초급 백엔드 스터디

8주차 - 프로젝트 배포, API 문서화

지난 주에는...

- 유효성 검증
- Global Exception Handler (AOP)
- 예외 메시지 리팩토링

이번 주에는...

- API 문서화
- 프로젝트 배포

- 백엔드가 만든 API에 대한 사용법을 문서로 공유하는 것
- 프론트엔드와 협업할 때 API 문서를 공유한다.

API 문서화 과정

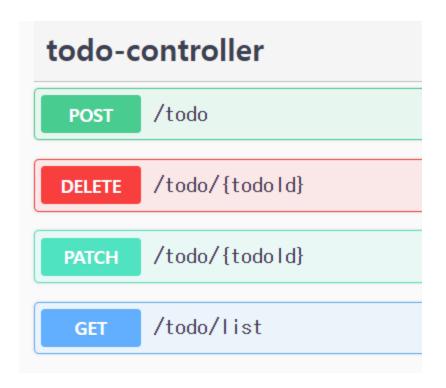
- 1. spring doc을 이용해서 OpenAPI 규격으로 API 문서 생성 (OpenAPI: 표준 API 문서 규격)
- 2. Swagger-ui를 사용하여 spring doc이 생성한 API 문서에 swagger 디자인 적용 (swagger 이외에도 다양한 API 문서화 도구가 있습니다.)

• Spring doc 의존성을 추가한다.

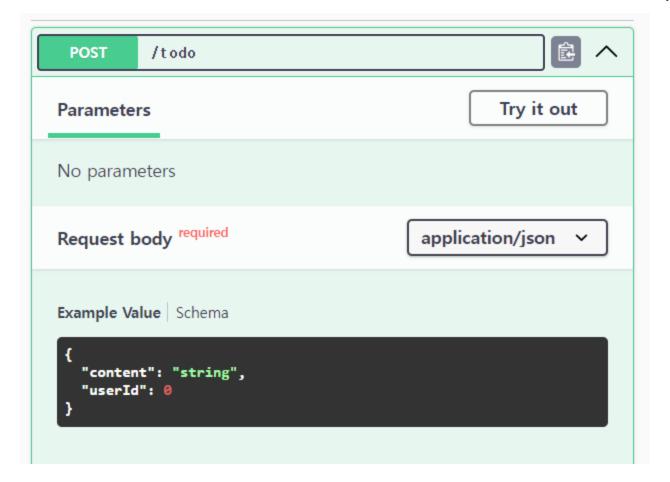
implementation 'org.springdoc:springdoc-openapi-starter-webmvc-ui:2.6.0'

```
dependencies {
    implementation 'org.springdoc:springdoc-openapi-starter-webmvc-ui:2.6.0'
    implementation 'org.springframework.boot:spring-boot-starter-data-jpa'
    implementation 'org.springframework.boot:spring-boot-starter-web'
    implementation 'org.springframework.boot:spring-boot-starter-validation'
    compileOnly 'org.projectlombok:lombok'
    annotationProcessor 'org.projectlombok:lombok'
    testImplementation 'org.springframework.boot:spring-boot-starter-test'
    testRuntimeOnly 'org.junit.platform:junit-platform-launcher'
```

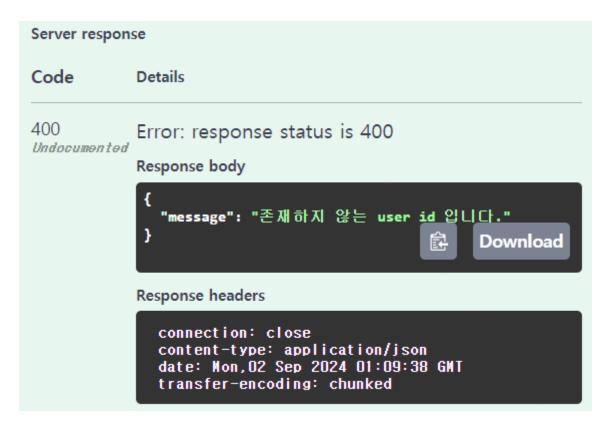
• spring doc은 swagger-ui를 적용한 문서를 만들어준다. http://localhost:8080/swagger-ui/index.html 접속



• API 호출 시 필요한 정보를 알 수 있고, 요청을 보내볼 수도 있다.



