else {  
 System.*out*.printf("The money is enough - it would cost %.2flv.", finalPrice);  
 }  
 }  
}

## \*Rage Expenses

As a MOBA challenger player, Peter has the bad habit of trashing his PC when he loses a game and rage quits. His gaming setup consists of a **headset, mouse, keyboard, and display**. You will receive Peter's **lost games count**.

Every **second** lost game, Peter trashes his **headset.**

Every **third** lost game, Peter trashes his **mouse**.

When Peter trashes **both** **his mouse and headset** in the **same** lost game, he also trashes his **keyboard**.

**Every** **second time when he trashes his keyboard**, he also trashes his **display**.

You will receive the price of each item in his gaming setup. Calculate his rage expenses for renewing his gaming equipment.

### Input / Constraints

* On the first input line - **lost games count** – integer in the range **[0, 1000]**.
* On the second line – **headset price** - the floating-point number in the range **[0, 1000]**.
* On the third line – **mouse price** - the floating-point number in the range **[0, 1000]**.
* On the fourth line – **keyboard price** - the floating-point number in the range **[0, 1000]**.
* On the fifth line – **display price** - the floating-point number in the range **[0, 1000]**.

### Output

* As output you must print Peter's total expenses: **"Rage expenses: {expenses} lv."**
* Allowed working **time** / **memory**: **100ms** / **16MB**.

### Examples

|  |  |  |
| --- | --- | --- |
| **Input** | **Output** | **Comment** |
| 7  2  3  4  5 | Rage expenses: 16.00 lv. | Trashed headset -> 3 times Trashed mouse -> 2 times Trashed keyboard -> 1 time Total: 6 + 6 + 4 = 16.00 lv; |
| 23  12.50  21.50  40  200 | Rage expenses: 608.00 lv. |  |

import java.util.Scanner;  
  
public class main {  
 public static void main(String[] args) {  
 Scanner scan = new Scanner(System.*in*);  
  
 int lostGames = Integer.*parseInt*(scan.nextLine());  
 double headsetPrice = Double.*parseDouble*(scan.nextLine());  
 double mousePrice = Double.*parseDouble*(scan.nextLine());  
 double keyboardPrice = Double.*parseDouble*(scan.nextLine());  
 double displayPrice = Double.*parseDouble*(scan.nextLine());  
  
 double totalExpenses = 0;  
  
 int trashHeads = lostGames / 2;  
 int trashMouse = lostGames / 3;  
 int trashKeyboard = lostGames / 6;  
 int trashDisplay = lostGames / 12;  
  
 totalExpenses = (trashHeads \* headsetPrice) + (trashMouse \* mousePrice) +  
 (trashKeyboard \* keyboardPrice) + (trashDisplay \* displayPrice);  
  
 System.*out*.printf("Rage expenses: %.2f lv.", totalExpenses);  
  
 }  
}