Introduction to Python

Answer the following

1. Explain the Features of Python.

2. List down the application of Python.

3. What do you mean by dynamic typing in Python.

Note: upload assignment in PDF format.

Write a Python Program to print Hello World in the output.

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Data Types & Variable

Answer the following

1. What are the rules in declaring the variables in Python?

2. Explain type casting in Python.

Note: Upload Assignment in PDF format.

Write a Python program to print the value assigned to a given variable.

Using the `type()` function, write a Python program to print the datatypes of the following variable.

Given cost price and selling price of a product, write a program to calculate the profit gained by the seller.

Write a Python program to calculate the simple interest on the amount given.

Write a Python program to calculate the gross salary on the basis of basic salary given by the employee. Diet Allowance (DA) is 20% of basic salary. House Rent Allowance (HRA) is 30% of basic salary. Gross salary is the sum of the basic, DA, and HRA.

Write a Python program to calculate the area and perimeter of a circle for a given radius of the circle.

Write a Python program to convert the given temperature from Celsius to Fahrenheit.

Write a Python script to determine the number of Rs 500, Rs 200, and Rs 100 notes needed to dispense for a given amount. The function should minimize the number of notes dispensed by prioritizing higher denominations first.

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Conditional Statement

What is the significance of indentation in Python?

Note: Please upload assignment in PDF format.

Write a Python program to check whether the given number is odd or even.

Write a program to check whether the given number is a positive or negative number.

If the ages of Ram, Shyam, and Ajay are given as input, write a program to determine the youngest of the three.

Write a program to check whether a triangle is valid or invalid. A triangle is valid if the sum of all the angles is equal to 180.

Marks of 3 subjects are given; write a Python program to calculate the percentage and assign the grade as given below.

Write a program to check whether the given year is a leap year or a non-leap year.

A three-digit number is given; write a program to check whether the number is an Armstrong number or not.

Write a Python program to check whether the given alphabet is a vowel or consonant.

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Let me know if you need anything e====================

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Loops in Python

Answer the following questions:

1. Why are loops necessary in programming languages?

2. What is the purpose of the `pass` keyword?

3. What is the difference between `break` and `continue`?

4. What is the difference between a `while` loop and a `for` loop?

Note: Upload the assignment in PDF format.

Write a program to find the summation of odd numbers from 1 to n.

Write a program to find the factorial of a given number.

Write a program to check whether a number is a perfect number or not.

Write a program to print the Fibonacci series for a given number of terms.

Write a program to check whether a number is a prime number or not.

Write a Python program to print the prime numbers from 1 to n.

Write a Python program to print the following pattern for a given number of lines.

Write a Python program to print Floyd's Triangle as shown below for a given number of lines.

Write a Python program to print the alphabets triangle as shown below for a given number of lines.

Write a Python code to print the following number pattern for a given number of lines.

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If you need further assistance, just let me know!

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More on Data Types

Answer the following:

1. What is the difference between single quoted strings and double quoted strings in Python?

2. What is the difference between immutable and mutable objects?

3. What is the difference between a list and a tuple in Python?

4. What are the differences between a set and a list in terms of functionality and use cases?

5. How does a dictionary differ from a list in terms of data storage and retrieval?

Note: Upload the assignment in PDF format.

Write a Python program to count the number of positive values given in the list.

Write a Python program to find the sum of odd values from the given list.

Write a program to check the frequency of occurrence of 4 in the given list.

Write a Python program to find the minimum number in the given list.

Write a Python program to find the position of the first occurrence of a given element assigned to variable n in the given list l.

Write a Python program to find the occurrence of a given character in the given string.

Write a program to count the number of vowels and consonants in the given string.

Write a Python program to check whether the given string is a palindrome or not.

Write a program to reverse words in the given string.

Write a program to add diagonal elements in a matrix for a given list. The matrix is created using a multidimensional list.

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Let me know if you need anything else!

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Function and Modules

Answer the following:

1. What are functions? State their types and explain the syntax to define a function.

2. What is a lambda function?

Note: Upload the assignment in PDF format.

