

Liang Python Revel Assigned Quiz and Programming Project Solution

Chapter 1

Chapter 1: Programming Project 1:

(Display three different messages)

Write a program that displays

Welcome to Python

Welcome to Computer Science

Programming is fun.

If you get a logical or runtime error, please refer <https://liangpy.pearsoncmg.com/faq.html>.

```
# Exercise01_01
print("Welcome to Python")
print("Welcome to Computer Science")
print("Programming is fun")
```

Chapter 1: Programming Project 2:

(Compute expressions)

Write a program that displays the result of $(9.5 * 4.5 - 2.5 * 3) / (45.5 - 3.5)$.

If you get a logical or runtime error, please refer <https://liangpy.pearsoncmg.com/faq.html>.

```
# Exercise01_05
print((9.5 * 4.5 - 2.5 * 3) / (45.5 - 3.5))
```

Chapter 1: Programming Project 3:

(Population projection)

The US Census Bureau projects population based on the following assumptions:

One birth every 7 seconds

One death every 13 seconds

One new immigrant every 45 seconds

Write a program to display the population for each of the next five years. Assume the current population is 312032486 and one year has 365 days.

If you get a logical or runtime error, please refer <https://liangpy.pearsoncmg.com/faq.html>.

```
# Exercise01_11
print(312032486 + 365 * 24 * 60 * 60 / 7 - 365 * 24 * 60 * 60 / 13 + 365 *
24 * 60 * 60 / 45)
print(312032486 + 2 * 365 * 24 * 60 * 60 / 7 - 2 * 365 * 24 * 60 * 60 / 13
+ 2 * 365 * 24 * 60 * 60 / 45)
print(312032486 + 3 * 365 * 24 * 60 * 60 / 7 - 3 * 365 * 24 * 60 * 60 / 13
+ 3 * 365 * 24 * 60 * 60 / 45)
print(312032486 + 4 * 365 * 24 * 60 * 60 / 7 - 4 * 365 * 24 * 60 * 60 / 13
+ 4 * 365 * 24 * 60 * 60 / 45)
print(312032486 + 5 * 365 * 24 * 60 * 60 / 7 - 5 * 365 * 24 * 60 * 60 / 13
+ 5 * 365 * 24 * 60 * 60 / 45)
```

Chapter 1: Programming Project 4:

(Simple computation)

The formula for computing the discriminant of a quadratic equation $ax^2 + bx + c = 0$ is $b^2 - 4ac$.

Write a program that computes the discriminant for the equation $3x^2 + 4x + 5 = 0$.

If you get a logical or runtime error, please refer <https://liangpy.pearsoncmg.com/faq.html>.

```
# Exercise01_01Extra
print(4 * 4 - 4 * 3 * 5)
```

Chapter 1: Programming Project 5:

(Physics: acceleration)

Average acceleration is defined as the change of velocity divided by the time taken to make the change, as shown in the following formula:

$$a = (v1 - v0) / t$$

Here, $v0$ is the starting velocity in meters/second, $v1$ is the ending velocity in meters/second, and t is the time span in seconds.

Assume $v0$ is 5.6, $v1$ is 10.5, and t is 0.5, and write the code to display the average acceleration.

If you get a logical or runtime error, please refer <https://liangpy.pearsoncmg.com/faq.html>.

```
# Exercise01_02Extra
print((10.5 - 5.6) / 0.5)
```

Chapter 2

Quiz 2.5 #1:

Assign 7 to a variable named `seven`.

```
seven = 7
```

Quiz 2.5 #2:

Define a variable `precise` and make it refer to 1.09388641.

```
precise = 1.09388641
```

Quiz 2.5 #3:

Define two variables, one named `length` making it refer to 3.5 and the other named `width` making it refer to 1.55.

```
length = 3.5  
width = 1.55
```

Quiz 2.6 #1:

Variables `i` and `j` each have associated values. Swap them, so that `i` becomes associated with `j`'s original value, and `j` becomes associated with `i`'s original value. You can use two more variables `itemp` and `jtemp`.

Note: This question does not follow our naming convention for variables. `itemp` and `jtemp` should have been named `iTemp` and `jTemp`.

```
itemp = i  
jtemp = j  
i = jtemp  
j = itemp
```

Quiz 2.6 #2:

Given two already defined variables, `i` and `j`, write a statement that swaps their associated values.

```
i, j = j, i
```

Quiz 2.6 #3:

Given two variables `matric_age` and `grad_age`, write a statement that makes the associated value of `grad_age` 4 more than that of `matric_age`.

