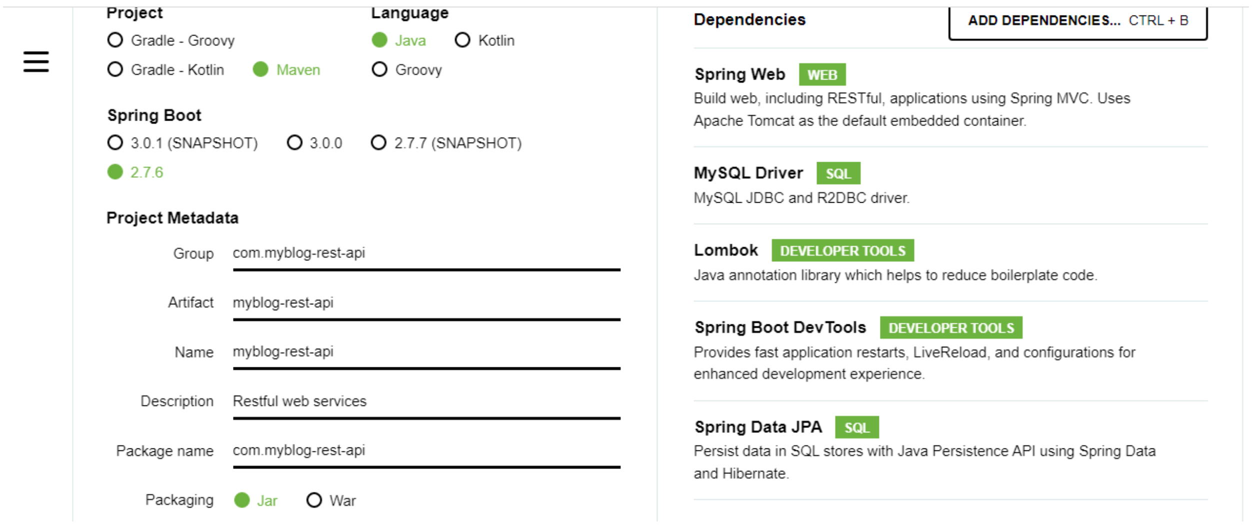
Developing restful web services in spring boot

1. Create Spring boot project with following dependencies:



Project
- ○ Gradle - Groovy
- ○ Gradle - Kotlin
- ● Maven

Language
- ● Java
- ○ Kotlin
- ○ Groovy

Spring Boot
- ○ 3.0.1 (SNAPSHOT)
- ○ 3.0.0
- ○ 2.7.7 (SNAPSHOT)
- ● 2.7.6

Project Metadata

Group	com.myblog-rest-api
Artifact	myblog-rest-api
Name	myblog-rest-api
Description	Restful web services
Package name	com.myblog-rest-api
Packaging	● Jar ○ War

Dependencies ADD DEPENDENCIES... CTRL + B

Spring Web WEB
Build web, including RESTful, applications using Spring MVC. Uses Apache Tomcat as the default embedded container.

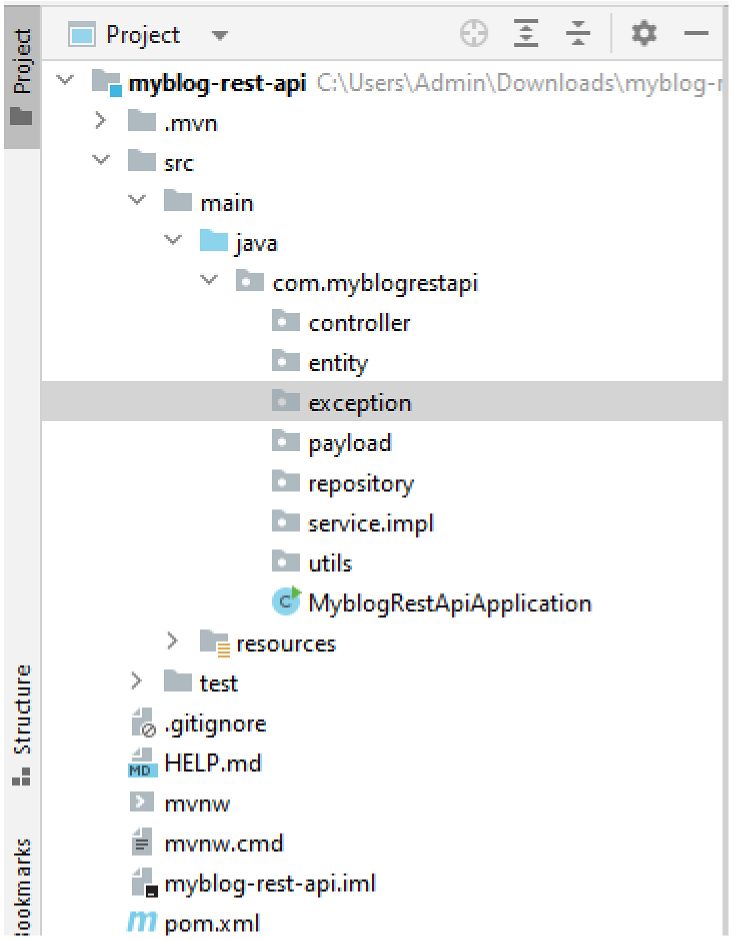
MySQL Driver SQL
MySQL JDBC and R2DBC driver.

Lombok DEVELOPER TOOLS
Java annotation library which helps to reduce boilerplate code.

Spring Boot DevTools DEVELOPER TOOLS
Provides fast application restarts, LiveReload, and configurations for enhanced development experience.

Spring Data JPA SQL
Persist data in SQL stores with Java Persistence API using Spring Data and Hibernate.

2. Create Following Project Structure in IntelliJ Idea



```
Project
myblog-rest-api C:\Users\Admin\Downloads\myblog-r
  .mvn
  src
    main
      java
        com.myblogrestapi
          controller
          entity
          exception
          payload
          repository
          service.impl
          utils
          MyblogRestApiApplication
      resources
    test
  .gitignore
  HELP.md
  mvnw
  mvnw.cmd
  myblog-rest-api.iml
  pom.xml
```

Step 3: Create POST Entity Class

```
import lombok.AllArgsConstructor;
import lombok.Data;
import lombok.NoArgsConstructor;

import javax.persistence.*;

@Data
@AllArgsConstructor
@NoArgsConstructor

@Entity
@Table
(
 name = "posts", uniqueConstraints = {@UniqueConstraint(columnNames = {"title"})}
)
public class Post {

    @Id
    @GeneratedValue( strategy = GenerationType.IDENTITY)    )
    private Long id;

    @Column(name = "title", nullable = false)
    private String title;

    @Column(name = "description", nullable = false)
    private String description;

    @Column(name = "content", nullable = false)
    private String content;
}
```

Step 3: Update application.properties file

```
spring.datasource.url =
jdbc:mysql://localhost:3306/myblog?useSSL=false&serverTimezone=UTC
```

```
spring.datasource.username = root
spring.datasource.password = root

# hibernate properties
spring.jpa.properties.hibernate.dialect = org.hibernate.dialect.MySQL5InnoDBDialect

# Hibernate ddl auto
spring.jpa.hibernate.ddl-auto = update
```

Step 4: Create Post Repository Layer:

```
import org.springframework.data.jpa.repository.JpaRepository;

public interface PostRepository extends JpaRepository<Post, Long> {

}
```

Step 5: Create Payload PostDto class

```
import lombok.Data;

@Data
public class PostDto {
   private long id;
   private String title;
   private String description;
   private String content;
}
```

Step 6: Create PostService Interface

```
import java.util.List;

public interface PostService {
   PostDto createPost(PostDto postDto);
}
```

Step 7: Create PostServiceImpl class

```
@Service
public class PostServiceImpl  implements PostService {

    private PostRepository postRepository;

    public PostServiceImpl(PostRepository postRepository) {
        this.postRepository = postRepository;
    }

    @Override
    public PostDto createPost(PostDto postDto) {

        // convert DTO to entity
        Post post = mapToEntity(postDto);
        Post newPost = postRepository.save(post);

        // convert entity to DTO
        PostDto postResponse = mapToDTO(newPost);
        return postResponse;
    }

// convert Entity into DTO
    private PostDto mapToDTO(Post post){
        PostDto postDto = new PostDto();
        postDto.setId(post.getId());
        postDto.setTitle(post.getTitle());
        postDto.setDescription(post.getDescription());
        postDto.setContent(post.getContent());
        return postDto;
    }

    // convert DTO to entity
    private Post mapToEntity(PostDto postDto){
        Post post = new Post();
        post.setTitle(postDto.getTitle());
        post.setDescription(postDto.getDescription());
        post.setContent(postDto.getContent());
        return post;
    }
}
```

Step 8: Create PostController Class:

```
@RestController
@RequestMapping("/api/posts")
public class PostController {

    private PostService postService;

    public PostController(PostService postService) {
        this.postService = postService;
    }

    // create blog post rest api
    @PostMapping
    public ResponseEntity<PostDto> createPost(@RequestBody PostDto postDto){
     return new ResponseEntity<>(postService.createPost(postDto), HttpStatus.CREATED);
    }
}
```

Step 9: Create Exception class

```
import org.springframework.http.HttpStatus;
import org.springframework.web.bind.annotation.ResponseStatus;

@ResponseStatus(value = HttpStatus.NOT_FOUND)
public class ResourceNotFoundException extends RuntimeException{

    private String resourceName;
    private String fieldName;
    private long fieldValue;
public ResourceNotFoundException(String resourceName, String fieldName, long fieldValue) {
        super(String.format("%s not found with %s : '%s'", resourceName, fieldName, 
        fieldValue)); // Post not found with id : 1
            this.resourceName = resourceName;
            this.fieldName = fieldName;
            this.fieldValue = fieldValue;
        }

        public String getResourceName() {
            return resourceName;
        }

        public String getFieldName() {
            return fieldName;
        }

        public long getFieldValue() {
            return fieldValue;
        }
    }
```

Step 10: Create GetMapping in controller layer:

```
import java.util.List;

@RestController
@RequestMapping("/api/posts")
public class PostController {

    private PostService postService;

    public PostController(PostService postService) {
        this.postService = postService;
    }

    // create blog post rest api
    @PostMapping
    public ResponseEntity<PostDto> createPost(@RequestBody PostDto postDto){
        return new ResponseEntity<>(postService.createPost(postDto),
HttpStatus.CREATED);
    }

    // get all posts rest api
    @GetMapping
    public List<PostDto> getAllPosts(){
        return postService.getAllPosts();
    }

}
```

Step 11: Update PostService interface:

```
import com.springboot.blog.payload.PostDto;

import java.util.List;

public interface PostService {
    PostDto createPost(PostDto postDto);

    List<PostDto> getAllPosts();

}
```

Step 12: Update PostServiceImpl class:

```
import com.springboot.blog.entity.Post;
import com.springboot.blog.exception.ResourceNotFoundException;
import com.springboot.blog.payload.PostDto;
import com.springboot.blog.repository.PostRepository;
import com.springboot.blog.service.PostService;
import org.springframework.beans.factory.annotation.Autowired;
import org.springframework.stereotype.Service;
```

```java
import java.util.List;
import java.util.stream.Collectors;

@Service
public class PostServiceImpl implements PostService {

    private PostRepository postRepository;

    public PostServiceImpl(PostRepository postRepository) {
        this.postRepository = postRepository;
    }

    @Override
    public PostDto createPost(PostDto postDto) {

        // convert DTO to entity
        Post post = mapToEntity(postDto);
        Post newPost = postRepository.save(post);

        // convert entity to DTO
        PostDto postResponse = mapToDTO(newPost);
        return postResponse;
    }

    @Override
    public List<PostDto> getAllPosts() {
        List<Post> posts = postRepository.findAll();
        return posts.stream().map(post -> mapToDTO(post)).collect(Collectors.toList());
    }


    // convert Entity into DTO
    private PostDto mapToDTO(Post post){
        PostDto postDto = new PostDto();
        postDto.setId(post.getId());
        postDto.setTitle(post.getTitle());
        postDto.setDescription(post.getDescription());
        postDto.setContent(post.getContent());
        return postDto;
    }

    // convert DTO to entity
    private Post mapToEntity(PostDto postDto){
        Post post = new Post();
        post.setTitle(postDto.getTitle());
        post.setDescription(postDto.getDescription());
        post.setContent(postDto.getContent());
        return post;
    }
}
```

