



Experiment 6

1. **Aim:** Develop Java programs using lambda expressions and stream operations for sorting, filtering, and processing large datasets efficiently.

2. Implementation/Code:

```
a. import java.util.*;

class Employee {
    String name;    int
    age;    double salary;

    Employee(String name, int age, double salary)
    {
        this.name = name;    this.age = age;
        this.salary = salary;
    }

    @Override    public String toString() {    return
    name + " - Age: " + age + ", Salary: " + salary;
    }
}

public class EmployeeSort {    public static void
main(String[] args) {    List<Employee>
employees = Arrays.asList(    new
Employee("Ayush", 20, 90000),    new
Employee("Vinay", 22, 100000),

        new Employee("Prakul", 23, 70000)
    );
    employees.sort(Comparator.comparing(emp -> emp.name));
    System.out.println("Sorted by Name: " + employees);
    employees.sort(Comparator.comparingInt(emp -> emp.age));
    System.out.println("Sorted by Age: " + employees);
    employees.sort(Comparator.comparingDouble(emp -> emp.salary));
    System.out.println("Sorted by Salary: " + employees);
}
```



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```
}
```

b. import java.util.*; import

```
java.util.stream.Collectors; class Student {  
    private String name;    private double marks;  
    public Student(String name, double marks) {  
        this.name = name;    this.marks = marks;  
    }
```

```
    public String getName() {  
        return name;  
    }
```

```
    public double getMarks() {  
        return marks;  
    }
```

```
}
```

```
public class StudentFilter {    public  
    static void main(String[] args) {  
        List<Student> students = List.of(  
            new Student("Ayush", 85),        new  
            Student("Rajeev", 70),        new  
            Student("Vinay", 90),        new  
            Student("David", 60),        new  
            Student("Prakul", 80)  
        );
```

```
        List<String> topStudents = students.stream()  
            .filter(s -> s.getMarks() > 75)  
            .sorted(Comparator.comparingDouble(Student::getMarks).reversed())  
            .map(Student::getName)  
            .collect(Collectors.toList());
```

```
        System.out.println("Top Students: " + topStudents);
```

```
    }  
}
```



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```
c. import java.util.*; import java.util.stream.Collectors; class
Product {    String name;    String category;    double price;
public Product(String name, String category, double price) {
this.name = name;        this.category = category;
this.price = price;
    }
    @Override    public String
toString() {        return name + " ($"
+ price + ")";
    }
}
public class ProductProcessor {    public static void
main(String[] args) {        List<Product> products
= Arrays.asList(            new Product("Laptop",
"Electronics", 1200),            new Product("Phone",
"Electronics", 800),            new Product("TV",
"Electronics", 1500),            new Product("Shirt",
"Clothing", 50),            new Product("Jeans",
"Clothing", 70),            new Product("Blender",
"Appliances", 200),            new Product("Toaster",
"Appliances", 100)
        );

        Map<String, List<Product>> productsByCategory = products.stream()
            .collect(Collectors.groupingBy(p -> p.category));
        System.out.println("Products grouped by category:");
        productsByCategory.forEach((category, productList) ->
            System.out.println(category + ": " + productList));
        Map<String, Optional<Product>> mostExpensiveByCategory = products.stream()
            .collect(Collectors.groupingBy(
                p -> p.category,
                Collectors.maxBy(Comparator.comparingDouble(p -> p.price))
            ));
```



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```
System.out.println("\nMost expensive product in each category:");
mostExpensiveByCategory.forEach((category, product) ->
System.out.println(category + ": " + product.orElse(null)));    double
averagePrice = products.stream()
    .mapToDouble(p -> p.price)
    .average()
    .orElse(0);
System.out.println("\nAverage price of all products: $" + averagePrice);
}
}
```

4. Output:

```
Sorted by Name: [Ayush - Age: 20, Salary: 90000.0, Prakul - Age: 23, Salary: 70000.0, Vinay - Age: 22, Salary: 100000.0]
Sorted by Age: [Ayush - Age: 20, Salary: 90000.0, Vinay - Age: 22, Salary: 100000.0, Prakul - Age: 23, Salary: 70000.0]
Sorted by Salary: [Prakul - Age: 23, Salary: 70000.0, Ayush - Age: 20, Salary: 90000.0, Vinay - Age: 22, Salary: 100000.0]
```

```
Top Students: [Vinay, Ayush, Prakul]
```



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```
Products grouped by category:  
Appliances: [Blender (200.0), Toaster (100.0)]  
Clothing: [Shirt (50.0), Jeans (70.0)]  
Electronics: [Laptop (1200.0), Phone (800.0), TV (1500.0)]  
  
Most expensive product in each category:  
Appliances: Blender (200.0)  
Clothing: Jeans (70.0)  
Electronics: TV (1500.0)  
  
Average price of all products: $560.0
```