Python for Computational Problem-Solving

LABORATORY MANUAL
Week 9
Topic: Programs on Reading CSV files

Semester: I
Course Code: UE23CS151A
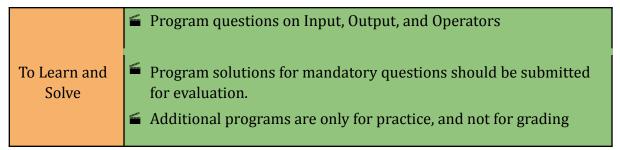Course Anchor: Prof. Sindhu R Pai
Lab Anchor: Dr. Divyashree N
Anchor and Lab Anchor – EC Campus: Prof. Kundhavai K R
 Session: September 2023 – December 2023

Instructions to Faculty

1. All faculty members shall be in the Lab on time.

2. Faculty members should not leave lab session unattended, when students are present, and Lab sessions should be engaged fully.

3. Faculty should explain all the lab programs during the lab hours only and make students to execute all the lab programs given for that week.

4. Faculty should not share the faculty copy of the lab manual to students.

5. Insist students to use lab systems only and not their laptops.

To Learn and Solve	▪ Program questions on Input, Output, and Operators
	▪ Program solutions for mandatory questions should be submitted for evaluation.
	▪ Additional programs are only for practice, and not for grading

(Submissions required. Students should submit their codes through hacker rank platform)

Day: Monday Sections: O2, C2, K2, B2, N2

Problem Statement 1:

Write a program that reads information from a csv file and prints the contents

Solution:

```python
import csv

with open('pythonlab.csv', 'r') as file:
    csv_reader = csv.reader(file)
    for row in csv_reader:
        print(row)
```

Problem Statement 2:

Write a program that writes only the "Name" and "Position" columns to a new csv file.

Solution:

```
import csv

with open('pythonlab.csv', 'r') as input_file:
    csv_reader = csv.DictReader(input_file)
    data_to_write = [{'Name': row['Name'], 'Position': row['Position']} for row in csv_re

with open('output_file.csv', 'w', newline='') as output_file:
    fieldnames = ['Name', 'Position']
    csv_writer = csv.DictWriter(output_file, fieldnames=fieldnames)
    csv_writer.writeheader()
    csv_writer.writerows(data_to_write)
```

Output:

A	B
Name	Position
Alice	Software Developer
Bob	Data Analyst
Charlie	HR Manager
David	Financial Analyst
Eve	Project Manager
Frank	Software Developer
Grace	HR Manager
Harry	Data Analyst
Ivy	Data Analyst
Jack	Software Developer

Problem Statement 3:

Write a program that calculates and prints the average salary of all employees in the CSV file.

Solution:

```python
import csv

with open('pythonlab.csv', 'r') as input_file:
    csv_reader = csv.DictReader(input_file)
    total_salary = 0
    total_employees = 0
    for row in csv_reader:
        total_salary += int(row['Salary'])
        total_employees += 1

if total_employees > 0:
    average_salary = total_salary / total_employees
    print(f"The average salary of all employees is: {average_salary:.2f}")
else:
    print("No employee data found.")
```

Problem Statement 4:

Write a program that creates a new CSV file named data_analysts.csv containing only the entries where the position is "Data Analyst".

Solution:

```python
import csv

with open('pythonlab.csv', 'r') as input_file:
    csv_reader = csv.DictReader(input_file)
    data_analyst_entries = [row for row in csv_reader if row['Position'] == 'Data Analyst']

with open('data_analysts.csv', 'w', newline='') as output_file:
    fieldnames = ['Name', 'Location', 'Birthdate', 'Position', 'Salary']
    csv_writer = csv.DictWriter(output_file, fieldnames=fieldnames)
    csv_writer.writeheader()
    csv_writer.writerows(data_analyst_entries)
```

Output:

	A	B	C	D	E
1	Name	Location	Birthdate	Position	Salary
2	Bob	San Francisco	22-09-1993	Data Analyst	90000
3	Harry	Chicago	18-06-1992	Data Analyst	85000
4	Ivy	Denver	09-09-1980	Data Analyst	68000
5					

Day: Tuesday Sections: D2, I2, E2, L2, A1, M1

Problem Statement 1:

Write a program that creates a new CSV file named data_analysts.csv containing only the entries where the position is "Data Analyst".