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• @ApiResponse를 사용하여 status code마다 설명을 적을 수 있다.

```
@PostMapping ©>>
@ApiResponse(responseCode = "404", description = "요청에 들어온 user id 가 <u>존재하지</u> 않음")
public ResponseEntity<Void> createTodo(@RequestBody @Valid TodoCreateRequest request) throws Exception {
    Long todoId = todoService.createTodo(request.getContent(), request.getUserId());
    return ResponseEntity.created(URI.create("/todo/" + todoId)).build();
}
```

Code	Description
404	요청에 들어온 user id 가 존재하지 않음

 누구나 인터넷을 통해 요청을 보낼 수 있도록
 우리가 만든 서버를 인터넷에 연결된 서버 컴퓨터에서 24시간 실행시켜 두는 것

- 노트북도 설정만 잘 해주면 서버 컴퓨터로 쓸 수 있다. 하지만 서버 컴퓨터를 설정하고 관리하는 것은 매우 복잡하다. (네트워크 설정, 방화벽 설정, 컴퓨터 온도 관리, 모니터링 등)
- 그래서 보통 잘 관리되는 **서버 컴퓨터를 빌려서 배포**한다.

- 서버 컴퓨터에서 우리가 만든 어플리케이션을 어떻게 실행할 수 있을까?
- 소스코드 옮기기 → 인텔리제이 설치하기 → 실행하기?

• 인텔리제이가 실행하는 방법

/Library/Java/JavaVirtualMachines/jdk-17.jdk/Contents/Home/bin/java -XX:TieredStopAtLevel=1 -Dspring.output.ansi.enabled=always -Dcom.sun.management.jmxremote -Dspring.jmx.enabled=true -Dspring.liveBeansView.mbeanDomain -Dspring.application.admin.enabled=true -Dmanagement.endpoints.jmx.exposure.include=* -javaagent:/Applications/IntelliJ IDEA.app/Contents/lib/idea_rt.jar=49344:/Applications/IntelliJ IDEA.app/Contents/bin -Dfile.encoding=UTF-8 -classpath /\users/everdu/\deaProjects/gdsc-2024-2-backerd-study/build/dasses/java/main;/\Users/everdu/\deaProjects/gdsc-2024-2-backerd-study/build/resources/main/\Users/everdu/\gradle/caches/modules-2/fies-2.1/org.projectlombok/1.18.34/es547ef414ab1d2c040118fb9c1c265ada63af14/lombok-1.18.34.jar;/\Users/everdu/\gradle/caches/modules-2/fies-2.1/org.springframework.boot/spring-boot-starter-data-jpa/3.32/2731d74dfc18fb905c29930d55499380c2ce65a/spring-boot-starter-data-jpa-3.32.jar;/\Users/everdu/\gradle/caches/modules-2/fies-2.1/org.springframework.boot/spring-boot-starter-data-jpa-3.32.jar;/\Users/everdu/\gradle/caches/modules-2/fies-2.1/org.springframework.boot/spring-boot-starter-data-jpa-3.32.jar;/\Users/everdu/\gradle/caches/modules-2/fies-2.1/org.springframework.boot/spring-boot-starter-data-jpa-3.32.jar;/\Users/everdu/\gradle/caches/modules-2/fies-2.1/org.springframework.boot/spring-boot-starter-data-jpa-3.32.jar;\Users/everdu/\gradle/caches/modules-2/fies-2.1/org.springframework.boot/spring-boot-starter-data-jpa-3.32.jar;\Users/everdu/\gradle/caches/modules-2/fies-2.1/org.springframework.boot/spring-boot-starter-data-jpa-3.32.jar;\Users/everdu/\gradle/caches/modules-2/fies-2.1/org.springframework.boot/spring-boot-starter-data-jpa-3.32.jar;\Users/everdu/\gradle/caches/modules-2/fies-2.1/org.springframework.boot/spring-boot-starter-data-jpa-3.32.jar;\Users/everdu/\gradle/caches/modules-2/fies-2.1/org.springframework.boot/spring-boot-starter-data-jpa-3.32.jar;\Users/everdu/\gradle/caches/modules-2/fies-2.1/org.springframework.boot/spring-boot-starter-data-jpa-3.32.jar;\Users/everdu/\gradle/caches/modules-2/fies-2.1/org.springframework.boot/spring-boot-starter-data-jpa-3.32.jar;\Users/everdu/\gradle/caches/modules-2/fies-2.1/org.springframework.boot/spring-boot-starter-data-jpa-3.32.jar;\Users/everdu/\gradle/caches/modules-2/fies-2.1/org.springframework.boot/spring-boot-starter-data-jpa-3.32.jar;\Users/everdu/\gradle/caches/modules-2/fies-2.1/org.springframework.boot 2.1/org. springframework boot/spring-boot-starter-web/3.3.2/720418538668a8742d0ae24097811d5250d5c32/spring-boot-starter-web-3.3.2.jar,/Users/everdu/.gradle/caches/modules-2/files-2.1/org.springframework boot/spring-boot-starter-validation/3.3.2/81ee0fb318ed35c2a344882a0f7b9946a39e1b39/spring-boot-starter-validation-3.3.2.jar,/Users/everdu/.gradle/caches/modules-2/files-2.1/org.springframework boot/spring-boot-starter-app/3.3.2/26d96e253768d3121bb3ffbef28cerc07fdbddb/spring-boot-starter-aop-3.3.2.jar,/Users/everdu/.gradle/caches/modules-2/files-2.1/org.springframework 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- 매번 변경된 소스 코드를 git으로 받아온 뒤 명령어로 실행하는 것은 어렵다.
- 따라서 어플리케이션을 하나의 파일로 실행할 수 있도록, 여러 소스코드를 합치는 **빌드** 과정을 거쳐 실행한다.