Answer the following:

1. What is the difference between the global and local scope of a variable?

2. What is a recursive function?

Note: Upload the assignment in PDF format.

Answer the following:

1. What are modules? Explain the need for modules.

2. State the different ways of importing a module.

Write a Python program to define a function named `unique\_list` to return a unique list by removing duplicate elements in the list.

Define a Python function `count\_upper` to count the number of uppercase alphabets in a string given to the function.

Object Oriented Programming

Answer the following:

1. What is a class in Python, and how is it used to create objects?

2. What are methods and attributes in Python classes?

3. What is encapsulation and how does it protect data within a class?

Note: Upload the assignment in PDF format.

Answer the following:

1. State the difference between a constructor and a destructor in Python.

2. State the difference between public and private access modifiers in Python.

3. Explain method overriding in Python inheritance.

4. What is abstraction in OOP and how does it simplify complex systems?

Write a program to create a class named `Product`. The `Product` class has the following attributes:

- \*\*Unique identification number\*\*: `id`

- \*\*Product Name\*\*: `name`

- \*\*Product Price\*\*: `price`

- \*\*Product Quantity\*\*: `qty`

Define the following methods and constructor:

1. Constructor to initialize the product ID.

2. Method to get product details as Name, Price, and Quantity.

3. Method to display a product.

**File Handling**

Answer the following:

1. What is a file? Explain the need for files in Python.

2. State and explain the different modes of opening a file in Python.

3. State the difference between write and append modes when opening a file in Python.

Note: Upload the assignment in PDF format.

Write Python programs for the following:

1. To count the number of lines in a text file.

2. To count the number of words in a text file.

Note: Upload the assignment in PDF format.

Write a Python program to access the list element for a given index. It must handle the exception of `IndexError` if the index to be accessed is not present in the list.

**Regular Expression & Web Scraping**

Write a Python program to search for numbers (0-9) of length between 2 and 3 in a given string.

Write a Python program that matches a word at the beginning of a string.

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**NUMPY**

Answer the following:

1. What is NumPy? Why should we use it?

2. Write the steps to create 2D and 3D arrays with output.

Note: Upload the assignment in PDF format.

Answer the following:

1. How can you identify the datatype of a given NumPy array? How do I change the data type of an array?

2. Create an array using NumPy. Then convert a numeric array to a categorical (text) array.

Note: Upload the answer in PDF format.

Create a one-dimensional NumPy array using a list object as shown in the input below. Expected output contains only the NumPy array to be displayed.

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If you need any additional information or examples, feel free to ask!

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**PANDAS**

Answer the following:

1. What are the most important features of the Pandas library?

2. Explain how to create a series from a dictionary in Pandas.

Note: Upload the assignment in PDF format.

Answer the following:

1. What are the different ways of creating a DataFrame in Pandas? Explain with examples.

2. How will you add a column to the existing DataFrames in Pandas?

Note: Upload the assignment in PDF format.

Solve the following:

Create a student DataFrame in Pandas with 10 rows and 5 columns as shown below.

| student\_id | name | roll\_no | percentage | city |

|------------|-------|---------|------------|----------|

| 1 | Harry | 35 | 99.7 | Pune |

| 2 | Mac | 45 | 97.6 | Delhi |

| ... | ... | ... | ... | ... |

| 10 | Rox | 50 | 65.7 | Bangalore |

Assume suitable data for all the records and perform the following operations using the Pandas library:

1. Display all the records from the student DataFrame.

2. Display only the first 5 records from the DataFrame.

3. Display only the last 3 records from the DataFrame.

Note:

1. Upload the assignment in PDF format with required code screenshots and the required output for that code.

2. Do not upload Jupyter Notebook.

Consider the following DataFrames:

| id | location | age | gender | is\_senior |

|----|----------|-----|--------|-----------|

| 0 | USA | 24 | M | FALSE |

| 1 | USA | 31 | F | TRUE |

| 2 | USA | 29 | F | FALSE |

| 3 | USA | 33 | M | FALSE |

| 4 | USA | 36 | F | TRUE |

| employee\_id | age | gender | popularity |

|-------------|-----|--------|------------|

| 0 | 24 | M | 6 |

| 1 | 31 | F | 4 |

| 2 | 29 | F | 0 |

| 3 | 33 | M | 7 |

| 4 | 36 | F | 6 |

Write code using the Pandas library to perform the following operations:

1. Merge the above two DataFrames.

2. Find the average popularity as per location.

Note:

1. Upload the assignment in PDF format with required code screenshots and the required output screenshots.

2. Do not upload Jupyter Notebook.

With respect to the given dataset, answer the following questions.