Solution:

```python
import csv

with open('pythonlab.csv', 'r') as input_file:
    csv_reader = csv.DictReader(input_file)
    data_analyst_entries = [row for row in csv_reader if row['Position'] == 'Data Analyst']

with open('data_analysts.csv', 'w', newline='') as output_file:
    fieldnames = ['Name', 'Location', 'Birthdate', 'Position', 'Salary']
    csv_writer = csv.DictWriter(output_file, fieldnames=fieldnames)
    csv_writer.writeheader()
    csv_writer.writerows(data_analyst_entries)
```

Output:

	A	B	C	D	E
1	Name	Location	Birthdate	Position	Salary
2	Bob	San Francisco	22-09-1993	Data Analyst	90000
3	Harry	Chicago	18-06-1992	Data Analyst	85000
4	Ivy	Denver	09-09-1980	Data Analyst	68000
5					

Problem Statement 2:

Write a program that, given a name, prints the corresponding "Location".

Solution:

```python
import csv

search_name = input("Enter a name: ")
with open('pythonlab.csv', 'r') as input_file:
    csv_reader = csv.DictReader(input_file)
    for row in csv_reader:
        if row['Name'] == search_name:
            print(f"The location for {search_name} is: {row['Location']}")
            break
    else:
        print(f"No entry found for {search_name}")
```

Problem Statement 3:

Write a program to replace all instances of "Software" in "Position" with "DevOps" and write the name and the updates position to a new CSV file named position_replace.csv.

Solution:

```python
import csv

with open('pythonlab.csv', 'r') as input_file:
    csv_reader = csv.DictReader(input_file)
    data_with_position_replace =\
    [{'Name': row['Name'], 'Position': row['Position'].replace('Software', 'DevOps')} for row in csv_reader]

with open('position_replace.csv', 'w', newline='') as output_file:
    fieldnames = ['Name', 'Position']
    csv_writer = csv.DictWriter(output_file, fieldnames=fieldnames)
    csv_writer.writeheader()
    csv_writer.writerows(data_with_position_replace)
```

Output:

	A	B
1	Name	Position
2	Alice	DevOps Developer
3	Bob	Data Analyst
4	Charlie	HR Manager
5	David	Financial Analyst
6	Eve	Project Manager
7	Frank	DevOps Developer
8	Grace	HR Manager
9	Harry	Data Analyst
10	Ivy	Data Analyst
11	Jack	DevOps Developer
12	Sara	Financial Analyst
13		

Problem Statement 4:

Write a program that sorts the entries based on "Salary" in descending order and write the sorted rows(name and salary) to a new CSV file named sorted_by_salary.csv.

Solution:

```python
import csv

with open('pythonlab.csv', 'r') as input_file:
    csv_reader = csv.DictReader(input_file)
    sorted_data_by_salary = sorted(csv_reader, key=lambda x: int(x['Salary']), reverse=True)

with open('sorted_by_salary.csv', 'w', newline='') as output_file:
    fieldnames = ['Name', 'Salary']
    csv_writer = csv.DictWriter(output_file, fieldnames=fieldnames)
    csv_writer.writeheader()
    csv_writer.writerows({'Name': row['Name'], 'Salary': row['Salary']} for row in sorted_data_by_salary)
```

Output:

	A	B
1	Name	Salary
2	Jack	95000
3	Bob	90000
4	Harry	85000
5	Sara	82000
6	David	80000
7	Grace	78000
8	Alice	75000
9	Frank	72000
10	Eve	70000
11	Ivy	68000
12	Charlie	65000
13		

Day: Wednesday Sections: C1, K1, J2, F2

Problem Statement 1:

Write a program to count and print the total number of entries in the CSV file. (The header is not included.)

Solution:

```python
import csv

with open('pythonlab.csv', 'r') as input_file:
    csv_reader = csv.reader(input_file)
    next(csv_reader)
    total_entries = sum(1 for row in csv_reader)
    print(f'Total number of entries: {total_entries}')
```

Problem Statement 2:

Write a program that creates a new column named "FullInfo" by concatenating "Name" and "Location" for each entry. Write this information to a new CSV file named full_info.csv.

Solution:

```python
import csv

with open('pythonlab.csv', 'r') as input_file:
    csv_reader = csv.DictReader(input_file)
    data_with_full_info = [{'FullInfo': f"{row['Name']}, {row['Location']}"} for row in csv_reader]

with open('full_info.csv', 'w', newline='') as output_file:
    fieldnames = ['FullInfo']
    csv_writer = csv.DictWriter(output_file, fieldnames=fieldnames)
    csv_writer.writeheader()
    csv_writer.writerows(data_with_full_info)
```

Output:

	A
1	FullInfo
2	Alice, New York
3	Bob, San Francisco
4	Charlie, Los Angeles
5	David, Chicago
6	Eve, Miami
7	Frank, Houston
8	Grace, Boston
9	Harry, Chicago
10	Ivy, Denver
11	Jack, New York

Problem Statement 3:

Write a program to extracts and write the names of employees whose names contain the letter 'a' to a new CSV file named names_with_a.csv.

