**ISE224 Python for Engineers**

**Homework 1**

1. Each group submit one .py file named as **[HW1\_YourGroupNum].py**
2. Follow the format specified in the **hw\_template.py**
3. Due: February 7th 11:59 PM (ET)

**Problem 1**

String Concatenation and Input: Write a program that asks for the user's name, birthplace, and favorite hobby, and then prints a sentence combining these inputs.

**Example Input for Problem 1:**Name: Alice  
Birthplace: New York  
Favorite Hobby: Reading

**Expected Output for Problem 1:**I am Alice, I was born in New York, and my favorite hobby is Reading.

**Problem 2**

Arithmetic Operations: Create a program that prompts the user for two integers and then calculates and displays their sum, difference, product, and average.

**Example Input for Problem 2:**First Integer: 5  
Second Integer: 3

**Expected Output for Problem 2:**Sum: 8  
Difference: 2  
Product: 15  
Average: 4.0

**Problem 3**

Formatted Output: Write a program that asks for a floating-point number and prints it in a formatted way, showing only two decimal places.

**Example Input for Problem 3:**Floating-point Number: 123.4567

**Expected Output for Problem 3:**Formatted number: 123.46

**Problem 4**

Temperature Conversion: Develop a program that converts temperature from Fahrenheit to Celsius, with the input being a Fahrenheit temperature.

**Example Input for Problem 4:**Fahrenheit Temperature: 68

**Expected Output for Problem 4:**Temperature in Celsius: 20.00

**Problem 5**

Basic Geometry Calculations: Create a program to calculate and display the area and perimeter of a rectangle, taking its length and width as input.

**Example Input for Problem 5:**Length: 10  
Width: 5

**Expected Output for Problem 5:**Area: 50  
Perimeter: 30

**Problem 6**

Investment Calculator: Similar to the stock transaction program, write a program that calculates the future value of a monthly investment in a mutual fund. It should prompt for the initial investment amount, monthly addition, annual interest rate, and the number of years.

**Example Input for Problem 6:**Initial Investment: 1000  
Monthly Addition: 100  
Annual Interest Rate: 5  
Years: 10

**Expected Output for Problem 6:**Future value of the investment: <variable depending on interest computation>

**Problem 7**

Write a program that prompts the user to enter their age and then prints "You are [age] years old." (Hint: integer)

*Input example*

Your age: 20

*Output example*

You are 20 years old.

**Problem 8**

Write a program to input a Celsius temperature, and then convert it to Fahrenheit temperature. Finally, print the Fahrenheit temperature to the screen at 1 decimal place.

Hint:

*Input example*

Celsius: 12

*Output example*

Fahrenheit: 53.6

**Problem 9**

Write a program to calculate the perimeter and the area of the circle with input the radius from keyboard.

1. Input a radius (r) from keyboard.
2. Print the perimeter and the area of the circle
3. Required format of the output:
   1. 4 decimals
   2. minimum field width = 10
   3. right alignment

Hint 1. 159

Hint 2. perimeter (circumference) of a circle: C = 2 \* π \* r

Hint 3. Area of a circle: A = π \* r^2

*Input example*

Enter the radius of the circle: 10

*Output example*

Perimeter: 62.8318

Area: 314.1593

**Problem 10**

Stock Transaction Program (Q2.12 from textbook)

Last month, Joe purchased some stock in Acme Software, Inc. Here are the details of the purchase:

* The number of shares that Joe purchased was 2,000.
* When Joe purchased the stock, he paid $40.00 per share.
* Joe paid his stockbroker a commission that amounted to 3 percent of the amount he paid for the stock.

Two weeks later, Joe sold the stock. Here are the details of the sale:

* The number of shares that Joe sold was 2,000.
* He sold the stock for $42.75 per share.
* He paid his stockbroker another commission that amounted to 3 percent of the amount he received for the stock.

Write a program do the following processes.

* Input how many shares he bought.
* Input the price per share he bought.
* Input commission rate.
* Input how many shares he sold.
* Input the price per share he sold.
* Input the commission rate of sale.
* Display the amount of money joe paid for the stock.
* Display the amount of commission Joe paid his broker when he bought the stock.
* Display the amount for which Joe sold the stock.
* Display the amount of commission Joe paid his broker when he sold the stock.
* Display the amount of money that Joe had left when he sold the stock and paid his broker (both times). It this amount is positive, then Joe made a profit. It the amount is negative, then Joe lost money.

*Input example*

How many shares he bought: 2000

Price per share he bought: 40

Commission rate of purchase: 0.03

How many shares he sold: 2000

Price per share he sold: 42.75

Commission rate of sale: 0.03

*Output example*

He paid 80000.0 for the stock.

He paid 2400.0 to his broker when he bought this stock.

He received 85500.0 for the stock.

He paid 2565.0 to his broker when he sold this stock.

He left 535.0