Dataset Link: [Netflix.csv](https://itv-contentbucket.s3.ap-south-1.amazonaws.com/Exams/AWP/pandas/Netflix.csv)

1. Make a dictionary that will contain the column names of the DataFrame as keys, check the datatype of the columns, and make those column values as values for those keys using Pandas.

2. Find out the number of duplicate rows in the DataFrame, and drop them. Going forward, we will use the de-duplicated DataFrame.

3. Using the de-duplicated DataFrame from the previous assignment question, check if all film titles have a unique release date. If not, take the oldest date.

4. Find out the missing value percentages of every column.

Note:

1. Upload the assignment in PDF format with required code screenshots and the required output screenshots.

2. Do not upload Jupyter Notebook.

With respect to the Netflix.csv dataset given below, solve the following questions using the Pandas library.

DataSet link: [Netflix.csv](https://itv-contentbucket.s3.ap-south-1.amazonaws.com/Exams/AWP/pandas/Netflix.csv)

1. A Box-office hit film means a film that has grossed $2,000,000. Find the number of Box-Office Hit Films.

2. A critically acclaimed movie means a film that has an IMDB rating of at least 8. Find the number of such films.

3. Find all critically acclaimed movies that were Box-Office Hits.

4. Find all critically acclaimed movies that have received at least 5 awards. Order them according to the number of awards.

5. Find all critically acclaimed TV series for the United States.

6. IMDB Rating is based on IMDB Votes. Find all films that, despite receiving at least 100 votes, did not receive any awards.

7. A popular film means it is released on Netflix platforms within 1 year. Find all films that were released on Netflix within 2 years of actual release.

8. Find all popular films that are available in Canada.

9. Find all movies that have a runtime of at least 1 hour.

10. Find all TV series that have been created in more than 1 language.

11. Find all movies that are available in Japan and fall into multiple genres.

12. A short summary means a summary of 50 characters. Find all films that have a long summary.

13. Total Rating of a film means the sum of Hidden Gem Score and IMDB Score. Find all films that have a combined total rating of at least 15.

14. A dramatic film means a film that is under the Drama genre. Find all dramatic TV series that came from Japan.

15. Find all films that were directed by a person whose name starts with a specific letter.

16. Find all films directed by Christopher Nolan whose name ends with "O."

17. Find all films that have been directed and written by Christopher Nolan.

18. Find the English movie name (title) which has an IMDB score of more than 8.5.

Note:

1. Upload the assignment in PDF format with required code screenshots and corresponding output screenshots.

2. Do not upload Jupyter Notebook.

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**MATploT**

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\*\*Introduction to Matplotlib\*\*

Answer the following:

1. How can you create a histogram in Matplotlib?

2. What is the purpose of the plt.subplots() function in Matplotlib?

3. How can you create a 3D plot in Matplotlib?

Note: Upload the assignment in PDF format.

Create a 1D numpy array using the list object shown in the input. Output contains a one-dimensional numpy array.

With reference to the given dataset, perform operations related to graphs using the Matplotlib library.

Dataset Link: [historical\_automobile\_sales.csv](https://itv-contentbucket.s3.ap-south-1.amazonaws.com/Exams/AWP/Matplotlib/historical\_automobile\_sales.csv)

1. Develop a line chart using the functionality of pandas to show how automobile sales fluctuate from year to year.

2. Plot different lines for categories of vehicle type and analyze the trend to answer the question: Is there a noticeable difference in sales trends between different vehicle types during recession periods?

3. Use the Matplotlib Library to create a visualization to compare the sales trend per vehicle type for a recession period with a non-recession period.