Note: This question does not follow our naming convention for variables. `matric_age` and `grad_age` should have been named `matricAge` and `gradAge`.

```
grad_age = matric_age + 4
```

Quiz 2.8 #1:

Given the variables `taxable_purchases` and `tax_free_purchases` (which already have been defined), write an expression corresponding to the total amount purchased.

Note: This question does not follow our naming convention for variables. `taxable_purchase` and `tax_free_purchase` should have been named `taxablePurchase` and `taxFreePurchase`.

```
taxable_purchases + tax_free_purchases
```

Quiz 2.8 #2:

Given the variables `full_admission_price` and `discount_amount` (already defined), write an expression corresponding to the price of a discount admission.

```
full_admission_price - discount_amount
```

Quiz 2.8 #3:

Given the variable `price_per_case`, write an expression corresponding to the price of a dozen cases.

Note: This question does not follow our naming convention for variables. `price_per_case` should have been named `pricePerCase`.

```
price_per_case * 12
```

Quiz 2.8 #4:

Given the variables `cost_of_bus_rental` and `max_bus_riders`, write an expression corresponding to the cost per rider (assuming the bus is full).

```
cost_of_bus_rental / max_bus_riders
```

Quiz 2.8 #5:

Write an expression that computes the remainder of the variable `principal` when divided by the variable `divisor`. (Assume that each is associated with an int.)

```
principal % divisor
```

Quiz 2.8 #6:

Write an expression that computes the average of the values 12 and 40, and assign it to the variable `avg`, which has already been defined.

```
avg = (12 + 40) / 2
```

Quiz 2.8 #7:

You are given two variables, both already defined. One is named `price` and is associated with a float and is the price of an order. The other is `total_number` and is associated with an int and is the number of orders. Write an expression that calculates the total price for all orders.

```
price * total_number
```

Quiz 2.8 #8:

You are given two variables, both already defined, one associated with a float and named `total_weight`, containing the weight of a shipment, the other associated with an int and named `quantity`, containing the number of items in the shipment. Write an expression that calculates the weight of one item.

```
total_weight / quantity
```

Quiz 2.8 #9:

Assume there is a variable, `h` already assigned a positive integer value. Write the code necessary to assign its square to the variable `g`. For example, if `h` had the value 8 then `g` would get the value 64.

```
g = h * h
```

Quiz 2.8 #10:

Assume that `price` is an integer variable whose value is the price (in US currency) in cents of an item. Assuming the item is paid for with a minimum amount of change and just single dollars, write an expression for the amount of change (in cents) that would have to be paid.

```
price % 100
```

Quiz 2.8 #11:

Assume that a variable `x` has been assigned a integer value. Write an expression whose value is the last (rightmost) digit of `x`.

```
x % 10
```

Quiz 2.10 #1:

Write an expression that computes the average of the variables `exam1` and `exam2` (both already assigned values).

```
(exam1 + exam2) / 2
```

Quiz 2.10 #2:

The dimensions (width and length) of room1 have been read into two variables: `width1` and `length1`. The dimensions of room2 have been read into two other variables: `width2` and `length2`. Write a single expression whose value is the total area of the two rooms.

```
length1 * width1 + length2 * width2
```

Quiz 2.10 #3:

In mathematics, the Nth harmonic number is defined to be $1 + 1/2 + 1/3 + 1/4 + \dots + 1/N$. So, the first harmonic number is 1, the second is 1.5, the third is 1.83333... and so on. Write an expression whose value is the 8th harmonic number.

```
1.0 + 1.0/2.0 + 1.0/3.0 + 1.0/4.0 + 1.0/5.0 + 1.0/6.0 + 1.0/7.0 + 1.0/8.0
```

Quiz 2.10 #4:

In mathematics, the Nth harmonic number is defined to be $1 + 1/2 + 1/3 + 1/4 + \dots + 1/N$. So, the first harmonic number is 1, the second is 1.5, the third is 1.83333... and so on. Assume that `n` is an integer variable whose value is some positive integer N. Assume also that `hn` is a variable whose value is the Nth harmonic number. Write an expression whose value is the (N+1)th harmonic number.

```
hn + 1.0 / (n + 1)
```

Quiz 2.11 #1:

Given a variable `bridge_players`, write a statement that increases its value by 4.

```
bridge_players += 4
```

Quiz 2.11 #2:

Given a variable `profits`, write a statement that increases its value by a factor of 10.

```
profits *= 10
```

Quiz 2.11 #3:

Write a statement that increments `total` by the value associated with `amount`. That is, add the value associated with `amount` to that associated with `total` and assign the result to `total`.

```
total += amount
```

Chapter 2: Programming Project 1

(Financial application: calculate tips)