- 자바 어플리케이션 빌드
- ./gradlew build

```
→ gdsc-2024-2-backend-study git:(week7-real) × ./gradlew build

Welcome to Gradle 8.8!

Here are the highlights of this release:
```

- 자바 어플리케이션 빌드
- 어플리케이션을 빌드할 때는 모든 테스트가 통과해야 한다.

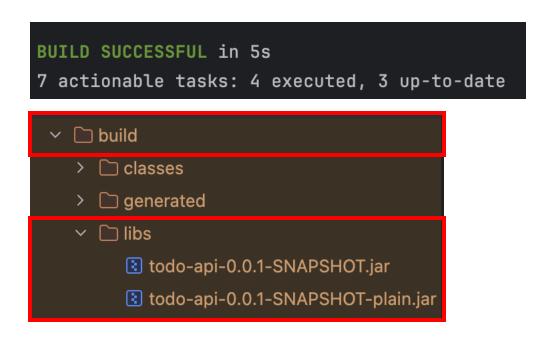
```
TodoRepositoryTest > todoUpdateTest() FAILED
    java.lang.IllegalStateException at DefaultCacheAwareContextLoaderDelegate.java:145

TodoRepositoryTest > todoFindOneByIdTest() FAILED
    java.lang.IllegalStateException at DefaultCacheAwareContextLoaderDelegate.java:145

TodoRepositoryTest > todoFindAllByMemberTest() FAILED
    java.lang.IllegalStateException at DefaultCacheAwareContextLoaderDelegate.java:145
```

- 자바 어플리케이션 빌드
- 레포지토리 테스트는 제거하고, 서비스 테스트는 통과하도록 수정

- 자바 어플리케이션 빌드
- 빌드 성공시 하나의 실행가능한 .jar 파일이 만들어진다.