Solution:

```
import csv

with open('pythonlab.csv', 'r') as input_file:
    csv_reader = csv.DictReader(input_file)
    names_with_a = [{'Name': row['Name']} for row in csv_reader if 'a' in row['Name'].lower()]

with open('names_with_a.csv', 'w', newline='') as output_file:
    fieldnames = ['Name']

    csv_writer = csv.DictWriter(output_file, fieldnames=fieldnames)
    csv_writer.writeheader()
    csv_writer.writerows(names_with_a)
```

Output:

	A
1	Name
2	Alice
3	Charlie
4	David
5	Frank
6	Grace
7	Harry
8	Jack
9	Sara

Problem Statement 4:

Write a program to count and print the number of occurrences for each unique "Position" in the CSV file.

Solution:

```python
import csv

with open('pythonlab.csv', 'r') as input_file:
    csv_reader = csv.DictReader(input_file)
    position_counts = {}
    for row in csv_reader:
        position = row['Position']
        if position in position_counts:
            position_counts[position] += 1
        else:
            position_counts[position] = 1

print("Number of occurrences for each unique position:")
for position, count in position_counts.items():
    print(f"{position}: {count}")
```

Day: Thursday Sections: B1, N1, O1, D1, M1

Problem Statement 1:

Write a program to check if "Manager" appears in any "Position" entry and write the boolean result to a new CSV file named position_check.csv.

Solution:

```python
import csv

with open('pythonlab.csv', 'r') as input_file:
    csv_reader = csv.DictReader(input_file)
    manager_check_result = [{'PositionCheck': 'Manager' in row['Position']} for row in csv_reader]

with open('position_check.csv', 'w', newline='') as output_file:
    fieldnames = ['PositionCheck']
    csv_writer = csv.DictWriter(output_file, fieldnames=fieldnames)
    csv_writer.writeheader()
    csv_writer.writerows(manager_check_result)
```

Output:

	A
1	PositionCheck
2	FALSE
3	FALSE
4	TRUE
5	FALSE
6	TRUE
7	FALSE
8	TRUE
9	FALSE
10	FALSE
11	FALSE

Problem Statement 2:

Write a program that converts all "Name" entries to uppercase and write the updated column to a new CSV file named uppercase_names.csv.

Solution:

```python
import csv

with open('pythonlab.csv', 'r') as input_file:
    csv_reader = csv.DictReader(input_file)
    names_uppercase = [{'Name': row['Name'].upper()} for row in csv_reader]

with open('uppercase_names.csv', 'w', newline='') as output_file:
    fieldnames = ['Name']
    csv_writer = csv.DictWriter(output_file, fieldnames=fieldnames)
    csv_writer.writeheader()
    csv_writer.writerows(names_uppercase)
```

Output:

	A
1	Name
2	ALICE
3	BOB
4	CHARLIE
5	DAVID
6	EVE
7	FRANK
8	GRACE
9	HARRY
10	IVY
11	JACK

Problem Statement 3:

Write a program that creates a new CSV file named high_salaries.csv containing only the entries with salaries greater than 80000

Solution:

```python
import csv

with open('pythonlab.csv', 'r') as input_file:
    csv_reader = csv.DictReader(input_file)
    high_salary_entries = [row for row in csv_reader if int(row['Salary']) > 80000]

with open('high_salaries.csv', 'w', newline='') as output_file:
    fieldnames = ['Name', 'Location', 'Birthdate', 'Position', 'Salary']
    csv_writer = csv.DictWriter(output_file, fieldnames=fieldnames)
    csv_writer.writeheader()
    csv_writer.writerows(high_salary_entries)
```

Output:

	A	B	C	D	E
1	Name	Location	Birthdate	Position	Salary
2	Bob	San Francisco	22-09-1993	Data Analyst	90000
3	Harry	Chicago	18-06-1992	Data Analyst	85000
4	Jack	New York	30-01-1987	Software Developer	95000
5	Sara	Austin	15-09-1993	Financial Analyst	82000
6					

Problem Statement 4:

Write a program that finds and print the details of the employee with the highest salary.