Write a program that reads the subtotal and the gratuity rate and computes the gratuity and total. For example, if the user enters 10 for the subtotal and 15% for the gratuity rate, the program displays 1.5 as the gratuity and 11.5 as the total. Here is another sample run:

```
Enter the subtotal: 15.69
```

```
Enter the gratuity rate: 15
```

```
The gratuity is 2.35 and the total is 18.04
```

If you get a logical or runtime error, please refer <https://liangpy.pearsoncmg.com/faq.html>.

```
# Exercise02_05
subtotal = float(input("Enter the subtotal: "))
rate = float(input("Enter the gratuity rate: "))

gratuity = subtotal * rate / 100
total = subtotal + gratuity

print("The gratuity is", int(gratuity * 100) / 100,
      "and total is", int(total * 100) / 100)
```

Chapter 2: Programming Project 2

(Find the number of years and days)

Write a program that prompts the user to enter the minutes (e.g., 1 billion), and displays the number of years and days for the minutes. For simplicity, assume a year has 365 days. Here is a sample run:

```
Enter the number of minutes: 1000000000
```

```
1000000000 minutes is approximately 1902 years and 214 days
```

If you get a logical or runtime error, please refer <https://liangpy.pearsoncmg.com/faq.html>.

```
# Exercise02_07
# Obtain input
minutes = int(input("Enter the number of minutes: "))

totalNumberOfDays = minutes // (24 * 60)
numberOfYears = totalNumberOfDays // 365
remainingNumberOfDays = totalNumberOfDays % 365;

# Display results
print(minutes, "minutes is approximately",
      numberOfYears, "years and", remainingNumberOfDays, "days")
```

Chapter 2: Programming Project 3

(Split digits)

Write a program that prompts the user to enter a four-digit integer and displays the number in reverse order. Here is a sample run:

```
Enter an integer: 5213
```

```
3
```

```
1
```

```
2
```

```
5
```

If you get a logical or runtime error, please refer <https://liangpy.pearsoncmg.com/faq.html>.

```
# Exercise02_13
number = int(input("Enter an integer: "))

d1 = number % 10
number = number // 10

d2 = number % 10
number = number // 10

d3 = number % 10
number = number // 10

d4 = number % 10
number = number // 10

print(d1)
print(d2)
print(d3)
print(d4)
```

Chapter 2: Programming Project 4

(Slope of a line)

Write a program that prompts the user to enter the coordinates of two points (x_1, y_1) and (x_2, y_2) , and displays the slope of the line that connects the two points. The formula of the slope is $(y_2 - y_1) / (x_2 - x_1)$. Here is a sample run:

```
Enter the x-coordinate for point1: 4.5
```

```
Enter the y-coordinate for point1: -5.5
```

```
Enter the x-coordinate for point2: 6.6
```

```
Enter the y-coordinate for point2: -6.5
```

The slope for the line that connects two points (4.5, -5.5) and (6.6, -6.5) is -0.47619

If you get a logical or runtime error, please refer <https://liangpy.pearsoncmg.com/faq.html>.

```
# Exercise02_04Extra
x1 = float(input("Enter the x-coordinate for point1: "))
y1 = float(input("Enter the y-coordinate for point1: "))
x2 = float(input("Enter the x-coordinate for point2: "))
y2 = float(input("Enter the y-coordinate for point2: "))
slope = (y1 - y2) / (x1 - x2)
print("The slope for the line that connects two points ("
      x1, ",", y1, ") and ("
      x2, ",", y2, ") is", slope)
```

Chapter 2: Programming Project 5

(Financial application: calculate future investment value)

Write a program that reads in an investment amount, the annual interest rate, and the number of years, and then displays the future investment value using the following formula:

$$\text{futureInvestmentAmount} = \text{investmentAmount} * (1 + \text{monthlyInterestRate}) ^ \text{numberOfMonths}$$

For example, if you enter the amount 1000.56, an annual interest rate of 4.25%, and the number of years as 1, the future investment value is 1043.33. Here is a sample run:

Enter investment amount: 1000.56

Enter annual interest rate: 4.25

Enter number of years: 1

Accumulated value is 1043.92

If you get a logical or runtime error, please refer <https://liangpy.pearsoncmg.com/faq.html>.

```
# Exercise02_19
# Enter the investment amount
investmentAmount = float(input("Enter the investment amount, for example
120000.95: "))

# Enter yearly interest rate
annualInterestRate = float(input("Enter annual interest rate, for example
8.25: "))

# Obtain monthly interest rate
monthlyInterestRate = annualInterestRate / 1200

# Enter number of years
numOfYears = int(input("Enter number of years as an integer, for example 5:
"))

futureValue = investmentAmount * ((1 + monthlyInterestRate) ** (numOfYears
* 12))
```



```
print("Future value is", int(futureValue * 100) / 100.0)
```