- 자바 어플리케이션 실행
- java -jar "jar 파일"
 - → gdsc-2024-2-backend-study git:(week8-practice) × java -jar build/libs/todo-api-0.0.1-SNAPSHOT.jar

```
2024-11-20T11:32:50.713+09:00 INFO 79131 --- [todo-api] [ main] j.LocalContainerEntityManagerFactoryBean : Initialized JPA EntityManagerFactory for persistence unit 'default'

2024-11-20T11:32:50.815+09:00 WARN 79131 --- [todo-api] [ main] JpaBaseConfiguration$JpaWebConfiguration : spring.jpa.open-in-view is enabled by default. Therefore, database queries may be performed during view rendering. Explicitly configure spring.jpa.open-in-view to disable this warning

2024-11-20T11:32:50.982+09:00 INFO 79131 --- [todo-api] [ main] o.s.b.w.embedded.tomcat.TomcatWebServer : Tomcat started on port 8080 (http) with context path

'/'

2024-11-20T11:32:50.994+09:00 INFO 79131 --- [todo-api] [ main] com.example.todoapi.TodoApiApplication : Started TodoApiApplication in 2.23 seconds (process running for 2.47)
```

프로젝트 배포 과정

- 1. 로컬에서 어플리케이션을 **빌드**하여 jar **파일**을 만든다.
- 2. Java가 설치된 서버 컴퓨터에 jar 파일을 옮겨 넣는다.
- 3. 서버 컴퓨터에서 jar 파일을 실행한다.

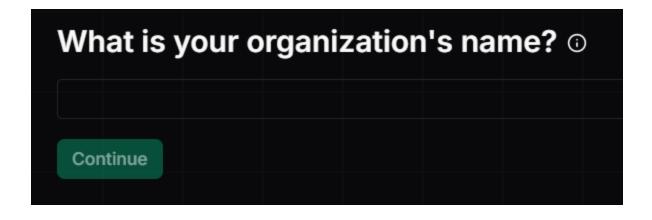
• AWS, GCP 와 같은 서비스를 통해 컴퓨터를 대여 받을 수 있다. 대여받은 컴퓨터에 java를 설치하고 jar 파일을 옮겨서 실행하면 서버 컴퓨터에 스프링 서버를 실행할 수 있다.

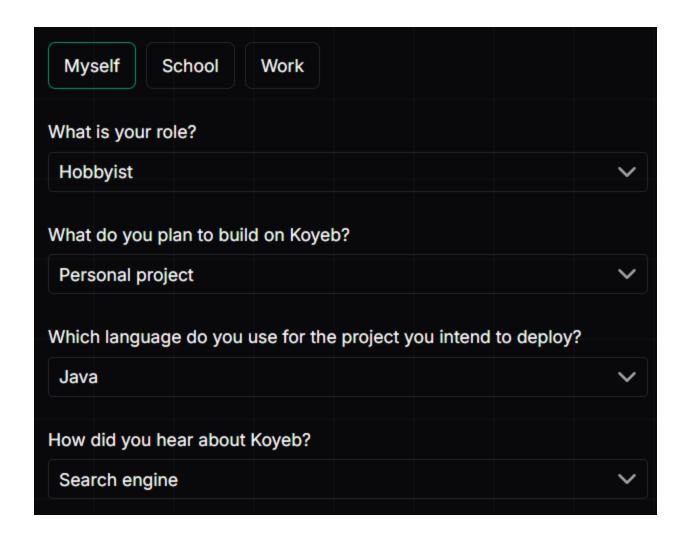
(멀리 떨어진 서버에 java를 어떻게 설치하고, jar 파일을 어떻게 옮길까요?)

• Koyeb, Qoddi 와 같은 서비스는 컴퓨터를 빌려줄 뿐만 아니라, 깃허브와 연동해서 빌드, 실행까지 자동화 해준다. (실제로는 aws 인스턴스를 빌려서 배포하는 게 일반적입니다.)

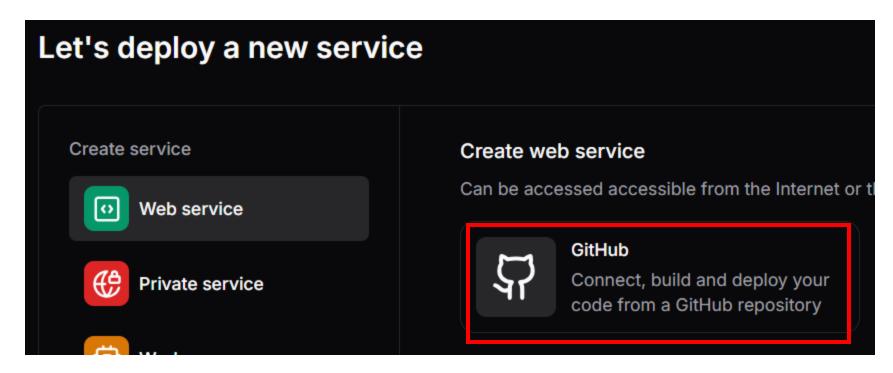
- https://app.koyeb.com/
- 깃허브 계정 또는 이메일로 회원가입하자. (ppt와 동일하게 진행하고 싶다면 이메일로 가입하자)