Solution:

```python
import csv

with open('pythonlab.csv', 'r') as input_file:
    csv_reader = csv.DictReader(input_file)
    highest_salary_employee = None
    highest_salary = 0

    for row in csv_reader:
        salary = int(row['Salary'])
        if salary > highest_salary:
            highest_salary = salary
            highest_salary_employee = row

if highest_salary_employee:
    print("Details of the employee with the highest salary:")
    print(highest_salary_employee)
else:
    print("No employee data found.")
```

Output:

	A
1	Name
2	ALICE
3	BOB
4	CHARLIE
5	DAVID
6	EVE
7	FRANK
8	GRACE
9	HARRY
10	IVY
11	JACK

Day: Friday Sections: E1, L1, J1, F1, A1, I1

Problem Statement 1:

Write a program that finds and print the details of the employee with the highest salary.

Solution:

```python
import csv

with open('pythonlab.csv', 'r') as input_file:
    csv_reader = csv.DictReader(input_file)
    highest_salary_employee = None
    highest_salary = 0

    for row in csv_reader:
        salary = int(row['Salary'])
        if salary > highest_salary:
            highest_salary = salary
            highest_salary_employee = row

if highest_salary_employee:
    print("Details of the employee with the highest salary:")
    print(highest_salary_employee)
else:
    print("No employee data found.")
```

Problem Statement 2:

Write a program that appends a new entry to the CSV file with the information: "Sara," "Austin," "15-09-1993," "Financial Analyst," "82000." Append this information to the existing CSV file.

Solution:

```
import csv

new_entry = {"Name": "Sara", "Location": "Austin", "Birthdate": "15-09-1993", "Position": "Financial Analyst", "Salary": "82000"}
with open('pythonlab.csv', 'a', newline='') as file:
    csv_writer = csv.DictWriter(file, fieldnames=["Name", "Location", "Birthdate", "Position", "Salary"])
    csv_writer.writerow(new_entry)
```

Output:

	A	B	C	D	E
1	Name	Location	Birthdate	Position	Salary
2	Alice	New York	15-04-1998	Software Developer	75000
3	Bob	San Francisco	22-09-1993	Data Analyst	90000
4	Charlie	Los Angeles	05-12-2001	HR Manager	65000
5	David	Chicago	10-07-1995	Financial Analyst	80000
6	Eve	Miami	28-02-1988	Project Manager	70000
7	Frank	Houston	14-03-1990	Software Developer	72000
8	Grace	Boston	02-11-1985	HR Manager	78000
9	Harry	Chicago	18-06-1992	Data Analyst	85000
10	Ivy	Denver	09-09-1980	Data Analyst	68000
11	Jack	New York	30-01-1987	Software Developer	95000
12	Sara	Austin	15-09-1993	Financial Analyst	82000

Problem Statement 3:

Write a program that creates a new column named "ReversedName" with the reversed order of characters for each "Name" entry and store it in a file reverse_names.csv(name and reversed name).

Solution:

```
import csv

def reverse_name(name):
    return name[::-1]

with open('pythonlab.csv', 'r') as input_file:
    csv_reader = csv.DictReader(input_file)
    data_with_reversed_name = [
        {
            'Name': row['Name'],
            'ReversedName': reverse_name(row['Name'])
        } for row in csv_reader
    ]

with open('reverse_names.csv', 'w', newline='') as output_file:
    fieldnames = ['Name', 'ReversedName']
    csv_writer = csv.DictWriter(output_file, fieldnames=fieldnames)
    csv_writer.writeheader()
    csv_writer.writerows(data_with_reversed_name)
```

Output:

	A	B
1	Name	ReversedName
2	Alice	ecilA
3	Bob	boB
4	Charlie	eilrahC
5	David	divaD
6	Eve	evE
7	Frank	knarF
8	Grace	ecarG
9	Harry	yrraH
10	Ivy	yvI
11	Jack	kcaJ
12	Sara	araS

Problem Statement 4:

Write a program that creates a new column named "FullInfo" by concatenating "Name" and "Location" for each entry. Write this information to a new CSV file named full_info.csv.

Solution:

```python
import csv

with open('pythonlab.csv', 'r') as input_file:
    csv_reader = csv.DictReader(input_file)
    data_with_full_info = [{'FullInfo': f"{row['Name']}, {row['Location']}"} for row in csv_reader]

with open('full_info.csv', 'w', newline='') as output_file:
    fieldnames = ['FullInfo']
    csv_writer = csv.DictWriter(output_file, fieldnames=fieldnames)
    csv_writer.writeheader()
    csv_writer.writerows(data_with_full_info)
```

Output:

	A
1	FullInfo
2	Alice, New York
3	Bob, San Francisco
4	Charlie, Los Angeles
5	David, Chicago
6	Eve, Miami
7	Frank, Houston
8	Grace, Boston
9	Harry, Chicago
10	Ivy, Denver
11	Jack, New York

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