Step 13: Create DeleteMapping By Id:

```
import com.springboot.blog.payload.PostDto;
import com.springboot.blog.service.PostService;
import org.springframework.http.HttpStatus;
import org.springframework.http.ResponseEntity;
import org.springframework.web.bind.annotation.*;

import java.util.List;

@RestController
@RequestMapping("/api/posts")
public class PostController {

    private PostService postService;

    public PostController(PostService postService) {
        this.postService = postService;
    }

    // create blog post rest api
    @PostMapping
    public ResponseEntity<PostDto> createPost(@RequestBody PostDto postDto){
        return new ResponseEntity<>(postService.createPost(postDto),
HttpStatus.CREATED);
```

```
    }

    // get all posts rest api
    @GetMapping
    public List<PostDto> getAllPosts(){
        return postService.getAllPosts();
    }

    // get post by id
    @GetMapping("/{id}")
    public ResponseEntity<PostDto> getPostById(@PathVariable(name = "id") long id){
        return ResponseEntity.ok(postService.getPostById(id));
    }

}
```

Step 14: Update PostServiceImpl interface:

```
import com.springboot.blog.payload.PostDto;

import java.util.List;

public interface PostService {
    PostDto createPost(PostDto postDto);

    List<PostDto> getAllPosts();

    PostDto getPostById(long id);

}
```

Step 15: Update PostServiceImpl class

```
import com.springboot.blog.entity.Post;
import com.springboot.blog.exception.ResourceNotFoundException;
import com.springboot.blog.payload.PostDto;
import com.springboot.blog.repository.PostRepository;
import com.springboot.blog.service.PostService;
import org.springframework.beans.factory.annotation.Autowired;
import org.springframework.stereotype.Service;

import java.util.List;
import java.util.stream.Collectors;

@Service
public class PostServiceImpl implements PostService {

    private PostRepository postRepository;

    public PostServiceImpl(PostRepository postRepository) {
        this.postRepository = postRepository;
    }

    @Override
    public PostDto createPost(PostDto postDto) {

        // convert DTO to entity
        Post post = mapToEntity(postDto);
        Post newPost = postRepository.save(post);

        // convert entity to DTO
        PostDto postResponse = mapToDTO(newPost);
        return postResponse;
    }

    @Override
    public List<PostDto> getAllPosts() {
        List<Post> posts = postRepository.findAll();
        return posts.stream().map(post -> mapToDTO(post)).collect(Collectors.toList());
    }

    @Override
    public PostDto getPostById(long id) {
        Post post = postRepository.findById(id).orElseThrow(() -> new
ResourceNotFoundException("Post", "id", id));
        return mapToDTO(post);
    }


    // convert Entity into DTO
    private PostDto mapToDTO(Post post){
        PostDto postDto = new PostDto();
        postDto.setId(post.getId());
        postDto.setTitle(post.getTitle());
        postDto.setDescription(post.getDescription());
        postDto.setContent(post.getContent());
        return postDto;
    }

    // convert DTO to entity
    private Post mapToEntity(PostDto postDto){
        Post post = new Post();
        post.setTitle(postDto.getTitle());
        post.setDescription(postDto.getDescription());
        post.setContent(postDto.getContent());
        return post;
    }
}
```

Step 16: Create UpdateMapping Controller

```
import com.springboot.blog.payload.PostDto;
import com.springboot.blog.service.PostService;
import org.springframework.http.HttpStatus;
import org.springframework.http.ResponseEntity;
import org.springframework.web.bind.annotation.*;

import java.util.List;

@RestController
@RequestMapping("/api/posts")
```

```
public class PostController {

    private PostService postService;

    public PostController(PostService postService) {
        this.postService = postService;
    }

    // create blog post rest api
    @PostMapping
    public ResponseEntity<PostDto> createPost(@RequestBody PostDto postDto){
        return new ResponseEntity<>(postService.createPost(postDto),
HttpStatus.CREATED);
    }

    // get all posts rest api
    @GetMapping
    public List<PostDto> getAllPosts(){
        return postService.getAllPosts();
    }

    // get post by id
    @GetMapping("/{id}")
    public ResponseEntity<PostDto> getPostById(@PathVariable(name = "id") long id){
        return ResponseEntity.ok(postService.getPostById(id));
    }

    // update post by id rest api
    @PutMapping("/{id}")
    public ResponseEntity<PostDto> updatePost(@RequestBody PostDto postDto,
@PathVariable(name = "id") long id){

       PostDto postResponse = postService.updatePost(postDto, id);

       return new ResponseEntity<>(postResponse, HttpStatus.OK);
    }

}
```

Step 17: Update PostService Interface:

```
import com.springboot.blog.payload.PostDto;

import java.util.List;

public interface PostService {
    PostDto createPost(PostDto postDto);

    List<PostDto> getAllPosts();

    PostDto getPostById(long id);

    PostDto updatePost(PostDto postDto, long id);
}
```

Step 18: Update PostServiceImpl class:

```
import com.springboot.blog.entity.Post;
import com.springboot.blog.exception.ResourceNotFoundException;
import com.springboot.blog.payload.PostDto;
import com.springboot.blog.repository.PostRepository;
import com.springboot.blog.service.PostService;
import org.springframework.beans.factory.annotation.Autowired;
import org.springframework.stereotype.Service;

import java.util.List;
import java.util.stream.Collectors;

@Service
public class PostServiceImpl implements PostService {

    private PostRepository postRepository;

    public PostServiceImpl(PostRepository postRepository) {
        this.postRepository = postRepository;
    }

    @Override
    public PostDto createPost(PostDto postDto) {

        // convert DTO to entity
        Post post = mapToEntity(postDto);
        Post newPost = postRepository.save(post);

        // convert entity to DTO
        PostDto postResponse = mapToDTO(newPost);
        return postResponse;
    }

    @Override
    public List<PostDto> getAllPosts() {
        List<Post> posts = postRepository.findAll();
        return posts.stream().map(post -> mapToDTO(post)).collect(Collectors.toList());
    }

    @Override
    public PostDto getPostById(long id) {
        Post post = postRepository.findById(id).orElseThrow(() -> new
ResourceNotFoundException("Post", "id", id));
        return mapToDTO(post);
    }

    @Override
    public PostDto updatePost(PostDto postDto, long id) {
        // get post by id from the database
        Post post = postRepository.findById(id).orElseThrow(() -> new
ResourceNotFoundException("Post", "id", id));

        post.setTitle(postDto.getTitle());
        post.setDescription(postDto.getDescription());
        post.setContent(postDto.getContent());

        Post updatedPost = postRepository.save(post);
        return mapToDTO(updatedPost);
    }


    // convert Entity into DTO
    private PostDto mapToDTO(Post post){
        PostDto postDto = new PostDto();
        postDto.setId(post.getId());
        postDto.setTitle(post.getTitle());
        postDto.setDescription(post.getDescription());
        postDto.setContent(post.getContent());
        return postDto;
    }

    // convert DTO to entity
    private Post mapToEntity(PostDto postDto){
        Post post = new Post();
        post.setTitle(postDto.getTitle());
        post.setDescription(postDto.getDescription());
        post.setContent(postDto.getContent());
        return post;
    }
}
```

Step 19: Create DeleteMapping controller:

```
import com.springboot.blog.payload.PostDto;
import com.springboot.blog.service.PostService;
import org.springframework.http.HttpStatus;
import org.springframework.http.ResponseEntity;
import org.springframework.web.bind.annotation.*;

import java.util.List;

@RestController
@RequestMapping("/api/posts")
public class PostController {
    private PostService postService;

    public PostController(PostService postService) {
        this.postService = postService;
    }

    // create blog post rest api
    @PostMapping
    public ResponseEntity<PostDto> createPost(@RequestBody PostDto postDto){
        return new ResponseEntity<>(postService.createPost(postDto),
HttpStatus.CREATED);
    }

    // get all posts rest api
    @GetMapping
    public List<PostDto> getAllPosts(){
        return postService.getAllPosts();
    }

    // get post by id
    @GetMapping("/{id}")
    public ResponseEntity<PostDto> getPostById(@PathVariable(name = "id") long id){
        return ResponseEntity.ok(postService.getPostById(id));
    }

    // update post by id rest api
    @PutMapping("/{id}")
    public ResponseEntity<PostDto> updatePost(@RequestBody PostDto postDto,
@PathVariable(name = "id") long id){

       PostDto postResponse = postService.updatePost(postDto, id);

       return new ResponseEntity<>(postResponse, HttpStatus.OK);
    }

    // delete post rest api
    @DeleteMapping("/{id}")
    public ResponseEntity<String> deletePost(@PathVariable(name = "id") long id){
        postService.deletePostById(id);

        return new ResponseEntity<>("Post entity deleted successfully.", HttpStatus.OK);
    }
}
```

Step 20: Update PostService Interface:

```
import com.springboot.blog.payload.PostDto;

import java.util.List;

public interface PostService {
    PostDto createPost(PostDto postDto);

    List<PostDto> getAllPosts();

    PostDto getPostById(long id);

    PostDto updatePost(PostDto postDto, long id);

    void deletePostById(long id);
}
```

Step 21: Create PostServiceImpl class:

```
import com.springboot.blog.entity.Post;
import com.springboot.blog.exception.ResourceNotFoundException;
import com.springboot.blog.payload.PostDto;
import com.springboot.blog.repository.PostRepository;
import com.springboot.blog.service.PostService;
import org.springframework.beans.factory.annotation.Autowired;
import org.springframework.stereotype.Service;

import java.util.List;
import java.util.stream.Collectors;

@Service
public class PostServiceImpl implements PostService {

    private PostRepository postRepository;

    public PostServiceImpl(PostRepository postRepository) {
        this.postRepository = postRepository;
    }

    @Override
    public PostDto createPost(PostDto postDto) {

        // convert DTO to entity
        Post post = mapToEntity(postDto);
        Post newPost = postRepository.save(post);

        // convert entity to DTO
        PostDto postResponse = mapToDTO(newPost);
        return postResponse;
    }

    @Override
    public List<PostDto> getAllPosts() {
        List<Post> posts = postRepository.findAll();
        return posts.stream().map(post -> mapToDTO(post)).collect(Collectors.toList());
    }

    @Override
    public PostDto getPostById(long id) {
        Post post = postRepository.findById(id).orElseThrow(() -> new
ResourceNotFoundException("Post", "id", id));
        return mapToDTO(post);
    }

    @Override
    public PostDto updatePost(PostDto postDto, long id) {
        // get post by id from the database
        Post post = postRepository.findById(id).orElseThrow(() -> new
ResourceNotFoundException("Post", "id", id));

        post.setTitle(postDto.getTitle());
        post.setDescription(postDto.getDescription());
        post.setContent(postDto.getContent());

        Post updatedPost = postRepository.save(post);
        return mapToDTO(updatedPost);
    }

    @Override
    public void deletePostById(long id) {
        // get post by id from the database
        Post post = postRepository.findById(id).orElseThrow(() -> new
ResourceNotFoundException("Post", "id", id));
        postRepository.delete(post);
    }

    // convert Entity into DTO
    private PostDto mapToDTO(Post post){
        PostDto postDto = new PostDto();
        postDto.setId(post.getId());
        postDto.setTitle(post.getTitle());
        postDto.setDescription(post.getDescription());
        postDto.setContent(post.getContent());
        return postDto;
    }

    // convert DTO to entity
    private Post mapToEntity(PostDto postDto){
        Post post = new Post();
        post.setTitle(postDto.getTitle());
        post.setDescription(postDto.getDescription());
        post.setContent(postDto.getContent());
        return post;
    }
```

```
}
```