• 조직 이름을 입력한다.

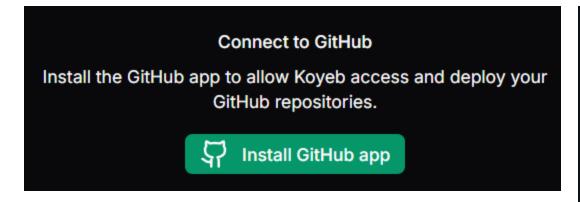




• 배포 서비스는 Github 선택

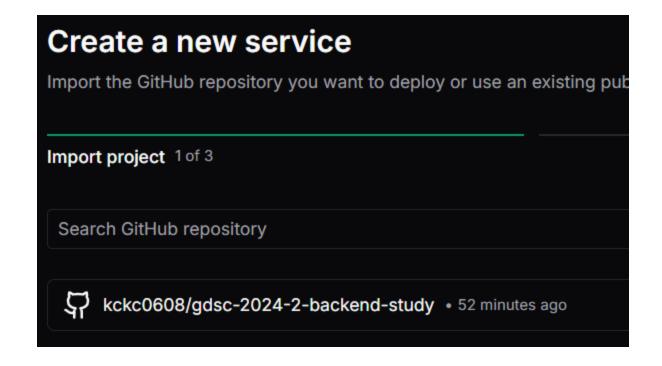


• Github 레포지토리를 연동한다.

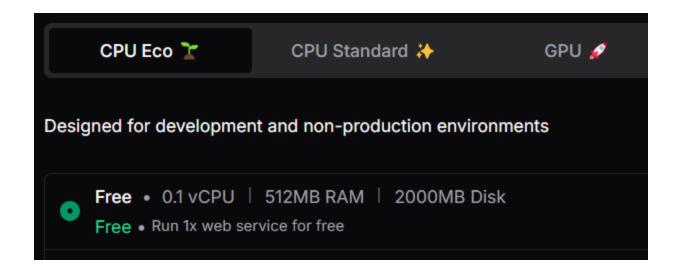


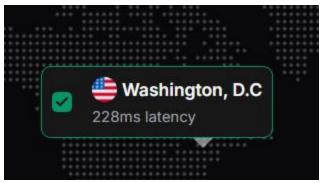


• 프로젝트 레포지토리를 선택한다.

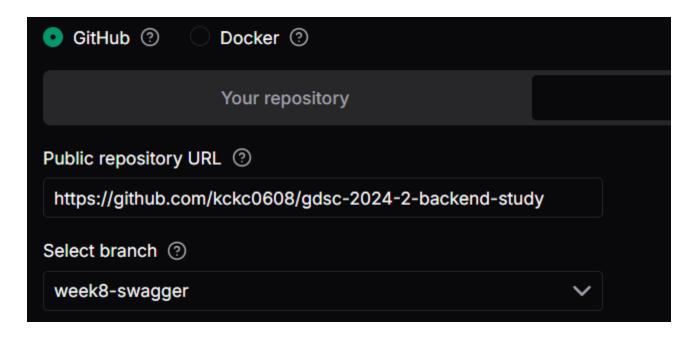


• CPU는 무료 CPU, 배포 지역은 지연율이 제일 낮은 곳을 선택한다.





• 배포하려는 코드가 있는 브랜치를 선택한다.

