**Assignment 2 – PS07 - ESOPs**

*Read through this entire document very carefully before you start!*

**Problem Statement**

In a company, employee IDs are assigned as 5-digit numbers. The company has decided to reward a selected group of employees with **Employee Stock Ownership Plans (ESOPs)**. The eligible employees are selected based on the following criteria:

1. Their **Employee ID** must be a 5-digit number between **10000 and 99999**.

2. They divided employee IDs into 3 groups a. Group 1: The **Employee ID** must be **palindrome.**

b. Group 2: The **Employee ID** must be **divisible by 25**.

c. Group 3: The **sum of the digits of their Employee ID** must be **divisible by 5**.

3. The Employee ID whose **sum of the digits** must be **divisible by 5** and it must be **palindrome**, then they get **extra 10%** ESOPs as reward.

**Tasks:**

1. Find total count of number of **eligible employee IDs** based on the above criteria with respect to Groups 1, 2, & 3 along with their individual Group counts.

2. List the15(or more) eligible employee IDs with respect to Group 1, 2 & 3(select 5 **unique** eligible employee IDs from each group **randomly**).

3. Display 15 eligible employee IDs in Descending order.

4. How many employees are eligible for extra 10% ESOPs, list top 3 of them (Ascending order)?

5. If you were given a random employee ID, can you determine if they are eligible for the ESOPs based on the above conditions? Provide a solution for checking an individual employee ID.

**Requirements:**

1. Formulate an efficient algorithm to perform the above task using Divide and Conquer techniques.

2. Provide a description about the design used and the rationale behind the design choice.

3. Analyze the time complexity of the algorithm.

4. Implement the above problem statement using Python 3.7 and above.

**Sample Input**

Input should be taken in through a file called “inputPS07.txt”. Where the Employee ID must be a 5-digit number between **10000 and 99999**.

14258

***Note that the input/output data shown here is only for understanding and testing, the actual file used for evaluation will be different.***

**Sample Output**

1. Total eligible Employees count: ‘X+Y+Z value’

Group 1: ‘X’

Group 2: ‘Y’

Group 3: ‘Z’

2. (Just selecting 2 from each group for this example)

Group 1: Palindrome: 51515, 79797

Group 2: Divisible by 25: 10075, 10100

Group 3: sum divisible by 5: 41055, 54123 (ex: 4+1+0+5+5 = 15 which is divisible by 5)

3. In descending order: 79797, 54123, 51515, 41055, 10100, 10075

4. Count: ‘X value’

99999 (just showing as example) – It’s both palindrome and sum divisible by 5

5. 14258 (given in input file) – This employee Id is eligible for ESOPs belongs to group 3.

***Note that the input/output data shown here is only for understanding and testing, the actual file used for evaluation will be different.***

**Display the output in outputPS07.txt.**