Pagination and Sorting in rest API

Step 1: Update Post Controller Class:

```
import com.springboot.blog.payload.PostDto;
import com.springboot.blog.payload.PostResponse;
import com.springboot.blog.service.PostService;
import org.springframework.http.HttpStatus;
import org.springframework.http.ResponseEntity;
import org.springframework.web.bind.annotation.*;

import java.util.List;

@RestController
@RequestMapping("/api/posts")
public class PostController {

   private PostService postService;

   public PostController(PostService postService) {
      this.postService = postService;
   }

   // create blog post rest api
   @PostMapping
   public ResponseEntity<PostDto> createPost(@RequestBody PostDto postDto){
      return new ResponseEntity<>(postService.createPost(postDto),
HttpStatus.CREATED);
   }

   // get all posts rest api
   @GetMapping
   public PostResponse getAllPosts(
         @RequestParam(value = "pageNo", defaultValue = "0", required = false)  int
pageNo,
@RequestParam(value = "pageSize", defaultValue = "10", required = false) int
pageSize,
@RequestParam(value = "sortBy", defaultValue = "id", required = false) String sortBy,
 @RequestParam(value = "sortDir", defaultValue = "asc", required = false) String
sortDir
    ){
        return postService.getAllPosts(pageNo, pageSize, sortBy, sortDir);
    }

    // get post by id
    @GetMapping("/{id}")
    public ResponseEntity<PostDto> getPostById(@PathVariable(name = "id") long id){
        return ResponseEntity.ok(postService.getPostById(id));
    }

    // update post by id rest api
    @PutMapping("/{id}")
    public ResponseEntity<PostDto> updatePost(@RequestBody PostDto postDto,
@PathVariable(name = "id") long id){

       PostDto postResponse = postService.updatePost(postDto, id);

       return new ResponseEntity<>(postResponse, HttpStatus.OK);
    }

    // delete post rest api
    @DeleteMapping("/{id}")
    public ResponseEntity<String> deletePost(@PathVariable(name = "id") long id){

        postService.deletePostById(id);

        return new ResponseEntity<>("Post entity deleted successfully.", HttpStatus.OK);
    }
}
```

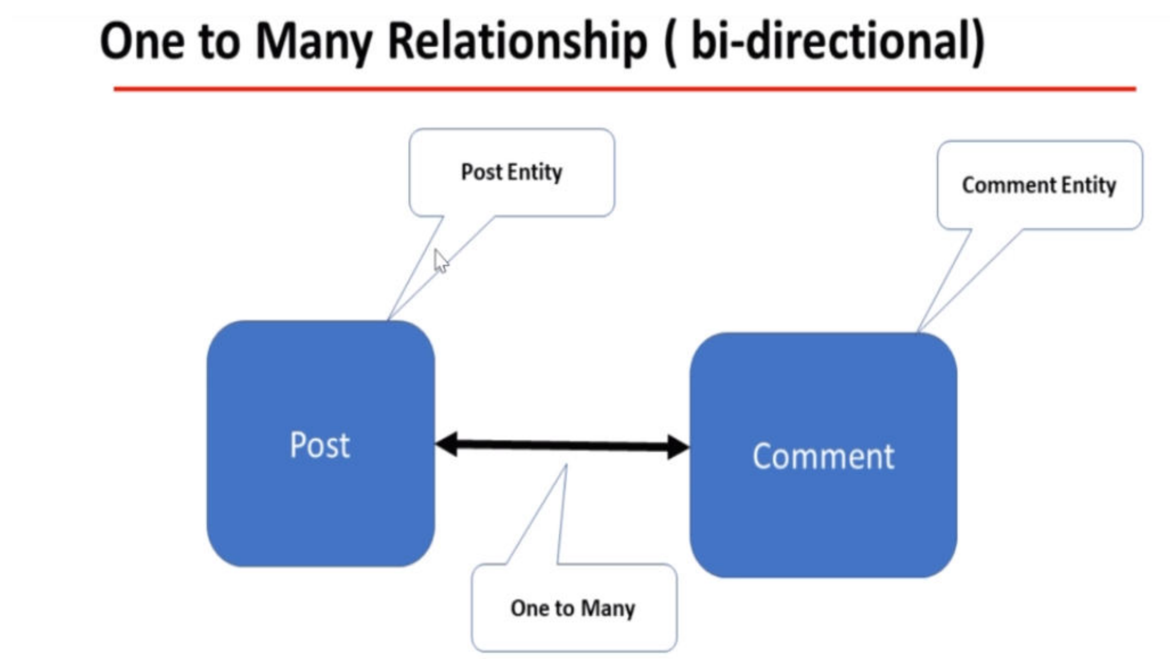
Step 2: Update PostService interface”:

```
import com.springboot.blog.payload.PostDto;
import com.springboot.blog.payload.PostResponse;

import java.util.List;

public interface PostService {
   PostDto createPost(PostDto postDto);

   PostResponse getAllPosts(int pageNo, int pageSize, String sortBy, String sortDir);

   PostDto getPostById(long id);

   PostDto updatePost(PostDto postDto, long id);

   void deletePostById(long id);
}
```

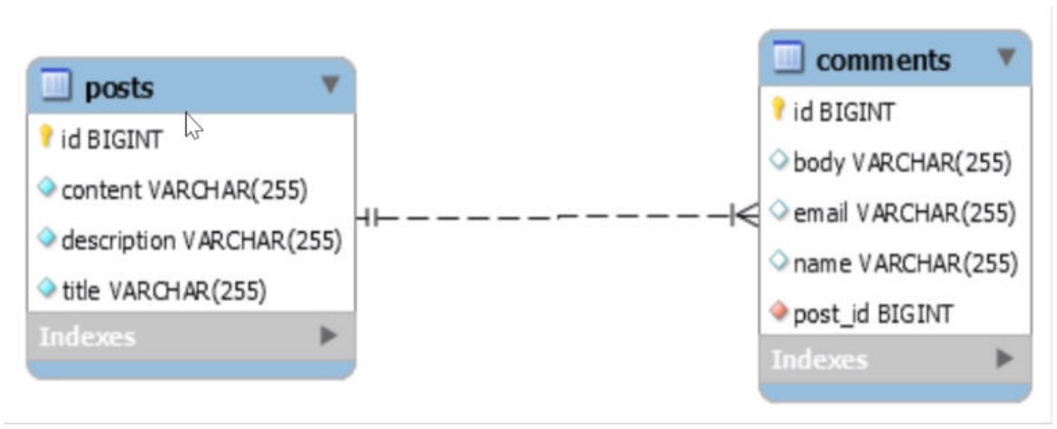
Step 3: Update PostServiceImpl class:

```
import com.springboot.blog.entity.Post;
import com.springboot.blog.exception.ResourceNotFoundException;
import com.springboot.blog.payload.PostDto;
import com.springboot.blog.payload.PostResponse;
import com.springboot.blog.repository.PostRepository;
import com.springboot.blog.service.PostService;
import org.springframework.beans.factory.annotation.Autowired;
import org.springframework.data.domain.Page;
import org.springframework.data.domain.PageRequest;
import org.springframework.data.domain.Pageable;
import org.springframework.data.domain.Sort;
import org.springframework.stereotype.Service;

import java.util.List;
import java.util.stream.Collectors;

@Service
public class PostServiceImpl implements PostService {
    private PostRepository postRepository;

    public PostServiceImpl(PostRepository postRepository) {
        this.postRepository = postRepository;
    }

    @Override
    public PostDto createPost(PostDto postDto) {

        // convert DTO to entity
        Post post = mapToEntity(postDto);
        Post newPost = postRepository.save(post);

        // convert entity to DTO
        PostDto postResponse = mapToDTO(newPost);
        return postResponse;
    }

    @Override
    public PostResponse getAllPosts(int pageNo, int pageSize, String sortBy, String
sortDir) {

        Sort sort = sortDir.equalsIgnoreCase(Sort.Direction.ASC.name()) ?
Sort.by(sortBy).ascending()
                : Sort.by(sortBy).descending();

        // create Pageable instance
        Pageable pageable = PageRequest.of(pageNo, pageSize, sort);

        Page<Post> posts = postRepository.findAll(pageable);

        // get content for page object
        List<Post> listOfPosts = posts.getContent();

        List<PostDto> content= listOfPosts.stream().map(post ->
mapToDTO(post)).collect(Collectors.toList());

        PostResponse postResponse = new PostResponse();
        postResponse.setContent(content);
        postResponse.setPageNo(posts.getNumber());
        postResponse.setPageSize(posts.getSize());
        postResponse.setTotalElements(posts.getTotalElements());
        postResponse.setTotalPages(posts.getTotalPages());
        postResponse.setLast(posts.isLast());

        return postResponse;
    }

    @Override
    public PostDto getPostById(long id) {
        Post post = postRepository.findById(id).orElseThrow(() -> new
ResourceNotFoundException("Post", "id", id));
        return mapToDTO(post);
    }

    @Override
    public PostDto updatePost(PostDto postDto, long id) {
        // get post by id from the database
        Post post = postRepository.findById(id).orElseThrow(() -> new
ResourceNotFoundException("Post", "id", id));

        post.setTitle(postDto.getTitle());
        post.setDescription(postDto.getDescription());
        post.setContent(postDto.getContent());

        Post updatedPost = postRepository.save(post);
        return mapToDTO(updatedPost);
    }

    @Override
    public void deletePostById(long id) {
        // get post by id from the database
        Post post = postRepository.findById(id).orElseThrow(() -> new
ResourceNotFoundException("Post", "id", id));
        postRepository.delete(post);
    }
    // convert Entity into DTO
    private PostDto mapToDTO(Post post){
        PostDto postDto = new PostDto();
        postDto.setId(post.getId());
        postDto.setTitle(post.getTitle());
        postDto.setDescription(post.getDescription());
        postDto.setContent(post.getContent());
        return postDto;
    }

    // convert DTO to entity
    private Post mapToEntity(PostDto postDto){
        Post post = new Post();
        post.setTitle(postDto.getTitle());
        post.setDescription(postDto.getDescription());
        post.setContent(postDto.getContent());
        return post;
    }
}
```

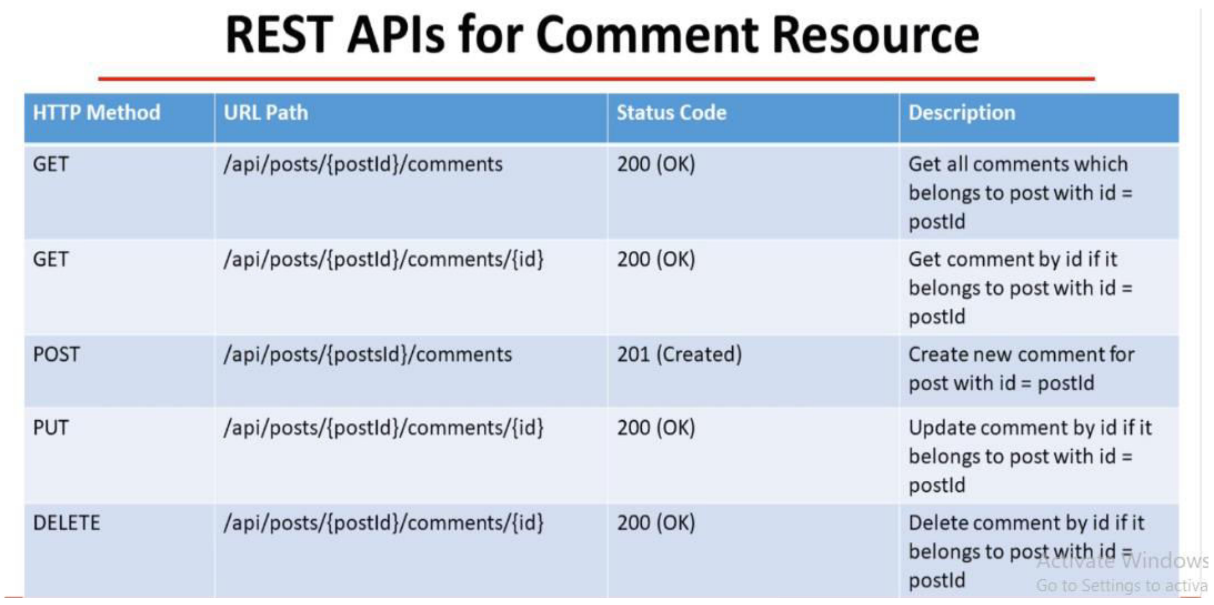
Create Comments API Later



ER(Entity Relationship Diagram)



