

## ITS100 Lab Final Quiz 1/2022

**Problem 3**

Write a program to take integer inputs. The program then filters to keep only positive values in a list. The program then groups the values from their ending digits (from 0 to 9). The program then outputs the frequency and the sorted values of each group. The output is formatted as shown in the examples below.

**Example 1** (user inputs are in *italics*)

```
Integer inputs: 1 4 6 7 3 -1 21 64 54 23 52 100 106 207
Group 0, Total 1, Values: [100]
Group 1, Total 2, Values: [1, 21]
Group 2, Total 1, Values: [52]
Group 3, Total 2, Values: [3, 23]
Group 4, Total 3, Values: [4, 54, 64]
Group 6, Total 2, Values: [6, 106]
Group 7, Total 2, Values: [7, 207]
```

**Example 2** (user inputs are in *italics*)

```
Integer inputs: 9988 0 1 11 21 9988 18 9988 -5 -100 20
Group 0, Total 1, Values: [20]
Group 1, Total 3, Values: [1, 11, 21]
Group 8, Total 4, Values: [18, 9988, 9988, 9988]
```

**Example 3** (user inputs are in *italics*)

```
Integer inputs: 50 33 23 40 100 20 143 83 60
Group 0, Total 5, Values: [20, 40, 50, 60, 100]
Group 3, Total 4, Values: [23, 33, 83, 143]
```

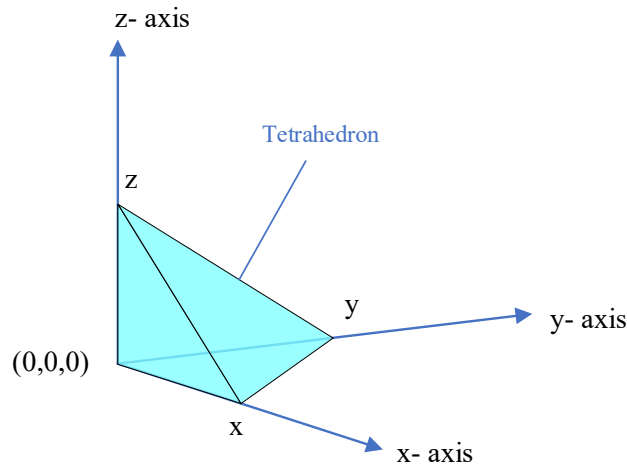
**Example 4** (user inputs are in *italics*)

```
Integer inputs: 109 99 9 886 90 3 14 12 21 33 65 77 48
Group 0, Total 1, Values: [90]
Group 1, Total 1, Values: [21]
Group 2, Total 1, Values: [12]
Group 3, Total 2, Values: [3, 33]
Group 4, Total 1, Values: [14]
Group 5, Total 1, Values: [65]
Group 6, Total 1, Values: [886]
Group 7, Total 1, Values: [77]
Group 8, Total 1, Values: [48]
Group 9, Total 3, Values: [9, 99, 109]
```

## ITS100 Lab Final Quiz 1/2022

**Problem 4**

Write a program to calculate the volume of Tetrahedrons (triangular pyramids). The origin of the Tetrahedron is (0,0,0), and the three sides of Tetrahedrons are on the x, y, and z axes. The program will accept 3 positive values for x, y, and z. The program will accept 3 values separated by a comma and calculate the Tetrahedrons' volumes until the input is "Exit" or "exit" (see Example1). The program will print "Invalid input" if the input values are not positive values and print "Enter 3 values" if the input values are less than or more than 3 (see Example 2). The volume of a Tetrahedron is  $\frac{1}{3} \times \text{base area} \times \text{height}$  (see Example 3).