4. Use the functionality of Matplotlib to develop a scatter plot to identify the correlation between average vehicle price related to the sales volume during recessions.

5. Create a pie chart to display the portion of advertising expenditure of automobiles during recession and non-recession periods.

6. Create a heatmap to understand the correlation between IMDB Score, Hidden Gem Score, and IMDB Votes.

7. Plot lines for categories of every movie type and analyze how they have received IMDB Votes. Create a subplot to compare the same categories with IMDB Score.

8. Create 2 bar plots to understand movies and web series by languages in which they have been made.

Note:

1. Upload the assignment in PDF format with required code screenshots and corresponding output screenshots.

2. Do not upload Jupyter Notebook.

Using the Netflix.csv dataset given below, study the following graph and derive insights from that graph.

Dataset link: [Netflix.csv](https://itv-contentbucket.s3.ap-south-1.amazonaws.com/Exams/AWP/pandas/Netflix.csv)

Graph:

![Graph](https://itv-uploads.s3.ap-south-1.amazonaws.com/summernote\_images/166a350f8c9dbd.png)

Note:

Upload the assignment in PDF format.

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\*\*Introduction to Seaborn Library\*\*

Answer the following:

1. Can you differentiate between Matplotlib and Seaborn? Under what circumstances would you prefer to use Seaborn?

2. Explain the concept of a Seaborn ‘FacetGrid’. How would you utilize it in a complex data visualization task?

Note: Upload the assignment in PDF format.

Answer the following:

1. What advantages does Seaborn have over other plotting libraries when it comes to statistical visualization?

2. How do you deal with outliers in Seaborn? Please elaborate on some methods.

Note: Upload the assignment in PDF format.

\*\*Using the following dataset, plot a linear regression model.\*\*

| weight in lbs | height in inches |

|----------------|-------------------|

| 140 | 60 |

| 155 | 62 |

| 159 | 67 |

| 179 | 70 |

| 192 | 71 |

| 200 | 72 |

| 212 | 75 |

Note:

1. Upload the assignment in PDF format with required code screenshots and corresponding output screenshots.

2. Do not upload the Jupyter file.

\*\*With respect to the given dataset, solve the following.\*\*

Dataset Link: [historical\_automobile\_sales.csv](https://itv-contentbucket.s3.ap-south-1.amazonaws.com/Exams/AWP/Matplotlib/historical\_automobile\_sales.csv)

1. How does Seaborn relate to Matplotlib? (Strengths and weaknesses of each).

2. Using the Seaborn library, create a stacked histogram which will capture Automobile Sales for Vehicle Types.

3. Create a distribution plot (kernel density estimation plot) to understand the distribution of Price for different Cities.

4. Create a relation plot to visualize how along with the effect of Recession, GDP has changed with time (Year).

5. Prepare a Joint Plot to understand the relation between Price, Advertising\_Expenditure, and Automobile\_Sales.

6. Create a heat map to understand the correlation for GDP, Growth\_Rate, and Unemployment\_Rate.

7. Make a swarm categorical Plot to deduce the automotive sales for every Automobile Type within every calendar month.

8. Prepare a Violin Plot of how Consumer\_Confidence has changed with every progressing year.

9. Create a facet grid of Competition to view the histogram of Advertising\_Expenditure.

Note:

1. Upload the assignment in PDF format with required code screenshots and their corresponding output screenshots.

2. Do not upload the Jupyter notebook.

\*\*With the given Netflix.csv dataset, solve the following questions using the Seaborn library.\*\*

Dataset Link: [Netflix.csv](https://itv-contentbucket.s3.ap-south-1.amazonaws.com/Exams/AWP/pandas/Netflix.csv)

1. Create a heatmap using Seaborn to understand the correlation between IMDB Score, Hidden Gem Score, and IMDB Votes.

2. Plot lines for categories of every movie type and analyze how they have received IMDB Votes. Create a subplot to compare the same categories with IMDB Score (using Seaborn).

Note:

1. Upload the assignment in PDF format with required code screenshots and corresponding output screenshots.

2. Do not upload the Jupyter notebook.

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If you need assistance with specific questions or coding examples, let me know!