URL Documentation with status code:



REST APIs for Comment Resource

HTTP Method	URL Path	Status Code	Description
GET	/api/posts/{postId}/comments	200 (OK)	Get all comments which belongs to post with id = postId
GET	/api/posts/{postId}/comments/{id}	200 (OK)	Get comment by id if it belongs to post with id = postId
POST	/api/posts/{postsId}/comments	201 (Created)	Create new comment for post with id = postId
PUT	/api/posts/{postId}/comments/{id}	200 (OK)	Update comment by id if it belongs to post with id = postId
DELETE	/api/posts/{postId}/comments/{id}	200 (OK)	Delete comment by id if it belongs to post with id = postId

Step 1: Create Comment Entity Class and do oneTomany bidirectional mapping

```
import lombok.AllArgsConstructor;
import lombok.Data;
import lombok.NoArgsConstructor;
import javax.persistence.*;

@Data
@AllArgsConstructor
@NoArgsConstructor

@Entity
@Table(name = "comments")
public class Comment {

   @Id
   @GeneratedValue(strategy = GenerationType.IDENTITY)
   private long id;

   private String name;
   private String email;
   private String body;

   @ManyToOne(fetch = FetchType.LAZY)
   @JoinColumn(name = "post_id", nullable = false)
   private Post post;
}
```

Step 2: Update Post Entity Class:

```
import lombok.*;

import javax.persistence.*;
import java.util.HashSet;
import java.util.Set;

@Getter
@Setter
@AllArgsConstructor
@NoArgsConstructor

@Entity
@Table(
        name = "posts", uniqueConstraints = {@UniqueConstraint(columnNames =
{"title"})}
)
public class Post {

    @Id
    @GeneratedValue(
            strategy = GenerationType.IDENTITY
    )
    private Long id;

    @Column(name = "title", nullable = false)
    private String title;

    @Column(name = "description", nullable = false)
    private String description;

    @Column(name = "content", nullable = false)
    private String content;

    @OneToMany(mappedBy = "post", cascade = CascadeType.ALL, orphanRemoval =
true)
    private Set<Comment> comments = new HashSet<>();

}
```

Step 3: Create CommentDto class

```
@Data
public class CommentDto {
    private long id;
    private String name;
   private String email;
   private String body;
}
```

Step 4: Create CommentService Interface:

```
import java.util.List;

public interface CommentService {
   CommentDto createComment(long postId, CommentDto commentDto);
}
```

Step 5: Create CommentServiceImpl class:

```
@Service
public class CommentServiceImpl implements CommentService {

   private CommentRepository commentRepository;
   private PostRepository postRepository;
   private ModelMapper mapper;
   public CommentServiceImpl(CommentRepository commentRepository,
PostRepository postRepository, ModelMapper mapper) {
       this.commentRepository = commentRepository;
       this.postRepository = postRepository;
       this.mapper = mapper;
   }

   @Override
   public CommentDto createComment(long postId, CommentDto commentDto) {

       Comment comment = mapToEntity(commentDto);

       // retrieve post entity by id
       Post post = postRepository.findById(postId).orElseThrow(
               () -> new ResourceNotFoundException("Post", "id", postId));

       // set post to comment entity
       comment.setPost(post);

       // comment entity to DB
       Comment newComment =  commentRepository.save(comment);

       return mapToDTO(newComment);
   }
private CommentDto mapToDTO(Comment comment){
       CommentDto commentDto = mapper.map(comment, CommentDto.class);

       CommentDto commentDto = new CommentDto();
       commentDto.setId(comment.getId());
       commentDto.setName(comment.getName());
       commentDto.setEmail(comment.getEmail());
       commentDto.setBody(comment.getBody());
       return  commentDto;
   }

   private Comment mapToEntity(CommentDto commentDto){
       Comment comment = mapper.map(commentDto, Comment.class);
      Comment comment = new Comment();
      comment.setId(commentDto.getId());
      comment.setName(commentDto.getName());
      comment.setEmail(commentDto.getEmail());
       comment.setBody(commentDto.getBody());
       return  comment;
   }

}
```

Step 6: Create RestController CommentController Class:

```
@RestController
@RequestMapping("/api/")
public class CommentController {

    private CommentService commentService;

    public CommentController(CommentService commentService) {
        this.commentService = commentService;
    }

    @PostMapping("/posts/{postId}/comments")
    public ResponseEntity<CommentDto> createComment(@PathVariable(value =
"postId") long postId,
                                                    @RequestBody CommentDto commentDto){
        return new ResponseEntity<>(commentService.createComment(postId,
commentDto), HttpStatus.CREATED);
    }
}
```

Get All Comments By PostId

Step 1: Update CommentRepository as shown below:

```
import org.springframework.data.jpa.repository.JpaRepository;

import java.util.List;

public interface CommentRepository extends JpaRepository<Comment, Long> {
    List<Comment> findByPostId(long postId);
}
```

Step 2: Update CommentService Interface:

```
import java.util.List;

public interface CommentService {
    CommentDto createComment(long postId, CommentDto commentDto);

    List<CommentDto> getCommentsByPostId(long postId);

}
```

Step 3: Update CommentServiceImpl Class:

```
@Service
public class CommentServiceImpl implements CommentService {

    private CommentRepository commentRepository;
    private PostRepository postRepository;
    private ModelMapper mapper;
    public CommentServiceImpl(CommentRepository commentRepository,
PostRepository postRepository, ModelMapper mapper) {
        this.commentRepository = commentRepository;
        this.postRepository = postRepository;
        this.mapper = mapper;
    }

    @Override
    public CommentDto createComment(long postId, CommentDto commentDto) {

        Comment comment = mapToEntity(commentDto);

        // retrieve post entity by id
        Post post = postRepository.findById(postId).orElseThrow(
                () -> new ResourceNotFoundException("Post", "id", postId));

        // set post to comment entity
        comment.setPost(post);

        // comment entity to DB
        Comment newComment =  commentRepository.save(comment);

        return mapToDTO(newComment);
    }

    @Override
    public List<CommentDto> getCommentsByPostId(long postId) {
        // retrieve comments by postId
        List<Comment> comments = commentRepository.findByPostId(postId);

        // convert list of comment entities to list of comment dto's
        return comments.stream().map(comment ->
mapToDTO(comment)).collect(Collectors.toList());
    }

private CommentDto mapToDTO(Comment comment){
        CommentDto commentDto = mapper.map(comment, CommentDto.class);

       CommentDto commentDto = new CommentDto();
        commentDto.setId(comment.getId());
        commentDto.setName(comment.getName());
       commentDto.setEmail(comment.getEmail());
        commentDto.setBody(comment.getBody());
        return  commentDto;
    }

    private Comment mapToEntity(CommentDto commentDto){
        Comment comment = mapper.map(commentDto, Comment.class);
      Comment comment = new Comment();
        comment.setId(commentDto.getId());
      comment.setName(commentDto.getName());
       comment.setEmail(commentDto.getEmail());
       comment.setBody(commentDto.getBody());
        return  comment;
    }
}
```

Step 4: Create handler method in CommentController Layer:

```
@RestController
@RequestMapping("/api/")
public class CommentController {

    private CommentService commentService;

    public CommentController(CommentService commentService) {
        this.commentService = commentService;
    }

    @PostMapping("/posts/{postId}/comments")
    public ResponseEntity<CommentDto> createComment(@PathVariable(value =
"postId") long postId,  @RequestBody CommentDto commentDto){
```

```
return new ResponseEntity<>(commentService.createComment(postId, commentDto),
HttpStatus.CREATED);
   }

   @GetMapping("/posts/{postId}/comments")
   public List<CommentDto> getCommentsByPostId(@PathVariable(value = "postId")
Long postId){
      return commentService.getCommentsByPostId(postId);
   }
}
```

Get Comment By CommentId

Step 1: Update CommentService interface:

```
import java.util.List;

public interface CommentService {
   CommentDto createComment(long postId, CommentDto commentDto);

   List<CommentDto> getCommentsByPostId(long postId);

   CommentDto getCommentById(Long postId, Long commentId);

}
```

Step 2: Create BlogApi Exception class:

```
import org.springframework.http.HttpStatus;

public class BlogAPIException extends RuntimeException {

   private HttpStatus status;
   private String message;

   public BlogAPIException(HttpStatus status, String message) {
      this.status = status;
      this.message = message;
   }

   public BlogAPIException(String message, HttpStatus status, String message1) {
      super(message);
      this.status = status;
      this.message = message1;
   }

   public HttpStatus getStatus() {
      return status;
   }

   @Override
   public String getMessage() {
      return message;
   }
}
```

Step 3: Update CommentServiceImpl class:

```
@Service
public class CommentServiceImpl implements CommentService {

   private CommentRepository commentRepository;
   private PostRepository postRepository;
   private ModelMapper mapper;
   public CommentServiceImpl(CommentRepository commentRepository,
PostRepository postRepository, ModelMapper mapper) {
      this.commentRepository = commentRepository;
      this.postRepository = postRepository;
      this.mapper = mapper;
   }

   @Override
   public CommentDto createComment(long postId, CommentDto commentDto) {

      Comment comment = mapToEntity(commentDto);
```

```
        // retrieve post entity by id
        Post post = postRepository.findById(postId).orElseThrow(
                () -> new ResourceNotFoundException("Post", "id", postId));

        // set post to comment entity
        comment.setPost(post);

        // comment entity to DB
        Comment newComment =  commentRepository.save(comment);

        return mapToDTO(newComment);
    }

    @Override
    public List<CommentDto> getCommentsByPostId(long postId) {
        // retrieve comments by postId
        List<Comment> comments = commentRepository.findByPostId(postId);

        // convert list of comment entities to list of comment dto's
        return comments.stream().map(comment ->
mapToDTO(comment)).collect(Collectors.toList());
    }

    @Override
    public CommentDto getCommentById(Long postId, Long commentId) {
        // retrieve post entity by id
        Post post = postRepository.findById(postId).orElseThrow(
                () -> new ResourceNotFoundException("Post", "id", postId));

        // retrieve comment by id
        Comment comment = commentRepository.findById(commentId).orElseThrow(() -
>
                new ResourceNotFoundException("Comment", "id", commentId));

        if(!comment.getPost().getId().equals(post.getId())){
            throw new BlogAPIException(HttpStatus.BAD_REQUEST, "Comment does not
belong to post");
        }
        return mapToDTO(comment);
    }

private CommentDto mapToDTO(Comment comment){
        CommentDto commentDto = mapper.map(comment, CommentDto.class);

        CommentDto commentDto = new CommentDto();
        commentDto.setId(comment.getId());
      commentDto.setName(comment.getName());
       commentDto.setEmail(comment.getEmail());
      commentDto.setBody(comment.getBody());
        return  commentDto;
    }

    private Comment mapToEntity(CommentDto commentDto){
        Comment comment = mapper.map(commentDto, Comment.class);
        Comment comment = new Comment();
       comment.setId(commentDto.getId());
      comment.setName(commentDto.getName());
        comment.setEmail(commentDto.getEmail());
       comment.setBody(commentDto.getBody());
        return  comment;
    }
}
```

