CIS 106 – Loops Part 2

For each problem prepare an IPO chart. Then write the code for each. Save the IPO within this document and upload to your repository. After code is complete upload the files (.py) to your repository. Make sure to include the text files in the folder. Use the same name convention as previous assignments.

Paste the link to your repository into the assignment completion link in Blackboard.

1. Allow the user to enter a principal amount and interest rate. Repeatedly (need a loop to control the program execution) compute the annual interest (principle x rate). Compute ending balance to be principal (beginning balance + interest). Display year, beginning balance and ending balance for each of the first 5 years. Display the accumulated interest for the 5 years. Note: the new balance by year (this will be the principle for the following year. ***Format the output*** to look like the example below.

Example:

Enter principal amount: 10000.00

Enter interest rate: 0.10

Formatted output

Year Beginning Ending

Balance Balance

1. $10,000.00 $11,000.00
2. $11,000.00 $12,100.00
3. $12,100.00 $13,310.00
4. $13,310.00 $14,641.00
5. $14,641.00 $16,105.00

Total interest earned: $6,156.00

1. Fibonacci sequence is a sequence of natural order. The sequence is:

1, 1, 2, 3, 5, 8 etc. where it is a series of numbers that may start with 0 and 1, and each subsequent number is the sum of the two preceding numbers. For this exercise, start with 1.

Use a for loop compute and display first 20 numbers in the sequence.

1. Create a text file that contains employee last name and salary. Read in this data. Determine the bonus rate based on the chart below. Use that rate to compute bonus. For each line display the employee’s last name, salary and bonus. After the loop display the sum of all bonuses paid out.

Salary Bonus Rate

100,000.00 and up 20%

50,000.00 15%

All other salaries 10%

Example file (create your own data with at least 5 employees:

Adams  
50000.00  
Baker  
75000.00  
Smith  
45000.00  
etc.

1. Create a text file with item, quantity and price. Read through the file one line at a time. Compute the extended price (quantity x price). For each line display the item, quantity, price and extended price. After the loop display the sum of all the extended prices, the count of the number of orders and the average order.

Example Data File

Widget  
10  
50  
Hammer  
2  
10  
Saw  
4  
8  
etc.

1. Create a text file with student last name, district code (I or O) and number of credits taken. Compute tuition owed (credits taken x cost per credit). Cost per credit for in district students (district code I) is 250.00. Out of district students pay 500.00 per credit. For each line display student last name, credits taken and tuition owed. After the loop display sum of all tuition owed and the number of students.

Example file

Jones  
I  
12  
Adams  
I  
10  
Baker  
O  
12  
Smith  
O  
16

# Problem 1

|  |  |  |
| --- | --- | --- |
| Input | Process | Output |
| * Principal Amount: **Real** * Interest Rate: **Real** | * Loop through 5 years: **Real**   ***Calculate each year***:   * Interest = principal amount \* interest rate: **Real** * Ending balance = principal + interest: **Real** * Update principal as the ending balance for the next year * Add interest to total interest earned: **Real** | * Display Year: **Text** * Display Principal: **Real** * Display Ending balance for each year: **Real** * Display Total interest earned after 5 years: **Real** |

# Problem 2

|  |  |  |
| --- | --- | --- |
| Input | Process | Output |
| * First (starts at 1): **Real** * Second (starts at 1): **Real** | * Loop 20 times * Display current number: **Text** * ***Calculate*** Next: first + second **Real** * Update first and second for the next loop | * Each Fibonacci number: **Real** * Display all numbers |

# Problem 3

|  |  |  |
| --- | --- | --- |
| Input | Process | Output |
| * Read employee data from text file * Last name: **Text** * Salary: **Real** | * Loop through the file one time for each employee * Determine bonus rate based on salary:   If 20% salary is 100,000.00 or more  15% if salary is exactly 50,000.00  10% for all other salaries   * Calculate bonus= salary \* bonus rate * Add bonus to total bonus | * Display last name: **text** * Display salary: **real** * Display bonus: **real**   After the loop, display total bonus: **Real** |

|  |  |  |
| --- | --- | --- |
| Input | Process | Output |
| * Read employee data from text file * Item: **Text** * Quantity: **Real** * Price: **Real** | * Loop through file once for each item * Calculate extended price = quantity \* price * Add extended price + total price * Add 1 to order count   After loop:   * Calculate average order = total price / order count | * Display item, quantity, price, and extended price   After loop:   * Display total price, order count, & average order |

# Problem 4

# Problem 5

|  |  |  |
| --- | --- | --- |
| Input | Process | Output |
| * Read student data from text file * Last name: **Text** * District code: **Text** * Credits: **Real** | * Loop through each file * Determine cost per credit based on district code:   250.00 if district code is "I"  500.00 if district code is "O"   * Calculate tuition= credits \* cost per credit * Add tuition to total tuition * Add 1 to student count | * Display last name, credits, and tuition   After loop:   * Display total tuition and student count |