**Example 1** (user inputs are in *italics*)

```
Input x,y,z :Exit
Program ended.
```

**Example 2** (user inputs are in *italics*)

```
Input x,y,z :-1,3,4
Invalid input.
Input x,y,z :1,3,a
Invalid input.
Input x,y,z :1,2
Enter 3 values.
Input x,y,z :exit
Program ended.
```

**Example 3** (user inputs are in *italics*)

```
Input x,y,z :2,3,4
Volume of Tetrahedron is 4.00 cubic unit.
Input x,y,z :4,5,6
Volume of Tetrahedron is 20.00 cubic unit.
Input x,y,z :3,3,2.5
Volume of Tetrahedron is 3.75 cubic unit.
Input x,y,z :exit
Program ended.
```

## ITS100 Lab Final Quiz 1/2022

**Problem 5**

Write a program to calculate five-year returns from a saving account repeatedly. The program gets an initial deposit of money and interest rate as inputs, where both input values must be positive floating-point values. The program then calculates and displays the five-years returns with their details. The program repeats until the user inputs “exit”. If any input is invalid, then the program display “Invalid input, please try again.” to a user and continues taking another input.

**Example 1** (user inputs are in *italics*)

```
Input initial money and interest rate: exit
```

**Example 2** (user inputs are in *italics*)

```
Input initial money and interest rate: 100 10
YEAR 1 --- 100.00 + 10.00 = 110.00
YEAR 2 --- 110.00 + 11.00 = 121.00
YEAR 3 --- 121.00 + 12.10 = 133.10
YEAR 4 --- 133.10 + 13.31 = 146.41
YEAR 5 --- 146.41 + 14.64 = 161.05
*****
Input initial money and interest rate: 100 0.5
YEAR 1 --- 100.00 + 0.50 = 100.50
YEAR 2 --- 100.50 + 0.50 = 101.00
YEAR 3 --- 101.00 + 0.51 = 101.51
YEAR 4 --- 101.51 + 0.51 = 102.02
YEAR 5 --- 102.02 + 0.51 = 102.53
*****
Input initial money and interest rate: hello
Invalid input, please try again.
Input initial money and interest rate: Exit
Invalid input, please try again.
Input initial money and interest rate: 100.5 10.5
YEAR 1 --- 100.50 + 10.55 = 111.05
YEAR 2 --- 111.05 + 11.66 = 122.71
YEAR 3 --- 122.71 + 12.88 = 135.60
YEAR 4 --- 135.60 + 14.24 = 149.84
YEAR 5 --- 149.84 + 15.73 = 165.57
*****
Input initial money and interest rate: 100000 5
YEAR 1 --- 100000.00 + 5000.00 = 105000.00
YEAR 2 --- 105000.00 + 5250.00 = 110250.00
YEAR 3 --- 110250.00 + 5512.50 = 115762.50
YEAR 4 --- 115762.50 + 5788.12 = 121550.62
YEAR 5 --- 121550.62 + 6077.53 = 127628.16
*****
Input initial money and interest rate: exit
```

**Example 3** (user inputs are in *italics*)

```
Input initial money and interest rate: -100 5
Invalid input, please try again.
Input initial money and interest rate: 100 -5
Invalid input, please try again.
Input initial money and interest rate: 0 0
Invalid input, please try again.
Input initial money and interest rate: done
Invalid input, please try again.
Input initial money and interest rate: EXIT
Invalid input, please try again.
Input initial money and interest rate: 300
Invalid input, please try again.
Input initial money and interest rate: 300 20
YEAR 1 --- 300.00 + 60.00 = 360.00
YEAR 2 --- 360.00 + 72.00 = 432.00
YEAR 3 --- 432.00 + 86.40 = 518.40
YEAR 4 --- 518.40 + 103.68 = 622.08
YEAR 5 --- 622.08 + 124.42 = 746.50
*****
Input initial money and interest rate: exit
```