Step 4: Update CommentController class:

```
@RestController
@RequestMapping("/api/")
public class CommentController {

    private CommentService commentService;

    public CommentController(CommentService commentService) {
        this.commentService = commentService;
    }
```

```
   @PostMapping("/posts/{postId}/comments")
   public ResponseEntity<CommentDto> createComment(@PathVariable(value =
"postId") long postId,
@RequestBody CommentDto commentDto){
      return new ResponseEntity<>(commentService.createComment(postId,
commentDto), HttpStatus.CREATED);
   }

   @GetMapping("/posts/{postId}/comments")
   public List<CommentDto> getCommentsByPostId(@PathVariable(value = "postId")
Long postId){
      return commentService.getCommentsByPostId(postId);
   }

   @GetMapping("/posts/{postId}/comments/{id}")
   public ResponseEntity<CommentDto> getCommentById(@PathVariable(value =
"postId") Long postId,
                                        @PathVariable(value = "id") Long commentId){
      CommentDto commentDto = commentService.getCommentById(postId,
commentId);
      return new ResponseEntity<>(commentDto, HttpStatus.OK);
   }
}
```

Developing Update Comment Rest API

Rest api url: http://localhost:8080/api/posts/{postId}/comments{id}

Step 1: Update CommentController with following handler method:

```
@PutMapping("/posts/{postId}/comments/{id}")
   public ResponseEntity<CommentDto> updateComment(@PathVariable(value =
"postId") Long postId,
                                       @PathVariable(value = "id") Long commentId,
                                       @RequestBody CommentDto commentDto){
      CommentDto updatedComment = commentService.updateComment(postId,
commentId, commentDto);
      return new ResponseEntity<>(updatedComment, HttpStatus.OK);
```

```
    }
```

Step 2: Update CommentService Interface:

```
import java.util.List;

public interface CommentService {
    CommentDto createComment(long postId, CommentDto commentDto);

    List<CommentDto> getCommentsByPostId(long postId);

    CommentDto getCommentById(Long postId, Long commentId);

    CommentDto updateComment(Long postId, long commentId, CommentDto
commentRequest);

}
```

Step 3: Update CommentServiceImpl class:

```
@Override

    public CommentDto updateComment(Long postId, long commentId, CommentDto
commentRequest) {

        // retrieve post entity by id

        Post post = postRepository.findById(postId).orElseThrow(

                () -> new ResourceNotFoundException("Post", "id", postId));


        // retrieve comment by id

        Comment comment = commentRepository.findById(commentId).orElseThrow(() ->

                new ResourceNotFoundException("Comment", "id", commentId));


        if(!comment.getPost().getId().equals(post.getId())){
            throw new BlogAPIException(HttpStatus.BAD_REQUEST, "Comment does not belongs
to post");
        }

        comment.setName(commentRequest.getName());
        comment.setEmail(commentRequest.getEmail());
        comment.setBody(commentRequest.getBody());

        Comment updatedComment = commentRepository.save(comment);
        return mapToDTO(updatedComment);
    }
```

Perform Testing in PostMan:

Delete Comment Feature

URL: http://localhost:8080/api/posts/{postId}/comments/{id}

Step 1: Update CommentController Class:

```
    @DeleteMapping("/posts/{postId}/comments/{id}")
    public ResponseEntity<String> deleteComment(@PathVariable(value = "postId") Long
postId,
                                                @PathVariable(value = "id") Long commentId){
        commentService.deleteComment(postId, commentId);
        return new ResponseEntity<>("Comment deleted successfully", HttpStatus.OK);
    }
```

Step 2: Update CommentService Interface

```
import java.util.List;

public interface CommentService {

    CommentDto createComment(long postId, CommentDto commentDto);


    List<CommentDto> getCommentsByPostId(long postId);


    CommentDto getCommentById(Long postId, Long commentId);


    CommentDto updateComment(Long postId, long commentId, CommentDto
commentRequest);


    void deleteComment(Long postId, Long commentId);

}
```

Step 3: Update CommentServiceImpl class

```
  @Override

    public void deleteComment(Long postId, Long commentId) {

        // retrieve post entity by id

        Post post = postRepository.findById(postId).orElseThrow(

                () -> new ResourceNotFoundException("Post", "id", postId));


        // retrieve comment by id

        Comment comment = commentRepository.findById(commentId).orElseThrow(() ->

                new ResourceNotFoundException("Comment", "id", commentId));
        if(!comment.getPost().getId().equals(post.getId())){
            throw new BlogAPIException(HttpStatus.BAD_REQUEST, "Comment does not belongs
to post");
        }

        commentRepository.delete(comment);
    }
```

ModelMapper library or MapStruct

Step 1: Add the following dependency:

```
<!-- https://mvnrepository.com/artifact/org.modelmapper/modelmapper -->
                    <dependency>
                                <groupId>org.modelmapper</groupId>
                                <artifactId>modelmapper</artifactId>
                                <version>2.3.9</version>
                    </dependency>
```

Step 2: Update PostServiceImpl class as shown below:

```
@Service
public class PostServiceImpl implements PostService {

    private PostRepository postRepository;

    private ModelMapper mapper;
    public PostServiceImpl(PostRepository postRepository, ModelMapper mapper) {
        this.postRepository = postRepository;
        this.mapper = mapper;
    }

    @Override
    public PostDto createPost(PostDto postDto) {

        // convert DTO to entity
        Post post = mapToEntity(postDto);
        Post newPost = postRepository.save(post);

        // convert entity to DTO
        PostDto postResponse = mapToDTO(newPost);
        return postResponse;
    }

    @Override
    public PostResponse getAllPosts(int pageNo, int pageSize, String sortBy, String sortDir) {

        Sort sort = sortDir.equalsIgnoreCase(Sort.Direction.ASC.name()) ?
Sort.by(sortBy).ascending()
                : Sort.by(sortBy).descending();
        // create Pageable instance

        Pageable pageable = PageRequest.of(pageNo, pageSize, sort);


        Page<Post> posts = postRepository.findAll(pageable);


        // get content for page object

        List<Post> listOfPosts = posts.getContent();


        List<PostDto> content= listOfPosts.stream().map(post ->
mapToDTO(post)).collect(Collectors.toList());


        PostResponse postResponse = new PostResponse();

        postResponse.setContent(content);

        postResponse.setPageNo(posts.getNumber());

        postResponse.setPageSize(posts.getSize());

        postResponse.setTotalElements(posts.getTotalElements());

        postResponse.setTotalPages(posts.getTotalPages());

        postResponse.setLast(posts.isLast());


        return postResponse;

    }


    @Override

    public PostDto getPostById(long id) {
        Post post = postRepository.findById(id).orElseThrow(() -> new
ResourceNotFoundException("Post", "id", id));
        return mapToDTO(post);
    }

    @Override
    public PostDto updatePost(PostDto postDto, long id) {
        // get post by id from the database
        Post post = postRepository.findById(id).orElseThrow(() -> new
ResourceNotFoundException("Post", "id", id));

        post.setTitle(postDto.getTitle());
        post.setDescription(postDto.getDescription());
        post.setContent(postDto.getContent());

        Post updatedPost = postRepository.save(post);
        return mapToDTO(updatedPost);
    }

    @Override
    public void deletePostById(long id) {
        // get post by id from the database
        Post post = postRepository.findById(id).orElseThrow(() -> new
ResourceNotFoundException("Post", "id", id));
        postRepository.delete(post);
    }


    // convert Entity into DTO
    private PostDto mapToDTO(Post post){
        PostDto postDto = mapper.map(post, PostDto.class);
//        PostDto postDto = new PostDto();
//        postDto.setId(post.getId());
//        postDto.setTitle(post.getTitle());
//        postDto.setDescription(post.getDescription());
//        postDto.setContent(post.getContent());
        return postDto;
    }


    // convert DTO to entity
    private Post mapToEntity(PostDto postDto){
        Post post = mapper.map(postDto, Post.class);
//        Post post = new Post();
//        post.setTitle(postDto.getTitle());
//        post.setDescription(postDto.getDescription());
//        post.setContent(postDto.getContent());
        return post;
    }
}
```

Step 3: Update CommentServiceImpl class:

```
@Service
public class CommentServiceImpl implements CommentService {


   private CommentRepository commentRepository;
   private PostRepository postRepository;
   private ModelMapper mapper;
   public CommentServiceImpl(CommentRepository commentRepository, PostRepository
postRepository, ModelMapper mapper) {
       this.commentRepository = commentRepository;
       this.postRepository = postRepository;
       this.mapper = mapper;
   }


   @Override
   public CommentDto createComment(long postId, CommentDto commentDto) {


       Comment comment = mapToEntity(commentDto);


       // retrieve post entity by id
       Post post = postRepository.findById(postId).orElseThrow(
               () -> new ResourceNotFoundException("Post", "id", postId));


       // set post to comment entity
```

```
        comment.setPost(post);


        // comment entity to DB

        Comment newComment =  commentRepository.save(comment);


        return mapToDTO(newComment);

    }


    @Override

    public List<CommentDto> getCommentsByPostId(long postId) {

        // retrieve comments by postId

        List<Comment> comments = commentRepository.findByPostId(postId);


        // convert list of comment entities to list of comment dto's

        return comments.stream().map(comment ->
mapToDTO(comment)).collect(Collectors.toList());

    }


    @Override

    public CommentDto getCommentById(Long postId, Long commentId) {

        // retrieve post entity by id

        Post post = postRepository.findById(postId).orElseThrow(

                () -> new ResourceNotFoundException("Post", "id", postId));
        // retrieve comment by id
        Comment comment = commentRepository.findById(commentId).orElseThrow(() ->
                new ResourceNotFoundException("Comment", "id", commentId));

        if(!comment.getPost().getId().equals(post.getId())){
            throw new BlogAPIException(HttpStatus.BAD_REQUEST, "Comment does not belong to
post");
        }

        return mapToDTO(comment);
    }

    @Override
    public CommentDto updateComment(Long postId, long commentId, CommentDto
commentRequest) {
        // retrieve post entity by id
        Post post = postRepository.findById(postId).orElseThrow(
                () -> new ResourceNotFoundException("Post", "id", postId));

        // retrieve comment by id
        Comment comment = commentRepository.findById(commentId).orElseThrow(() ->
                new ResourceNotFoundException("Comment", "id", commentId));

        if(!comment.getPost().getId().equals(post.getId())){
            throw new BlogAPIException(HttpStatus.BAD_REQUEST, "Comment does not belongs
to post");
        }

        comment.setName(commentRequest.getName());
        comment.setEmail(commentRequest.getEmail());
        comment.setBody(commentRequest.getBody());

        Comment updatedComment = commentRepository.save(comment);
        return mapToDTO(updatedComment);
    }

    @Override
    public void deleteComment(Long postId, Long commentId) {
        // retrieve post entity by id
        Post post = postRepository.findById(postId).orElseThrow(
                () -> new ResourceNotFoundException("Post", "id", postId));

        // retrieve comment by id
        Comment comment = commentRepository.findById(commentId).orElseThrow(() ->
                new ResourceNotFoundException("Comment", "id", commentId));

        if(!comment.getPost().getId().equals(post.getId())){
            throw new BlogAPIException(HttpStatus.BAD_REQUEST, "Comment does not belongs
to post");
```

```
        }


        commentRepository.delete(comment);
    }


    private CommentDto mapToDTO(Comment comment){
        CommentDto commentDto = mapper.map(comment, CommentDto.class);


//        CommentDto commentDto = new CommentDto();
//        commentDto.setId(comment.getId());
//        commentDto.setName(comment.getName());
//        commentDto.setEmail(comment.getEmail());
//        commentDto.setBody(comment.getBody());
        return  commentDto;
    }


    private Comment mapToEntity(CommentDto commentDto){
        Comment comment = mapper.map(commentDto, Comment.class);
//        Comment comment = new Comment();
//        comment.setId(commentDto.getId());
//        comment.setName(commentDto.getName());
//        comment.setEmail(commentDto.getEmail());
//        comment.setBody(commentDto.getBody());
        return  comment;
    }
}
```

