

## Note

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

## 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
```

### 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 87912.
```

### 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.
- 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