PYTHON PROGRAMMING

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Question:

Scenario overview:
You are tasked with analyzing a dataset of employee performance in different departments of a company. 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 (e.g., '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 of experience for the entire dataset.
(e) Identify all employees who have less than 2 years of experience.

Code:

```
import numpy as np

employee_dtype = np.dtype([
   ('Employee ID', np.int32),
   ('Department', 'U20'),
   ('Years of Experience', np.float32),
   ('Projects Completed', np.int32),
   ('Client Satisfaction Rating', np.float32)
])

# Generate data for 20 employees
np.random.seed(0)
departments = ['Engineering', 'HR', 'Marketing', 'Sales']
data = np.array([
```

```
  (i+1, np.random.choice(departments), np.random.uniform(0, 15), np.random.randint(1, 21),
np.random.uniform(1.0, 5.0))
  for i in range(20)
], dtype=employee_dtype)

# (a) Function to display the structured array
def display_employees(data):
  print("Employee Data:\n", data)

# (b) Function to filter employees by department
def filter_by_department(data, department):
  return data[data['Department'] == department]

# (c) Function to find the employee with the highest Client Satisfaction Rating
def highest_client_satisfaction(data):
  return data[np.argmax(data['Client Satisfaction Rating'])]

# (d) Function to calculate average Projects Completed and Years of Experience
def calculate_averages(data):
  avg_projects = np.mean(data['Projects Completed'])
  avg_experience = np.mean(data['Years of Experience'])
  return avg_projects, avg_experience

# (e) Function to find employees with less than 2 years of experience
def less_than_two_years_experience(data):
  return data[data['Years of Experience'] < 2]

# Display employee data
display_employees(data)

# Filter employees working in 'Engineering' department
eng_employees = filter_by_department(data, 'Engineering')
print("\nEmployees in Engineering department:\n", eng_employees)

# Employee with the highest client satisfaction rating
top_employee = highest_client_satisfaction(data)
print("\nEmployee with the highest Client Satisfaction Rating:\n", top_employee)

# Average number of projects completed and years of experience
avg_projects, avg_experience = calculate_averages(data)
print(f"\nAverage Projects Completed: {avg_projects:.2f}, Average Years of Experience:
{avg_experience:.2f}")

# Employees with less than 2 years of experience
new_employees = less_than_two_years_experience(data)
```

```
print("\nEmployees with less than 2 years of experience:\n", new_employees)
```

Output:

```
Employee Data:
 [( 1, 'Engineering',  8.89267  ,  1, 3.4110534)
 ( 2, 'Sales', 12.708776 , 20, 3.5835764)
 ( 3, 'Engineering',  4.463019 , 13, 2.533766 )
 ( 4, 'Marketing', 12.182531 , 15, 3.2721782)
 ( 5, 'HR', 12.541182 ,  9, 1.3485172)
 ( 6, 'Sales',  5.523623 ,  6, 4.112627 )
 ( 7, 'Sales', 13.051309 ,  4, 4.1966343)
 ( 8, 'Sales',  7.8071623, 20, 1.4730977)
 ( 9, 'Engineering',  8.730297 ,  1, 3.0873933)
 (10, 'Engineering',  7.1040063, 12, 3.9476726)
 (11, 'Engineering',  8.526509 ,  1, 2.296564 )
 (12, 'HR',  9.181436 , 18, 4.7749925)
 (13, 'HR',  6.74925  ,  2, 3.7905247)
 (14, 'HR', 14.547136 ,  7, 3.6825514)
 (15, 'Marketing',  5.3722825,  1, 2.2617135)
 (16, 'HR',  4.8757086, 11, 2.754406 )
 (17, 'Engineering', 14.384239 , 16, 1.835507 )
 (18, 'Sales', 14.929494 ,  9, 2.6574743)
 (19, 'Engineering',  3.666384 , 16, 1.4415005)
 (20, 'HR',  4.758026 ,  6, 1.7863294)]

Employees in Engineering department:
 [( 1, 'Engineering',  8.89267  ,  1, 3.4110534)
 ( 3, 'Engineering',  4.463019 , 13, 2.533766 )
...
Average Projects Completed: 9.40, Average Years of Experience: 9.00

Employees with less than 2 years of experience:
 []
```