Exception Handling – Specific Exception & Global Exception

Step 1: Create ErrorDetails class in payload package

```
import java.util.Date;

public class ErrorDetails {
    private Date timestamp;
    private String message;
    private String details;

    public ErrorDetails(Date timestamp, String message, String details) {
        this.timestamp = timestamp;
        this.message = message;
        this.details = details;
    }

    public Date getTimestamp() {
        return timestamp;
    }

    public String getMessage() {
        return message;
    }


    public String getDetails() {
        return details;
    }
}
```

Step 2: Create GlobalExceptionHandler class in exceptionpackage

```
import com.springboot.blog.payload.ErrorDetails;
import org.springframework.http.HttpHeaders;
import org.springframework.http.HttpStatus;
import org.springframework.http.ResponseEntity;
import org.springframework.validation.FieldError;
import org.springframework.web.bind.MethodArgumentNotValidException;
import org.springframework.web.bind.annotation.ControllerAdvice;
import org.springframework.web.bind.annotation.ExceptionHandler;
import org.springframework.web.context.request.WebRequest;
import
org.springframework.web.servlet.mvc.method.annotation.ResponseEntityExceptionHandler;


import java.util.Date;
import java.util.HashMap;
import java.util.Map;


@ControllerAdvice
```

```
public class GlobalExceptionHandler extends ResponseEntityExceptionHandler {


    // handle specific exceptions

    @ExceptionHandler(ResourceNotFoundException.class)

    public ResponseEntity<ErrorDetails>
handleResourceNotFoundException(ResourceNotFoundException exception,

                                                                        WebRequest webRequest){

        ErrorDetails errorDetails = new ErrorDetails(new Date(), exception.getMessage(),

                webRequest.getDescription(false));

        return new ResponseEntity<>(errorDetails, HttpStatus.NOT_FOUND);

    }


    @ExceptionHandler(BlogAPIException.class)

    public ResponseEntity<ErrorDetails> handleBlogAPIException(BlogAPIException exception,

                                                                        WebRequest webRequest){

        ErrorDetails errorDetails = new ErrorDetails(new Date(), exception.getMessage(),

                webRequest.getDescription(false));

        return new ResponseEntity<>(errorDetails, HttpStatus.BAD_REQUEST);

    }

    // global exceptions

    @ExceptionHandler(Exception.class)

    public ResponseEntity<ErrorDetails> handleGlobalException(Exception exception,

                                                               WebRequest webRequest){

        ErrorDetails errorDetails = new ErrorDetails(new Date(), exception.getMessage(),
            webRequest.getDescription(false));

        return new ResponseEntity<>(errorDetails, HttpStatus.INTERNAL_SERVER_ERROR);

    }

}
```

Spring Validations

Step 1: Add dependency in pom.xml file

```
<!-- https://mvnrepository.com/artifact/org.springframework.boot/spring-boot-starter-validation -->

                <dependency>

                        <groupId>org.springframework.boot</groupId>

                        <artifactId>spring-boot-starter-validation</artifactId>

                </dependency>
```

Step 2: Add Validation annotations in DTO classes

```
package com.springboot.blog.payload;


import io.swagger.annotations.ApiModel;

import io.swagger.annotations.ApiModelProperty;

import lombok.Data;


import javax.validation.constraints.NotEmpty;

import javax.validation.constraints.Size;

import java.util.Set;


@ApiModel(description = "Post model information")
```

```
@Data
public class PostDto {

    private long id;

    // title should not be null  or empty
    // title should have at least 2 characters
    @NotEmpty
    @Size(min = 2, message = "Post title should have at least 2 characters")
    private String title;

    // post description should be not null or empty
    // post description should have at least 10 characters
    @NotEmpty
    @Size(min = 10, message = "Post description should have at least 10 characters")
    private String description;

    // post content should not be null or empty
        @NotEmpty
    private String content;
    private Set<CommentDto> comments;
}
```

Step 3: Add @Valid annotation in controller class:

```
import com.springboot.blog.payload.PostDto;

import com.springboot.blog.payload.PostResponse;

import com.springboot.blog.service.PostService;

import com.springboot.blog.utils.AppConstants;

import io.swagger.annotations.Api;

import io.swagger.annotations.ApiOperation;

import io.swagger.annotations.ApiResponses;

import org.springframework.http.HttpStatus;

import org.springframework.http.ResponseEntity;

import org.springframework.security.access.prepost.PreAuthorize;

import org.springframework.web.bind.annotation.*;


import javax.validation.Valid;


@RestController

@RequestMapping()

public class PostController {


    private PostService postService;


    public PostController(PostService postService) {

        this.postService = postService;

    }
    // create blog post rest api
    @PostMapping("/api/v1/posts")
    public ResponseEntity<PostDto> createPost(@Valid @RequestBody PostDto postDto){
        return new ResponseEntity<>(postService.createPost(postDto), HttpStatus.CREATED);
    }
    // get all posts rest api
    @GetMapping("/api/v1/posts")
    public PostResponse getAllPosts(
            @RequestParam(value = "pageNo", defaultValue =
AppConstants.DEFAULT_PAGE_NUMBER, required = false) int pageNo,
            @RequestParam(value = "pageSize", defaultValue =
AppConstants.DEFAULT_PAGE_SIZE, required = false) int pageSize,
            @RequestParam(value = "sortBy", defaultValue = AppConstants.DEFAULT_SORT_BY,
required = false) String sortBy,
            @RequestParam(value = "sortDir", defaultValue =
AppConstants.DEFAULT_SORT_DIRECTION, required = false) String sortDir
    ){
        return postService.getAllPosts(pageNo, pageSize, sortBy, sortDir);
    }


    // get post by id
    @GetMapping(value = "/api/v1/posts/{id}")
    public ResponseEntity<PostDto> getPostByIdV1(@PathVariable(name = "id") long id){
        return ResponseEntity.ok(postService.getPostById(id));
    }
    // update post by id rest api
    @PutMapping("/api/v1/posts/{id}")
    public ResponseEntity<PostDto> updatePost(@Valid @RequestBody PostDto postDto,
@PathVariable(name = "id") long id){

       PostDto postResponse = postService.updatePost(postDto, id);

       return new ResponseEntity<>(postResponse, HttpStatus.OK);
    }

    // delete post rest api
    @DeleteMapping("/api/v1/posts/{id}")
    public ResponseEntity<String> deletePost(@PathVariable(name = "id") long id){

        postService.deletePostById(id);

        return new ResponseEntity<>("Post entity deleted successfully.", HttpStatus.OK);
    }
}
```

Spring Security

Step 1: Add Spring Dependency Jar

```
<dependency>
<groupId>org.springframework.boot</groupId>
<artifactId>spring-boot-starter-security</artifactId>
</dependency>
```

Step 2: All Links of rest api are now secured

Step 3: Update application.properties file

```
Spring.security.user.name=pankaj

Spring.security.user.password=password

Spring.security.user.roles=ADMIN
```

Step 4: Implementing basic authentication

Develop config package

Step 5: Develop SecurityConfig class and Extend WebSecurityConfigurerAdapter

```
@Configuration

@EnableWebSecurity

public class SecurityConfig extends WebSecurityConfigurerAdapter {

   @Override

   protected void configure(HttpSecurity http) throws Exception {

      http

            .csrf().disable()

            .authorizeRequests()

            .anyRequest()

            .authenticated()

            .and()

            .httpBasic();

   }

}
```

In memory Authentication

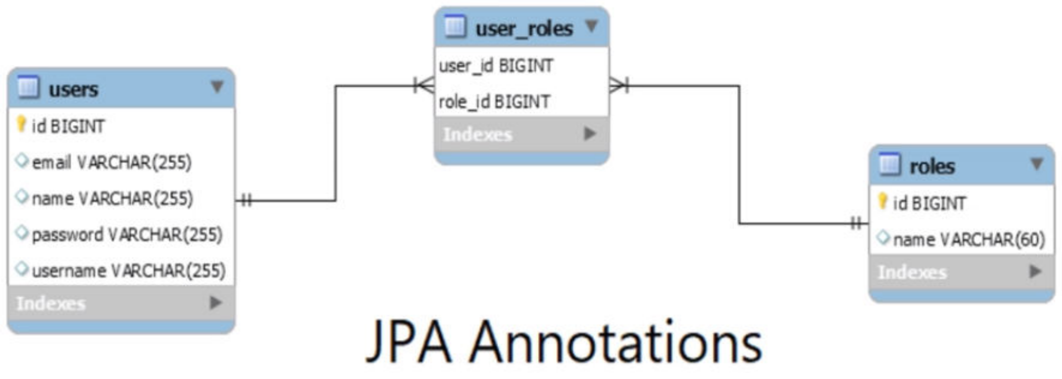
Step 1: Update SecurityConfig class as shown below:

```
package com.springboot.blog.config;

import org.springframework.context.annotation.Bean;
import org.springframework.context.annotation.Configuration;
import org.springframework.http.HttpMethod;
import
org.springframework.security.config.annotation.method.configuration.EnableGlo
balMethodSecurity;
import
org.springframework.security.config.annotation.web.builders.HttpSecurity;
import
org.springframework.security.config.annotation.web.configuration.EnableWebSec
urity;
import
org.springframework.security.config.annotation.web.configuration.WebSecurityC
onfigurerAdapter;
import org.springframework.security.core.userdetails.User;
import org.springframework.security.core.userdetails.UserDetails;
import org.springframework.security.core.userdetails.UserDetailsService;
import org.springframework.security.crypto.bcrypt.BCryptPasswordEncoder;
import org.springframework.security.crypto.password.PasswordEncoder;
import org.springframework.security.provisioning.InMemoryUserDetailsManager;


@Configuration
@EnableWebSecurity
@EnableGlobalMethodSecurity(prePostEnabled = true)
public class SecurityConfig extends WebSecurityConfigurerAdapter {


    @Bean
    PasswordEncoder passwordEncoder(){
        return new BCryptPasswordEncoder();
    }

    @Override
    protected void configure(HttpSecurity http) throws Exception {
        http
                .csrf().disable()
                .authorizeRequests()
                .antMatchers(HttpMethod.GET, "/api/**").permitAll()
                .anyRequest()
                .authenticated()
                .and()
                .httpBasic();
    }



        @Override
    @Bean
    protected UserDetailsService userDetailsService() {
        UserDetails ramesh =
User.builder().username("pankaj").password(passwordEncoder()
                .encode("password")).roles("USER").build();
        UserDetails admin =
User.builder().username("admin").password(passwordEncoder()
                .encode("admin")).roles("ADMIN").build();
        return new InMemoryUserDetailsManager(ramesh, admin);
    }
}
```

