

AI Programming

(CB2001103-059)

HW02

Note

For the following problems, write a program to solve the problem and display the answer. A possible output is shown in a example I/O section and responses to input statements appear **green**. Make sure you run scripts using Python 3.

Submission format

HW02_(NAME).zip included:

- HW02_A_(NAME).py – **CODE** for Problem A and sufficient **COMMENTS**.
- HW02_B_(NAME).py – **CODE** for Problem B and sufficient **COMMENTS**
- HW02_C_(NAME).py – **CODE** for Problem C and sufficient **COMMENTS**
- HW02_(NAME).pdf - **SCREEN SHOT** of terminal that run example case.

Homework Policy

Late penalty: 20 points per 12 hours

Any cheating → 0 point for anyone involved

- Copying from a fellow student
- Copying from the Web or ChatGPT/ChatGPT-like apps.
- Working together with a group of students on this non-group assignment.

Problem A. Median [30 points]

Problem

The median of an ordered set of measurements is a number separating the lower half from the upper half. If the number of measurements is odd, the median is the middle measurement. If the number of measurements is even, the median is the average of the two middle measurements. Write a program that requests a list of measurements (not necessarily ordered) as input and then displays the median of the measurements.

Restrictions

Use the **sort** method and calculate the median.

Use the **format** method to display the following outputs.

Example I/O

Enter measurements as a list: [10, 3, 5, 6, 1, 8] Median: 5.5
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Submit format

HW02_A_(NAME).py

Problem B. Special Number [30 points]

Problem

Write a program to find the five-digit number, call it *abcde*, whose digits are reversed when the number is multiplied by 4. That is, $4 \times abcde = edcba$.

Restrictions

Use the **reverse** method and the **join** method

Use the **format** method to display the following outputs.

You must check all the five-digit number from 10,000 to 99,999 using loop (You can use break if you find the number)

Example I/O

Since $4 * 21978$ is 87912, The special number is 21978.

Submit format

HW02_B_(NAME).py

Problem C. Mortgage Calculations [40 points]

Problem

Write a program to calculate three monthly values associated with a mortgage. The interest paid each month is the monthly rate of interest (annual rate of interest / 12) applied to the balance at the beginning of the month. Each month the reduction of principal equals the monthly payment minus the interest paid. At any time, the balance of the mortgage is the amount still owed—that is, the amount required to pay off the mortgage. The end of month balance is calculated as [beginning of month balance] - [reduction of principal]. The main function should call three functions—one (multi valued) for input, one (multi-valued) to calculate the values, and one for output.

Restrictions

First define the main function in the below followed by three other functions
Round down the 'Interest paid for the month' to two decimal places and then calculate.
Use the **format** method to display the following outputs.

Skeleton Code

```
def main():  
    ## Analyze monthly payment of mortgage.  
    annualRateOfInterest, monthlyPayment, begBalance = inputData()  
    (intForMonth, redOfPrincipal, endBalance)= \  
        calculateValues(annualRateOfInterest, monthlyPayment, begBalance)  
    displayOutput(intForMonth, redOfPrincipal, endBalance)
```

Example I/O

```
annual rate of interest: 3  
Enter monthly payment: 1820  
Enter beg. of month balance: 632030  
Interest paid for the month: $1,580.07  
Reduction of principal: $239.93  
End of month balance: $631,790.07
```

Submit format

HW02_C_(NAME).py