**Example 4** (user inputs are in *italics*)

```
Input initial money and interest rate: 1000 200
YEAR 1 --- 1000.00 + 2000.00 = 3000.00
YEAR 2 --- 3000.00 + 6000.00 = 9000.00
YEAR 3 --- 9000.00 + 18000.00 = 27000.00
YEAR 4 --- 27000.00 + 54000.00 = 81000.00
YEAR 5 --- 81000.00 + 162000.00 = 243000.00
*****
Input initial money and interest rate: 1000 0.1
YEAR 1 --- 1000.00 + 1.00 = 1001.00
YEAR 2 --- 1001.00 + 1.00 = 1002.00
YEAR 3 --- 1002.00 + 1.00 = 1003.00
YEAR 4 --- 1003.00 + 1.00 = 1004.01
YEAR 5 --- 1004.01 + 1.00 = 1005.01
*****
Input initial money and interest rate: 2000 0.25
YEAR 1 --- 2000.00 + 5.00 = 2005.00
YEAR 2 --- 2005.00 + 5.01 = 2010.01
YEAR 3 --- 2010.01 + 5.03 = 2015.04
YEAR 4 --- 2015.04 + 5.04 = 2020.08
YEAR 5 --- 2020.08 + 5.05 = 2025.13
*****
Input initial money and interest rate: exit
```

## ITS100 Lab Final Quiz 1/2022

**Problem 6**

Write a program that repeatedly takes the account number and amount to open a bank account, and the account number, withdraw or deposit and amount to make a transaction.

Thus, define the following functions:

- ❑ The **deposit** function takes an account number and an amount as parameters and then increases the account's balance. For example, assume that account 101 has \$1,000 in it. When \$500 is deposited, its total balance becomes \$1500. In the program, "d" is denoted for deposit. "101 d 500" means the account 101 deposits \$500.
- ❑ The **withdraw** function takes an account number and an amount as parameters and then decreases the account's balance. For example, assume that the account 202 has \$20,000 in it. When \$1,000 is withdrawn, the total balance becomes \$19,000. In the program, "w" is denoted for withdraw. "202 w 1000" means the account 202 withdraws 1000. Here, the program checks whether the account has enough money to withdraw or not. If it doesn't have enough, then alert the user that "You don't have enough amount" and ask for a new transaction.

For each transaction, the program checks whether the account is valid or not. If the account is invalid, then alert the user that "Invalid account. Please enter transaction again" and ask for a new transaction.

The program repeats until the user enters "done" for each open bank account and new transaction. Finally, the program will then display results as the following examples.

**Example 1** (user inputs are in *italics*)

Open bank account with initial amount (account number, amount): <i>done</i> Enter transaction (account number, withdraw/deposit, amount): <i>done</i>
--

**Example 2** (user inputs are in *italics*)

Open bank account with initial amount (account number, amount): <i>101 1000</i> Open bank account with initial amount (account number, amount): <i>202 20000</i> Open bank account with initial amount (account number, amount): <i>303 5000</i> Open bank account with initial amount (account number, amount): <i>done</i> Enter transaction (account number, withdraw/deposit, amount): <i>done</i>
--

**Example 3** (user inputs are in *italics*)

Open bank account with initial amount (account number, amount): <i>101 1000</i> Open bank account with initial amount (account number, amount): <i>202 20000</i> Open bank account with initial amount (account number, amount): <i>done</i> Enter transaction (account number, withdraw/deposit, amount): <i>101 d 500</i> Available amount of account number 101 is 1500.00. Enter transaction (account number, withdraw/deposit, amount): <i>202 w 1000</i> Available amount of account number 202 is 19000.00. Enter transaction (account number, withdraw/deposit, amount): <i>done</i>
---

**Example 4** (user inputs are in *italics*)

```
Open bank account with initial amount (account number, amount): 101 1000
Open bank account with initial amount (account number, amount): 202 20000
Open bank account with initial amount (account number, amount): done
Enter transaction (account number, withdraw/deposit, amount): 101 w 2000
You don't have enough amount.
Available amount of account number 101 is 1000.00.
Enter transaction (account number, withdraw/deposit, amount): 203 d 500
Invalid account. Please enter transaction again.
Enter transaction (account number, withdraw/deposit, amount): done
```