Step 2: Add @PreAuthorize("hasRole('ADMIN')") Annotation in controller layer

```
package com.springboot.blog.controller;

import com.springboot.blog.payload.PostDto;
import com.springboot.blog.payload.PostResponse;
import com.springboot.blog.service.PostService;
import com.springboot.blog.utils.AppConstants;
import org.springframework.http.HttpStatus;
import org.springframework.http.ResponseEntity;
import org.springframework.security.access.prepost.PreAuthorize;
import org.springframework.web.bind.annotation.*;

import javax.validation.Valid;
import java.util.List;

@RestController
@RequestMapping("/api/posts")
public class PostController {

    private PostService postService;

    public PostController(PostService postService) {
        this.postService = postService;
    }

    @PreAuthorize("hasRole('ADMIN')")
    // create blog post rest api
    @PostMapping
    public ResponseEntity<PostDto> createPost(@Valid @RequestBody PostDto
postDto){
        return new ResponseEntity<>(postService.createPost(postDto),
HttpStatus.CREATED);
    }

    // get all posts rest api
    @GetMapping
    public PostResponse getAllPosts(
            @RequestParam(value = "pageNo", defaultValue =
AppConstants.DEFAULT_PAGE_NUMBER, required = false) int pageNo,
            @RequestParam(value = "pageSize", defaultValue =
AppConstants.DEFAULT_PAGE_SIZE, required = false) int pageSize,
            @RequestParam(value = "sortBy", defaultValue =
AppConstants.DEFAULT_SORT_BY, required = false) String sortBy,
            @RequestParam(value = "sortDir", defaultValue =
AppConstants.DEFAULT_SORT_DIRECTION, required = false) String sortDir
    ){
        return postService.getAllPosts(pageNo, pageSize, sortBy, sortDir);
    }
    // get post by id
    @GetMapping("/{id}")
    public ResponseEntity<PostDto> getPostById(@PathVariable(name = "id")
long id){
        return ResponseEntity.ok(postService.getPostById(id));
    }

    @PreAuthorize("hasRole('ADMIN')")
    // update post by id rest api
    @PutMapping("/{id}")
    public ResponseEntity<PostDto> updatePost(@Valid @RequestBody PostDto
postDto, @PathVariable(name = "id") long id){

       PostDto postResponse = postService.updatePost(postDto, id);

       return new ResponseEntity<>(postResponse, HttpStatus.OK);
    }

    @PreAuthorize("hasRole('ADMIN')")
    // delete post rest api
    @DeleteMapping("/{id}")
    public ResponseEntity<String> deletePost(@PathVariable(name = "id") long
id){

        postService.deletePostById(id);

        return new ResponseEntity<>("Post entity deleted successfully.",
HttpStatus.OK);
    }
}
```

Create JPA Entities User & Role



Step 1: Create user table:

```
package com.springboot.blog.entity;

import lombok.Data;

import javax.persistence.*;
import java.util.Set;
```

```
@Data
@Entity
@Table(name = "users", uniqueConstraints = {
        @UniqueConstraint(columnNames = {"username"}),
        @UniqueConstraint(columnNames = {"email"})
})
public class User {

    @Id
    @GeneratedValue(strategy = GenerationType.IDENTITY)
    private long id;
    private String name;
    private String username;
    private String email;
    private String password;

    @ManyToMany(fetch = FetchType.EAGER, cascade = CascadeType.ALL)
    @JoinTable(name = "user_roles",
            joinColumns = @JoinColumn(name = "user_id", referencedColumnName
= "id"),
            inverseJoinColumns = @JoinColumn(name = "role_id",
referencedColumnName = "id"))
    private Set<Role> roles;
}
```

Step 2: Create Role Entity Class:

```
package com.springboot.blog.entity;

import lombok.Getter;
import lombok.Setter;

import javax.persistence.*;

@Setter
@Getter
@Entity
@Table(name = "roles")
public class Role {

    @Id
    @GeneratedValue(strategy = GenerationType.IDENTITY)
    private long id;

    @Column(length = 60)
    private String name;
}
```

Create Repository Layer

Step 1: Create UserRepository Layer

```java
package com.springboot.blog.repository;
import com.springboot.blog.entity.User;
import org.springframework.data.domain.Example;
import org.springframework.data.jpa.repository.JpaRepository;

import java.util.Optional;

public interface UserRepository extends JpaRepository<User, Long> {
    Optional<User> findByEmail(String email);
    Optional<User> findByUsernameOrEmail(String username, String email);
    Optional<User> findByUsername(String username);
    Boolean existsByUsername(String username);
    Boolean existsByEmail(String email);
}
```

Step 2: Create RoleRepository Layer

```java
import com.springboot.blog.entity.Role;
import org.springframework.data.jpa.repository.JpaRepository;

import java.util.Optional;

public interface RoleRepository extends JpaRepository<Role, Long> {
    Optional<Role> findByName(String name);
}
```

UserDetailsService Implementation

Step 1: Create CustomUserDetailsService class in security package

```java
package com.springboot.blog.security;


import com.springboot.blog.entity.Role;
import com.springboot.blog.entity.User;
import com.springboot.blog.repository.UserRepository;
import org.springframework.security.core.GrantedAuthority;
import org.springframework.security.core.authority.SimpleGrantedAuthority;
import org.springframework.security.core.userdetails.UserDetails;
import org.springframework.security.core.userdetails.UserDetailsService;
import
org.springframework.security.core.userdetails.UsernameNotFoundException;
import org.springframework.stereotype.Service;

import java.util.Collection;
import java.util.Set;
import java.util.stream.Collectors;

@Service
public class CustomUserDetailsService implements UserDetailsService {

    private UserRepository userRepository;
    public CustomUserDetailsService(UserRepository userRepository) {
        this.userRepository = userRepository;
    }

    @Override
    public UserDetails loadUserByUsername(String usernameOrEmail) throws
UsernameNotFoundException {
        User user = userRepository.findByUsernameOrEmail(usernameOrEmail,
usernameOrEmail)
                .orElseThrow(() ->
                        new UsernameNotFoundException("User not found with
username or email:" + usernameOrEmail));
        return new
org.springframework.security.core.userdetails.User(user.getEmail(),
                user.getPassword(), mapRolesToAuthorities(user.getRoles()));
    }

    private Collection< ? extends GrantedAuthority>
mapRolesToAuthorities(Set<Role> roles){
        return roles.stream().map(role -> new
SimpleGrantedAuthority(role.getName())).collect(Collectors.toList());
    }
}
```

Step 2: Update SecurityConfig File as shown below:

```
package com.springboot.blog.config;

import com.springboot.blog.security.CustomUserDetailsService;
import org.springframework.beans.factory.annotation.Autowired;
import org.springframework.context.annotation.Bean;
import org.springframework.context.annotation.Configuration;
import org.springframework.http.HttpMethod;
import
org.springframework.security.config.annotation.authentication.builders.Authen
ticationManagerBuilder;
import
org.springframework.security.config.annotation.method.configuration.EnableGlo
balMethodSecurity;
import
org.springframework.security.config.annotation.web.builders.HttpSecurity;
import
org.springframework.security.config.annotation.web.configuration.EnableWebSec
urity;
import
org.springframework.security.config.annotation.web.configuration.WebSecurityC
onfigurerAdapter;
import org.springframework.security.core.userdetails.User;
import org.springframework.security.core.userdetails.UserDetails;
import org.springframework.security.core.userdetails.UserDetailsService;
import org.springframework.security.crypto.bcrypt.BCryptPasswordEncoder;
import org.springframework.security.crypto.password.PasswordEncoder;
import org.springframework.security.provisioning.InMemoryUserDetailsManager;
```

```
@Configuration
@EnableWebSecurity
@EnableGlobalMethodSecurity(prePostEnabled = true)
public class SecurityConfig extends WebSecurityConfigurerAdapter {

    @Autowired
    private CustomUserDetailsService userDetailsService;

    @Bean
    PasswordEncoder passwordEncoder(){
        return new BCryptPasswordEncoder();
    }

    @Override
    protected void configure(HttpSecurity http) throws Exception {
        http
                .csrf().disable()
                .authorizeRequests()
                .antMatchers(HttpMethod.GET, "/api/**").permitAll()
                .anyRequest()
                .authenticated()
                .and()
                .httpBasic();
    }

    @Override
    protected void configure(AuthenticationManagerBuilder auth) throws
Exception {
        auth.userDetailsService(userDetailsService)
                .passwordEncoder(passwordEncoder());
    }

    //    @Override
//    @Bean
//    protected UserDetailsService userDetailsService() {
//        UserDetails ramesh =
User.builder().username("ramesh").password(passwordEncoder()
//                .encode("password")).roles("USER").build();
//        UserDetails admin =
User.builder().username("admin").password(passwordEncoder()
//                .encode("admin")).roles("ADMIN").build();
//        return new InMemoryUserDetailsManager(ramesh, admin);
//    }
}
```

Developing Signin Rest API

Step 1: Create LoginDto class in payload package:

```
import lombok.Data;



@Data

public class LoginDto {

   private String usernameOrEmail;

   private String password;

}
```

Step 2: Create AuthController class in controller package:

```
import com.springboot.blog.payload.LoginDto;
import com.springboot.blog.repository.UserRepository;
import org.springframework.beans.factory.annotation.Autowired;
import org.springframework.http.HttpStatus;
import org.springframework.http.ResponseEntity;
import org.springframework.security.authentication.AuthenticationManager;
import
org.springframework.security.authentication.UsernamePasswordAuthenticationTok
en;
import org.springframework.security.core.Authentication;
import org.springframework.security.core.context.SecurityContextHolder;
import org.springframework.web.bind.annotation.PostMapping;
import org.springframework.web.bind.annotation.RequestBody;
import org.springframework.web.bind.annotation.RequestMapping;
import org.springframework.web.bind.annotation.RestController;

@RestController
@RequestMapping("/api/auth")
public class AuthController {

    @Autowired
    private AuthenticationManager authenticationManager;

    @PostMapping("/signin")
    public ResponseEntity<String> authenticateUser(@RequestBody LoginDto
loginDto){
        Authentication authentication = authenticationManager.authenticate(
                new
UsernamePasswordAuthenticationToken(loginDto.getUsernameOrEmail(),
loginDto.getPassword())
        );
        SecurityContextHolder.getContext().setAuthentication(authentication);
        return new ResponseEntity<>("User signed-in successfully!.",
HttpStatus.OK);
    }
}
```

Step 3: Update SecurityConfig File:

```
import com.springboot.blog.security.CustomUserDetailsService;
import org.springframework.beans.factory.annotation.Autowired;
import org.springframework.context.annotation.Bean;
import org.springframework.context.annotation.Configuration;
import org.springframework.http.HttpMethod;
import org.springframework.security.authentication.AuthenticationManager;
import
org.springframework.security.config.annotation.authentication.builders.Authen
ticationManagerBuilder;
import
org.springframework.security.config.annotation.method.configuration.EnableGlo
balMethodSecurity;
import
org.springframework.security.config.annotation.web.builders.HttpSecurity;
import
org.springframework.security.config.annotation.web.configuration.EnableWebSec
urity;
import
org.springframework.security.config.annotation.web.configuration.WebSecurityC
onfigurerAdapter;
import org.springframework.security.core.userdetails.User;
import org.springframework.security.core.userdetails.UserDetails;
import org.springframework.security.core.userdetails.UserDetailsService;
import org.springframework.security.crypto.bcrypt.BCryptPasswordEncoder;
import org.springframework.security.crypto.password.PasswordEncoder;
import org.springframework.security.provisioning.InMemoryUserDetailsManager;

@Configuration
@EnableWebSecurity
@EnableGlobalMethodSecurity(prePostEnabled = true)
public class SecurityConfig extends WebSecurityConfigurerAdapter {

    @Autowired
    private CustomUserDetailsService userDetailsService;

    @Bean
    PasswordEncoder passwordEncoder(){
        return new BCryptPasswordEncoder();
    }

    @Override
    @Bean
    public AuthenticationManager authenticationManagerBean() throws Exception
{
        return super.authenticationManagerBean();
    }

    @Override
    protected void configure(HttpSecurity http) throws Exception {
        http
                .csrf().disable()
                .authorizeRequests()
                .antMatchers(HttpMethod.GET, "/api/**").permitAll()
                .antMatchers("/api/auth/**").permitAll()
                .anyRequest()
                .authenticated()
                .and()
                .httpBasic();
    }

    @Override
    protected void configure(AuthenticationManagerBuilder auth) throws
Exception {
        auth.userDetailsService(userDetailsService)
                .passwordEncoder(passwordEncoder());
    }

    //    @Override
//    @Bean
//    protected UserDetailsService userDetailsService() {
//        UserDetails ramesh =
User.builder().username("ramesh").password(passwordEncoder()
//                .encode("password")).roles("USER").build();
//        UserDetails admin =
User.builder().username("admin").password(passwordEncoder()
//                .encode("admin")).roles("ADMIN").build();
//        return new InMemoryUserDetailsManager(ramesh, admin);
//    }
}
```

