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**Subject : Python Programming**

**Lab Practical**

Q.) Each employee has the following attributes:

(1) Employee ID: Unique identifier (integer).

(2) Department: The department the employee works in (string)

(3) Years of Experience: Number of years the employee has worked (float).

(4) Projects Completed: Number of projects completed successfully (integer).

(5) Client Satisfaction Rating: Average satisfaction rating provided by clients.

Question

(1) By carefully observing the above scenario, write a python program to perform the following tasks using NumPy Library, for a data of 20 employees.

(a) Create a structured array with the attributes described above. Populate the data with reasonable values.

(b) Write a function to filter and return the records of employees working in a specific department (eg. Engineering', 'HR', 'Marketing".)

(c) Identify the employee with the highest Client Satisfaction Rating.

(d) Calculate the average number of projects completed and the average years

*Code : (a)*

import numpy as np

employee\_dtype = np.dtype([

    ('EmployeeID', 'i4'),

    ('Department', 'U15'),

    ('YearsOfExperience', 'f4'),

    ('ProjectsCompleted', 'i4'),

    ('ClientSatisfactionRating', 'f4')

])

# Populate the data with reasonable values for 20 employees

employee\_data = np.array([

    (101, 'Engineering', 5.5, 12, 4.5),

    (102, 'HR', 3.2, 8, 3.9),

    (103, 'Marketing', 2.1, 9, 4.8),

    (104, 'Engineering', 7.6, 14, 4.3),

    (105, 'HR', 1.9, 6, 4.1),

    (106, 'Marketing', 5.2, 10, 4.9),

    (107, 'Engineering', 6.0, 15, 3.8),

    (108, 'Marketing', 3.5, 11, 4.6),

    (109, 'HR', 9.8, 17, 4.7),

    (110, 'Engineering', 2.3, 8, 4.2),

    (111, 'Marketing', 6.7, 13, 4.4),

    (112, 'HR', 4.6, 10, 3.7),

    (113, 'Engineering', 8.9, 16, 4.0),

    (114, 'Marketing', 3.0, 7, 4.1),

    (115, 'HR', 2.8, 9, 4.3),

    (116, 'Marketing', 7.4, 12, 4.9),

    (117, 'Engineering', 4.2, 11, 3.9),

    (118, 'HR', 5.5, 14, 4.6),

    (119, 'Marketing', 6.2, 13, 4.4),

    (120, 'Engineering', 3.1, 7, 3.5)

], dtype=employee\_dtype)

*Code : (b)*

def filter\_by\_department(data, department\_name):

    filtered\_data = data[data['Department'] == department\_name]

    print("Employees in department:", department\_name)

    for employee in filtered\_data:

        print(employee)

filter\_by\_department(employee\_data, 'HR')

*Output:*

Employees in department: HR

(102, 'HR', 3.2, 8, 3.9)

(105, 'HR', 1.9, 6, 4.1)

(109, 'HR', 9.8, 17, 4.7)

(112, 'HR', 4.6, 10, 3.7)

(115, 'HR', 2.8, 9, 4.3)

(118, 'HR', 5.5, 14, 4.6)

*Code : (c)*

def highest\_satisfaction(data):

    max\_satisfaction\_index = np.argmax(data['ClientSatisfactionRating'])

    print("Employee with highest client satisfaction rating is:",

          data[max\_satisfaction\_index])

highest\_satisfaction(employee\_data)

*Output:*

Employee with highest client satisfaction rating is: (106, 'Marketing', 5.2, 10, 4.9)

*Code : (d)*

def calculate\_averages(data):

    avg\_projects = np.mean(data['ProjectsCompleted'])

    avg\_experience = np.mean(data['YearsOfExperience'])

    print("Average number of projects completed:", avg\_projects)

    print("Average years of experience:", avg\_experience)

calculate\_averages(employee\_data)

*Output:*

Average number of projects completed: 11.1

Average years of experience: 4.9749994

*Code : (e)*

def less\_than\_two\_years\_experience(data):

    inexperienced\_employees = data[data['YearsOfExperience'] < 2]

    print("Employees with less than 2 years of experience:")

    for employee in inexperienced\_employees:

        print(employee)

less\_than\_two\_years\_experience(employee\_data)

*Output:*

Employees with less than 2 years of experience:

(105, 'HR', 1.9, 6, 4.1)