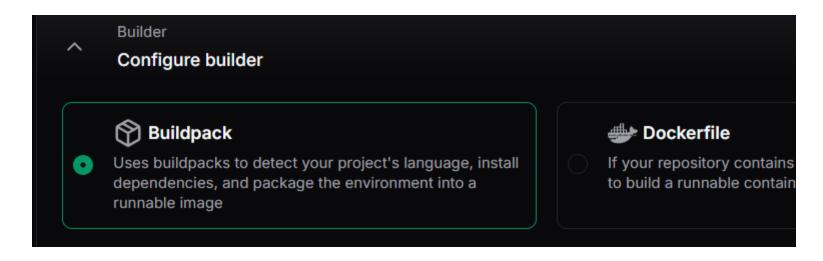


- Koyeb은 깃허브에서 빌드할 어플리케이션 소스코드를 가져오고, Koyeb이 미리 준비한 자바 환경에서 소스코드를 빌드한다.
 - 1. 어플리케이션을 **빌드**하여 **jar 파일**을 만든다.
 - 2. Java가 설치된 서버 컴퓨터에 jar 파일을 옮겨 넣는다.
 - 3. 서버 컴퓨터에서 jar **파일을 실행**한다.

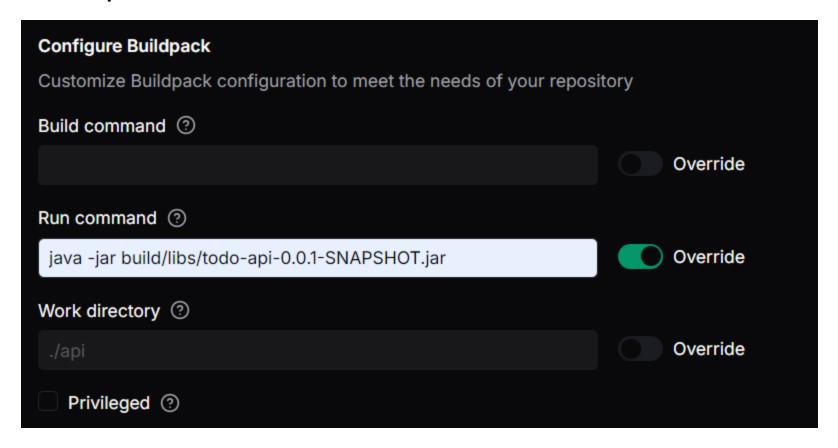
• Koyeb이 제공하는 컴퓨터에 빌드한 jar 파일이 생긴다.

- 1. 어플리케이션을 **빌드**하여 jar **파일**을 만든다.
- 2. Java가 설치된 서버 컴퓨터에 jar 파일을 옮겨 넣는다.
- 3. 서버 컴퓨터에서 jar **파일을 실행**한다.

• 빌더는 Buildpack을 선택한다.



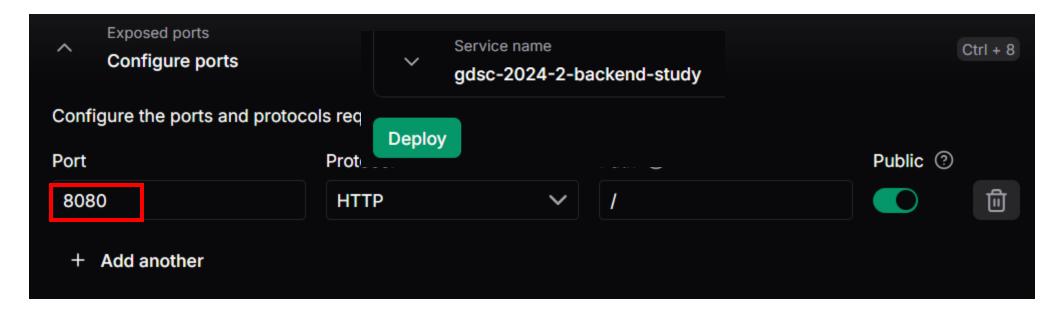
• Buildpack 설정에서 Run command를 다음과 같이 설정한다.



• 이 명령어는 배포 과정에서 3번 과정에 해당하는 명령어이다.

- 1. 어플리케이션을 **빌드**하여 jar **파일**을 만든다.
- 2. Java가 설치된 서버 컴퓨터에 jar 파일을 옮겨 넣는다.
- 3. 서버 컴퓨터에서 **jar 파일을 실행**한다.