Developing SignUp Feature Rest API

Step 1: Update AuthController class as shown below

```
package com.springboot.blog.controller;

import com.springboot.blog.entity.Role;
import com.springboot.blog.entity.User;
import com.springboot.blog.payload.LoginDto;
import com.springboot.blog.payload.SignUpDto;
import com.springboot.blog.repository.RoleRepository;
import com.springboot.blog.repository.UserRepository;
import org.springframework.beans.factory.annotation.Autowired;
import org.springframework.http.HttpStatus;
import org.springframework.http.ResponseEntity;
import org.springframework.security.authentication.AuthenticationManager;
import
org.springframework.security.authentication.UsernamePasswordAuthenticationTok
en;
import org.springframework.security.core.Authentication;
import org.springframework.security.core.context.SecurityContextHolder;
import org.springframework.security.crypto.password.PasswordEncoder;
import org.springframework.web.bind.annotation.PostMapping;
import org.springframework.web.bind.annotation.RequestBody;
import org.springframework.web.bind.annotation.RequestMapping;
import org.springframework.web.bind.annotation.RestController;
import java.util.Collections;

@RestController
@RequestMapping("/api/auth")
public class AuthController {

    @Autowired
    private AuthenticationManager authenticationManager;

    @Autowired
    private UserRepository userRepository;

    @Autowired
    private RoleRepository roleRepository;

    @Autowired
    private PasswordEncoder passwordEncoder;

    @PostMapping("/signin")
    public ResponseEntity<String> authenticateUser(@RequestBody LoginDto
loginDto){
        Authentication authentication =
authenticationManager.authenticate(new UsernamePasswordAuthenticationToken(
                loginDto.getUsernameOrEmail(), loginDto.getPassword()));

        SecurityContextHolder.getContext().setAuthentication(authentication);
        return new ResponseEntity<>("User signed-in successfully!.",
HttpStatus.OK);
    }

    @PostMapping("/signup")
    public ResponseEntity<?> registerUser(@RequestBody SignUpDto signUpDto){

        // add check for username exists in a DB
        if(userRepository.existsByUsername(signUpDto.getUsername())){
            return new ResponseEntity<>("Username is already taken!",
HttpStatus.BAD_REQUEST);
        }

        // add check for email exists in DB
        if(userRepository.existsByEmail(signUpDto.getEmail())){
            return new ResponseEntity<>("Email is already taken!",
HttpStatus.BAD_REQUEST);
        }

        // create user object
        User user = new User();
        user.setName(signUpDto.getName());
        user.setUsername(signUpDto.getUsername());
        user.setEmail(signUpDto.getEmail());
        user.setPassword(passwordEncoder.encode(signUpDto.getPassword()));

        Role roles = roleRepository.findByName("ROLE_ADMIN").get();
        user.setRoles(Collections.singleton(roles));

        userRepository.save(user);
        return new ResponseEntity<>("User registered successfully",
HttpStatus.OK);

    }
}
```

Step 2: Develop SignUpDto payload class:

```
import lombok.Data;

@Data
public class SignUpDto {
    private String name;
    private String username;
    private String email;
    private String password;
}
```

Developing JWT Token

For JWT Token add the following dependency:

```
<dependency>

<groupId>io.jsonwebtoken</groupId>

<artifactId>jjwt</artifactId>

<version>0.9.1</version>

</dependency>
```

Step 1: In security package create JwtAuthenticationEntryPoint

import org.springframework.security.core.AuthenticationException;

import org.springframework.security.web.AuthenticationEntryPoint;

import org.springframework.stereotype.Component;

import javax.servlet.ServletException;

import javax.servlet.http.HttpServletRequest;

```
import javax.servlet.http.HttpServletResponse;

import java.io.IOException;


@Component

public class JwtAuthenticationEntryPoint implements AuthenticationEntryPoint {

   @Override

   public void commence(HttpServletRequest request,

                    HttpServletResponse response,

                    AuthenticationException authException) throws IOException, ServletException {

       response.sendError(HttpServletResponse.SC_UNAUTHORIZED,
authException.getMessage());


   }

}
```

Step 2: Update application.properties file:

```
## App Properties

app.jwt-secret= JWTSecretKey

app.jwt-expiration-milliseconds = 604800000
```

Step 3: Develop JwtAuthenticationFilter class in security package:

```
package com.springboot.blog.security;


import org.springframework.beans.factory.annotation.Autowired;

import
org.springframework.security.authentication.UsernamePasswordAuthenticationToken;
```

```
import org.springframework.security.core.context.SecurityContextHolder;

import org.springframework.security.core.userdetails.UserDetails;

import org.springframework.security.web.authentication.WebAuthenticationDetailsSource;

import org.springframework.util.StringUtils;

import org.springframework.web.filter.OncePerRequestFilter;


import javax.servlet.FilterChain;

import javax.servlet.ServletException;

import javax.servlet.http.HttpServletRequest;

import javax.servlet.http.HttpServletResponse;

import java.io.IOException;


public class JwtAuthenticationFilter extends OncePerRequestFilter {


    // inject dependencies

    @Autowired

    private JwtTokenProvider tokenProvider;


    @Autowired

    private CustomUserDetailsService customUserDetailsService;


    @Override

    protected void doFilterInternal(HttpServletRequest request,

                                    HttpServletResponse response,
                    FilterChain filterChain) throws ServletException, IOException {
        // get JWT (token) from http request
        String token = getJWTfromRequest(request);
        // validate token
        if(StringUtils.hasText(token) && tokenProvider.validateToken(token)){
            // get username from token
            String username = tokenProvider.getUsernameFromJWT(token);
            // load user associated with token
            UserDetails userDetails = customUserDetailsService.loadUserByUsername(username);

            UsernamePasswordAuthenticationToken authenticationToken = new
UsernamePasswordAuthenticationToken(
                    userDetails, null, userDetails.getAuthorities()
            );
            authenticationToken.setDetails(new
WebAuthenticationDetailsSource().buildDetails(request));
            // set spring security
            SecurityContextHolder.getContext().setAuthentication(authenticationToken);
        }
        filterChain.doFilter(request, response);
    }

    // Bearer <accessToken>
    private String getJWTfromRequest(HttpServletRequest request){
        String bearerToken = request.getHeader("Authorization");
            if(StringUtils.hasText(bearerToken) && bearerToken.startsWith("Bearer ")){
                return bearerToken.substring(7, bearerToken.length());
            }
            return null;
    }

}
```

Step 4: Develop JwtTokenProvider class in security package:

```
package com.springboot.blog.security;

import com.springboot.blog.exception.BlogAPIException;
import io.jsonwebtoken.*;
import org.springframework.beans.factory.annotation.Value;
import org.springframework.http.HttpStatus;
import org.springframework.security.core.Authentication;
import org.springframework.stereotype.Component;

import java.util.Date;

@Component
public class JwtTokenProvider {

    @Value("${app.jwt-secret}")
    private String jwtSecret;
```

```
@Value("${app.jwt-expiration-milliseconds}")

private int jwtExpirationInMs;


// generate token

public String generateToken(Authentication authentication){

   String username = authentication.getName();

   Date currentDate = new Date();

   Date expireDate = new Date(currentDate.getTime() + jwtExpirationInMs);


   String token = Jwts.builder()

         .setSubject(username)

         .setIssuedAt(new Date())

         .setExpiration(expireDate)

         .signWith(SignatureAlgorithm.HS512, jwtSecret)

         .compact();

   return token;

}


// get username from the token

public String getUsernameFromJWT(String token){

   Claims claims = Jwts.parser()

         .setSigningKey(jwtSecret)

         .parseClaimsJws(token)

         .getBody();
```

```
        return claims.getSubject();
    }


    // validate JWT token
    public boolean validateToken(String token){
        try{
            Jwts.parser().setSigningKey(jwtSecret).parseClaimsJws(token);
            return true;
        }catch (SignatureException ex){
            throw new BlogAPIException(HttpStatus.BAD_REQUEST, "Invalid JWT signature");
        } catch (MalformedJwtException ex) {
            throw new BlogAPIException(HttpStatus.BAD_REQUEST, "Invalid JWT token");
        } catch (ExpiredJwtException ex) {
            throw new BlogAPIException(HttpStatus.BAD_REQUEST, "Expired JWT token");
        } catch (UnsupportedJwtException ex) {
            throw new BlogAPIException(HttpStatus.BAD_REQUEST, "Unsupported JWT token");
        } catch (IllegalArgumentException ex) {
            throw new BlogAPIException(HttpStatus.BAD_REQUEST, "JWT claims string is
empty.");
        }
    }


}
```

Step 4: Update AuthController class:

```
import com.springboot.blog.entity.Role;

import com.springboot.blog.entity.User;

import com.springboot.blog.payload.JWTAuthResponse;

import com.springboot.blog.payload.LoginDto;

import com.springboot.blog.payload.SignUpDto;

import com.springboot.blog.repository.RoleRepository;

import com.springboot.blog.repository.UserRepository;

import com.springboot.blog.security.JwtTokenProvider;

import org.springframework.beans.factory.annotation.Autowired;

import org.springframework.http.HttpStatus;

import org.springframework.http.ResponseEntity;

import org.springframework.security.authentication.AuthenticationManager;

import
org.springframework.security.authentication.UsernamePasswordAuthenticationToken;

import org.springframework.security.core.Authentication;

import org.springframework.security.core.context.SecurityContextHolder;

import org.springframework.security.crypto.password.PasswordEncoder;

import org.springframework.web.bind.annotation.PostMapping;

import org.springframework.web.bind.annotation.RequestBody;

import org.springframework.web.bind.annotation.RequestMapping;

import org.springframework.web.bind.annotation.RestController;


import java.util.Collections;
```

```
@RestController

@RequestMapping("/api/auth")

public class AuthController {


  @Autowired

  private AuthenticationManager authenticationManager;


  @Autowired

  private UserRepository userRepository;


  @Autowired

  private RoleRepository roleRepository;


  @Autowired

  private PasswordEncoder passwordEncoder;


  @Autowired

  private JwtTokenProvider tokenProvider;


  @PostMapping("/signin")

  public ResponseEntity<JWTAuthResponse> authenticateUser(@RequestBody LoginDto
loginDto){

    Authentication authentication = authenticationManager.authenticate(new
UsernamePasswordAuthenticationToken(

        loginDto.getUsernameOrEmail(), loginDto.getPassword()));
    SecurityContextHolder.getContext().setAuthentication(authentication);

    // get token form tokenProvider
    String token = tokenProvider.generateToken(authentication);

    return ResponseEntity.ok(new JWTAuthResponse(token));
  }

  @PostMapping("/signup")
  public ResponseEntity<?> registerUser(@RequestBody SignUpDto signUpDto){

    // add check for username exists in a DB
    if(userRepository.existsByUsername(signUpDto.getUsername())){
        return new ResponseEntity<>("Username is already taken!",
HttpStatus.BAD_REQUEST);
    }

    // add check for email exists in DB
    if(userRepository.existsByEmail(signUpDto.getEmail())){
        return new ResponseEntity<>("Email is already taken!", HttpStatus.BAD_REQUEST);
    }

    // create user object
    User user = new User();
    user.setName(signUpDto.getName());
    user.setUsername(signUpDto.getUsername());
    user.setEmail(signUpDto.getEmail());
    user.setPassword(passwordEncoder.encode(signUpDto.getPassword()));

    Role roles = roleRepository.findByName("ROLE_ADMIN").get();
    user.setRoles(Collections.singleton(roles));

    userRepository.save(user);

    return new ResponseEntity<>("User registered successfully", HttpStatus.OK);

  }
}
```

Step 5: Create payload class JWTAuthResponse

```
public class JWTAuthResponse {
    private String accessToken;
    private String tokenType = "Bearer";

    public JWTAuthResponse(String accessToken) {
        this.accessToken = accessToken;
    }

    public void setAccessToken(String accessToken) {

        this.accessToken = accessToken;

    }


    public void setTokenType(String tokenType) {

        this.tokenType = tokenType;

    }


    public String getAccessToken() {

        return accessToken;

    }


    public String getTokenType() {

        return tokenType;

    }

}
```