Python for Computer Science and Data Science 1 (CSE 3651)

MINOR ASSIGNMENT-8: FILES AND EXCEPTIONS

1. How does the read method differ from the readlines method?
2. What is the purpose of JSON serialization?
3. Why is the pickle module considered a security risk in some cases?
4. What is the significance of file modes ('r', 'w', 'a', 'b') in Python?
5. write code that reads the grades from the grades.txt file. Display the individual grades and their total, count, and average.
6. Write a Python program that lets an instructor enter a student's first and last name (strings) and three exam grades (integers). Save each student's data in a grades.csv file using the csv module, with each record in the format:
   firstname,lastname,exam1grade,exam2grade,exam3grade
7. Write a Python program that counts the number of words in a given text file.

   Input file, sample.txt contains,
   Python is a versatile programming language.
   It is widely used in data science, web development, and automation.

   Output: The file 'sample.txt' contains 16 words.
8. Write a function to safely deserialize JSON data from a file and handle errors if the data is invalid.

   Input file (Valid), 'data.json' contains,
   "name": "Alice", "age": 30, "skills": ["Python", "Data Science"]
   Output:
   JSON data successfully loaded.
   Deserialized Data: 'name': 'Alice', 'age': 30, 'skills': ['Python', 'Data Science']
   Input file (Invalid), 'data.json' contains,
   "name": "Alice", "age": 30, "skills": ["Python", "Data Science"

   Output:
   Error: The file 'missing.json' does not exist.
   No valid data could be loaded.
9. Solve the problem of dividing two numbers, handling invalid inputs like zero or non-numeric values.
10. Write a Python function that reads a file file1 and displays the number of words and the number of vowels in the file.
11. Write a Python function that takes two files of equal size as input from the user. The first file contains weights of items and the second file contains corresponding prices. Create another file that should contain price per unit weight for each item.

12. Create a program to extract and save unique email addresses from a large text file.

    Input file, sample.txt contains,
    Hello, contact me at example1@example.com for more info. You can also reach me at test_email@example.org or example1@example.com. Spam emails: spam@spammer.com, info@spammer.com, spam@spammer.com

    Output file, Output.txt:
    example1@example.com
    info@spammer.com
    spam@spammer.com
    test_email@example.org

13. Identify two exceptions that may be raised while executing the following statement:
    result = a + b

14. What will be the output produced on executing function inverse1 when the following input is entered as the value of variable num:
    (a)5 (b)0 (c)2.0 (d)x (e)None

```
def inverse1():
    try:
        num = input("Enter the number: ")
        num = float(num)
        inverse = 1.0 / num
    except ValueError:
        print("ValueError: Invalid input, not a number.")
    except TypeError:
        print("TypeError: Invalid type for operation.")
    except ZeroDivisionError:
        print("ZeroDivisionError: Division by zero is not allowed.")
    except Exception as e:
        print(f"Unexpected error: {e}")
    else:
        print(f"Inverse: {inverse}")
    finally:
        print("Function inverse completed")
```

15. Write the output of the following program:

(a)
```
f = open('PYTHON', 'w')
f.write('failure is a part of success')
f = open('PYTHON', 'r')
print(f.read(4))
f.close()
```

(b)
```
f = open('PYTHON', 'w')
f.write('failure is a part of success')
f = open('PYTHON', 'r')
print(f.read())
f.close()
```

(c)
```
f = open('PYTHON', 'w')
f.write('failure is a part of success also, i am fine')
f = open('PYTHON', 'r')
print(f.readline())
f.close()
```

(d)
```
f = open('PYTHON', 'w')
description = ['we either choose the pain of discipline \n', 'or\n', 'the pain of regret\n']
f.writelines(description)
f.close()
f = open('PYTHON', 'r')
print(f.read())
f.close()
```

16. Create a program that reads CSV data and converts it into a list of dictionaries.

    Input file, sample.csv contains,
    Name,Age,Email
    Alice,30,alice@example.com
    Bob,25,bob@example.com
    Charlie,35,charlie@example.com

    Output:
    Successfully read 3 rows from 'data.csv'.
    First 5 rows of the CSV data as dictionaries:
    'Name': 'Alice', 'Age': '30', 'Email': 'alice@example.com'
    'Name': 'Bob', 'Age': '25', 'Email': 'bob@example.com'
    'Name': 'Charlie', 'Age': '35', 'Email': 'charlie@example.com'

17. Create a robust program to read user input and write it into a file, handling invalid inputs gracefully.

18. Write a program to merge two CSV files containing Titanic data and print the combined dataset.
    Sample Input Files:

    #titanic1.csv
    PassengerId,Survived,Pclass,Name,Sex,Age
    1,1,1,"Allen, Miss. Elisabeth",female,29
    2,0,3,"Moran, Mr. James",male,25

    #titanic2.csv
    PassengerId,Survived,Pclass,Name,Sex,Age
    3,1,2,"Brown, Mrs. Mary",female,35
    4,0,3,"Smith, Mr. John",male,40

19. Implement a program that reads a titanic1.CSV file into a Pandas DataFrame and finds the passenger with the longest name.

20. Write a program to analyze the distribution of ticket prices in the Titanic dataset. Using Pandas, filter and display the names of passengers who were under 18 years old on the Titanic.
    Sample input files:

    #titanic.csv
    PassengerId,Survived,Pclass,Name,Sex,Age,Fare
    1,1,1,"Allen, Miss. Elisabeth",female,29,211.3375
    2,0,3,"Moran, Mr. James",male,25,7.925
    3,1,2,"Brown, Mrs. Mary",female,35,51.8625
    4,0,3,"Smith, Mr. John",male,40,8.05
    5,1,1,"Clark, Miss. Martha",female,18,81.8583
    6,0,3,"Williams, Mr. Charles",male,12,10.5
    7,1,2,"Moore, Miss. Ann",female,16,30.0708
    8,0,3,"Wilson, Mr. Henry",male,19,7.75