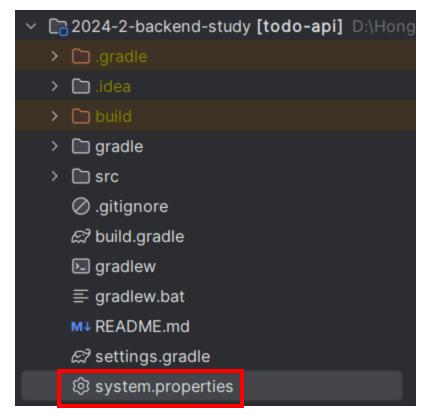
• 어플리케이션을 실행할 포트를 8080으로 지정한다.



- Koyeb은 기본적으로 빌려줄 컴퓨터에 java 8을 설치한다.
- 우리는 java 17을 사용하므로 Koyeb이 java 17을 설치하도록 세팅 해주자.

• 프로젝트 루트에 system.properties 파일을 만든다.

(Koyeb 공식문서 참고 : https://www.koyeb.com/docs)



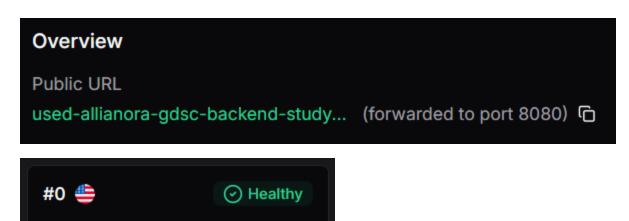
java.runtime.version=17

• 설정이 끝났다면 Deploy 버튼을 클릭한다.

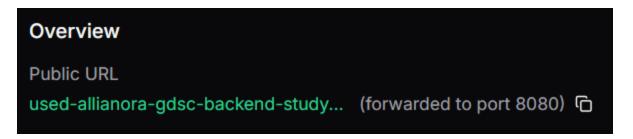


Instance is healthy. All health ...

• Public URL이 생성되고, 빌드와 배포가 진행된다. (몇 분 소요)



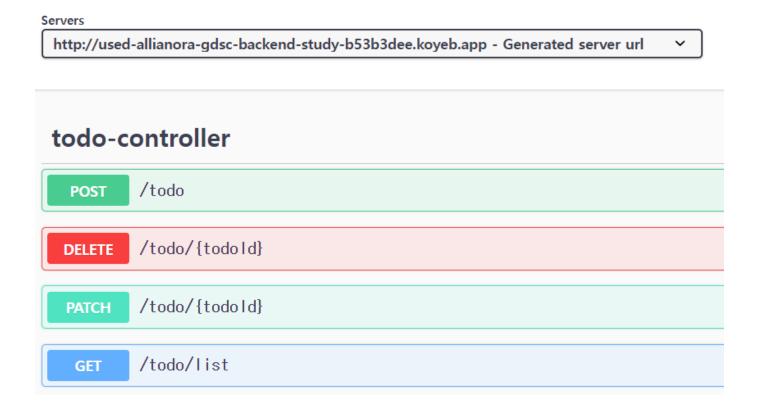
• Public URL 경로 뒤에 /swagger-ui/index.html 을 붙여 접속해보자.



• 위 경로의 경우

https://used-allianora-gdsc-backend-study-b53b3dee.koyeb.app/swagger-ui/index.html

• API 문서가 나오면 배포가 잘 된 것이다.



• 클라이언트는 public URL로 백엔드와 데이터를 주고 받는다.



프로젝트 - 과제

- swagger-ui API 문서를 만들어보자.
- Koyeb을 사용해서 프로젝트를 배포해보자.

다음으로

- AWS, Docker 를 공부하고 직접 서버를 설정해서 배포해보기
- Java가 어떻게 빌드되는지, gradle, jvm 관련 내용을 더 찾아보기
- Spring Security를 공부하고 로그인, 세션, jwt를 공부해보기 (개발자 유미 유튜브 강의 영상 추천 : https://www.youtube.com/@xxxjjhhh)