Problem 2: E-commerce Product Catalog ----------

```java
// Approach: Implement a Product entity, use Spring Data JPA for CRUD, and add custom search/filter
methods.

@Entity
public class Product {
    @Id
    @GeneratedValue(strategy = GenerationType.IDENTITY)
    private Long productId;
    private String name;
    private String description;
    private double price;
    private String category;
    private int stockQuantity;

}


public interface ProductRepository extends JpaRepository<Product, Long> {
    List<Product> findByCategory(String category);
    List<Product> findByPriceBetween(double min, double max);
    List<Product> findByNameContainingIgnoreCase(String name);
}


@RestController
@RequestMapping("/products")
public class ProductController {
    @Autowired
    private ProductService service;

    @PostMapping
    @PreAuthorize("hasRole('ADMIN')")
    public Product add(@RequestBody Product p) {
        return service.save(p);
    }

    @GetMapping("/search")
    public List<Product> search(@RequestParam String name) {
        return service.searchByName(name);
    }

    @GetMapping("/filter")
    public List<Product> filter(@RequestParam String category, @RequestParam double min,
@RequestParam double max) {
        return service.filterByCategoryAndPrice(category, min, max);
    }
}
```