YZV102E - Introduction to Programming for

Data Science (python)

Homework ›3

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**Problem**

Solution of the problem;

In this problem there is a CSV file that have information of student number, midterm and fi-nal grades of some students. Program reads ([1](#page1)) this CSV and define list of tuples ([2](#page1)) that have all information for one student in a single tuple. It also calculates average of given exam for all students in calculate-average-exam function.([3](#page2)) Then it finds students who can pass by *(0.3)\*midterm1 + (0.3)\*midterm2 + (0.4)\*final* formula.([4](#page2))There exist another CSV file that havenew midterm and final grades for some students. It finds same students in both CSV files and updates first values create a new list with tuples.([5](#page3))

*Code Snippet* 1: Read Grades Function

* def r e a d \_ g r a d e s ( filename ) :
* import csv

|  |  |  |
| --- | --- | --- |
| 3 | name , | mt1 , mt2 , final = {} ,{} ,{} ,{} |
| 4 |  |  |
| 5 | with | open ( ’grades . csv ’ , newline = ’’) as csv\_file : |

* s p a m r e a d e r = csv . reader ( csv\_file , d el im it er = ’,’)
* for row in s p a m r e a d e r :

|  |  |  |
| --- | --- | --- |
| 8 | s t u d e n t \_ n u m b e r = row [0] | |
| 9 | name [ s t u d e n t \_ n u m b e r ]= row [1] | |
| 10 | if row [2]== ’midterm1 ’: mt1 [ s t u d e n t \_ n u m b e r ]= int ( row [3]) | |
| 11 | elif | row [2]== ’midterm2 ’: mt2 [ s t u d e n t \_ n u m b e r ]= int ( row [3]) |
| 12 | elif | row [2]== ’final ’: final [ s t u d e n t \_ n u m b e r ]= int ( row [3]) |
| 13 |  |  |

1. return name , mt1 , mt2 , final
   1. As shown in *Code Snippet* [1](#page1), the program opens the CSV file in line 5 then reads each row of this CSV file in line **6** and used in for loop, in line **7 to 12**. Then it stores midterm and final grades in a separate dictionaries with student numbers as key, in line **8 to 12**.

*Code Snippet* 2: Convert Function

1 def convert ( names , midterm1 , midterm2 , final ) :

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* lst = []

3

* for i in names . keys () :
* lst . append (( i , names [ i ] , midterm1 [ i ] , midterm2 [ i ] , final [ i ]) )

6

* return lst
  1. As shown in *Code Snippet* [2](#page1), the program puts together all values which have the same key value in each input dictionary into a single tuple and append all these tuples into a single list, in line **4 and 5**.

*Code Snippet* 3: Calculate Exam Average Function

* def c a l c u l a t e \_ e x a m \_ a v e r a g e ( lst , exam ) :
* average = 0.0

3

* for element in lst :
* number , name , mt1 , mt2 , final = element

|  |  |  |
| --- | --- | --- |
| 6 | if exam == ’midterm1 ’: average += mt1 | |
| 7 | elif | exam == ’midterm2 ’: average += mt2 |
| 8 | elif | exam == ’final ’: average += final |
| 9 |  |  |

1. average /= len ( lst )
2. return average
3. As shown in *Code Snippet* [3](#page2), the function calculates the average of the given parameter as the exam. It unpacks the values in line **5** and detects which value to change in lines **6 to 8**

according to the given input.

*Code Snippet* 4: Find Passing Student Function

* def f i n d \_ p a s s i n g \_ s t u d e n t s ( lst ) :
* s t u d e n t \_ n a m e s =[]

3

* for element in lst :
* number , name , mt1 , mt2 , final = element

6 c u m u l a t i v e \_ g r a d e = (0.3) \* mt1 + (0.3) \* mt2 + (0.4) \* final

* if cumulative\_grade >60:

|  |  |
| --- | --- |
| 8 | s t u d e n t \_ n a m e s . append ( name ) |
| 9 |  |

1. return s t u d e n t \_ n a m e s
   1. As shown in *Code Snippet* [4](#page2), the program, unpacks the values in line **5**.Then it finds students who can pass by formula in line **6**. If the result of this formula bigger than 60, it means the student pass. Then it appends the names of all passing students in student-names list.

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*Code Snippet* 5: Manipulate Function

* def m a n i p u l a t e ( filename , lst ) :
* result = []
* import csv

4

* for i in range ( len ( lst ) ) :

6 number , name , mt1 , mt2 , final = lst [ i ]

* with open ( filename , newline = ’’) as csv\_file :

|  |  |  |
| --- | --- | --- |
| 8 | s p a m r e a d e r = | csv . reader ( csv\_file , d el im it er = ’,’) |
| 9 | for row in s p a m r e a d e r : | |
| 10 | student\_number , exam , grade = row [0] , row [1] , int ( row [2]) | |
| 11 | if s t u d e n t \_ n u m b e r == number : | |
| 12 | if exam == ’midterm1 ’: mt1 = grade | |
| 13 | elif | exam == ’midterm2 ’: mt2 = grade |
| 14 | elif | exam == ’final ’: final = grade |
| 15 |  |  |

1. result . append (( number , name , mt1 , mt2 , final ) )
2. return result
   1. As shown in *Code Snippet* [5](#page3), the program, unpacks the values in input lst, in line **6** and opens the file in line **7**. It reads CSV file line by line in line **8** and used in for loop, in line **9 to 14**. It unpacks the values in each row in line **10** and detects which value to change and assigns it to the new value in line **11 to 14**. Then packs all values in a single tuple and appends all these tuples in a list in line **16**.

**Conclusion**

I learned have to open and read CSV files and how to manipulate data by given CSV files. I also learned how to work with tuples.

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