

PACEMAKER

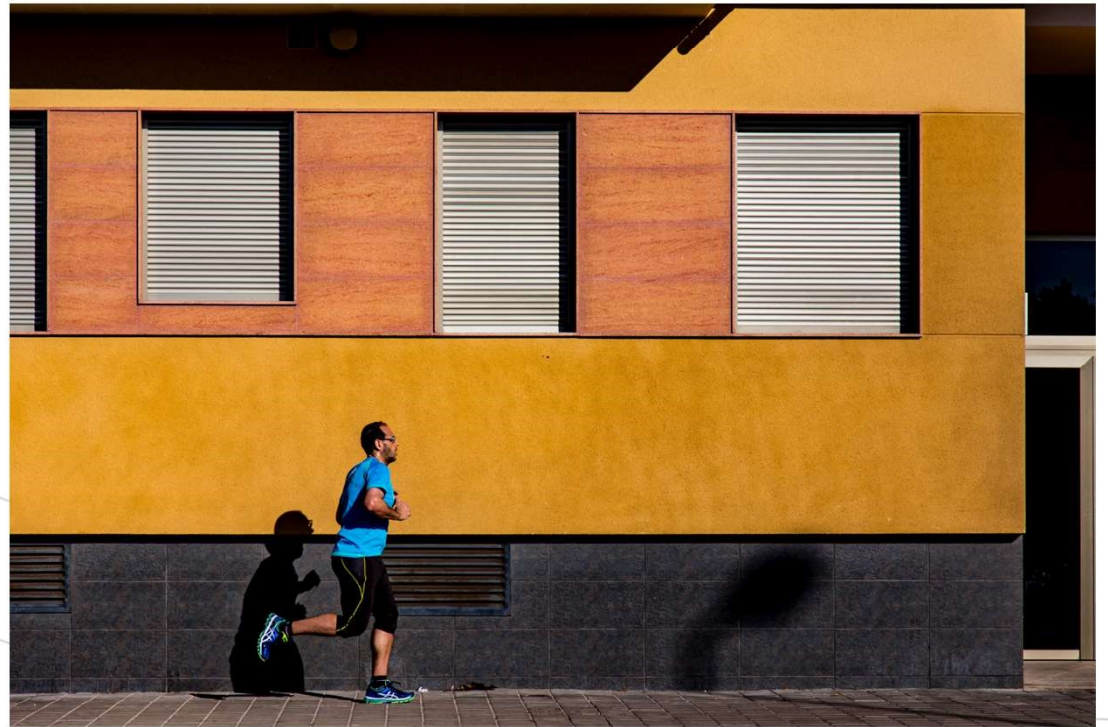
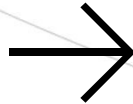
1st Demo

곽신우 (201411260)

문성찬 (201511260)

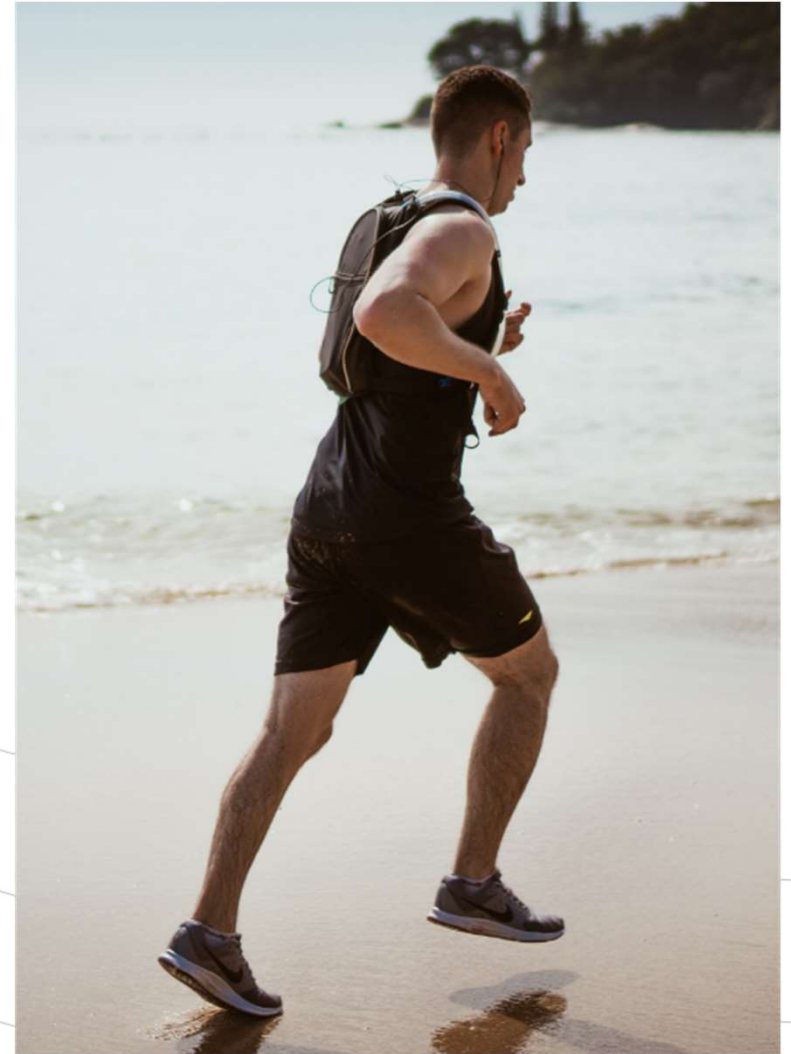
배윤희 (201511266)

주재빈 (201511298)



CONTENTS

- I. WHAT IS PACEMAKER
- II. QUESTION GENERATION
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WHAT IS PACEMAKER

Your Running Mate

When you run,

We are with you.

When you are tired,

We are waiting for you.

On the way you want to go,

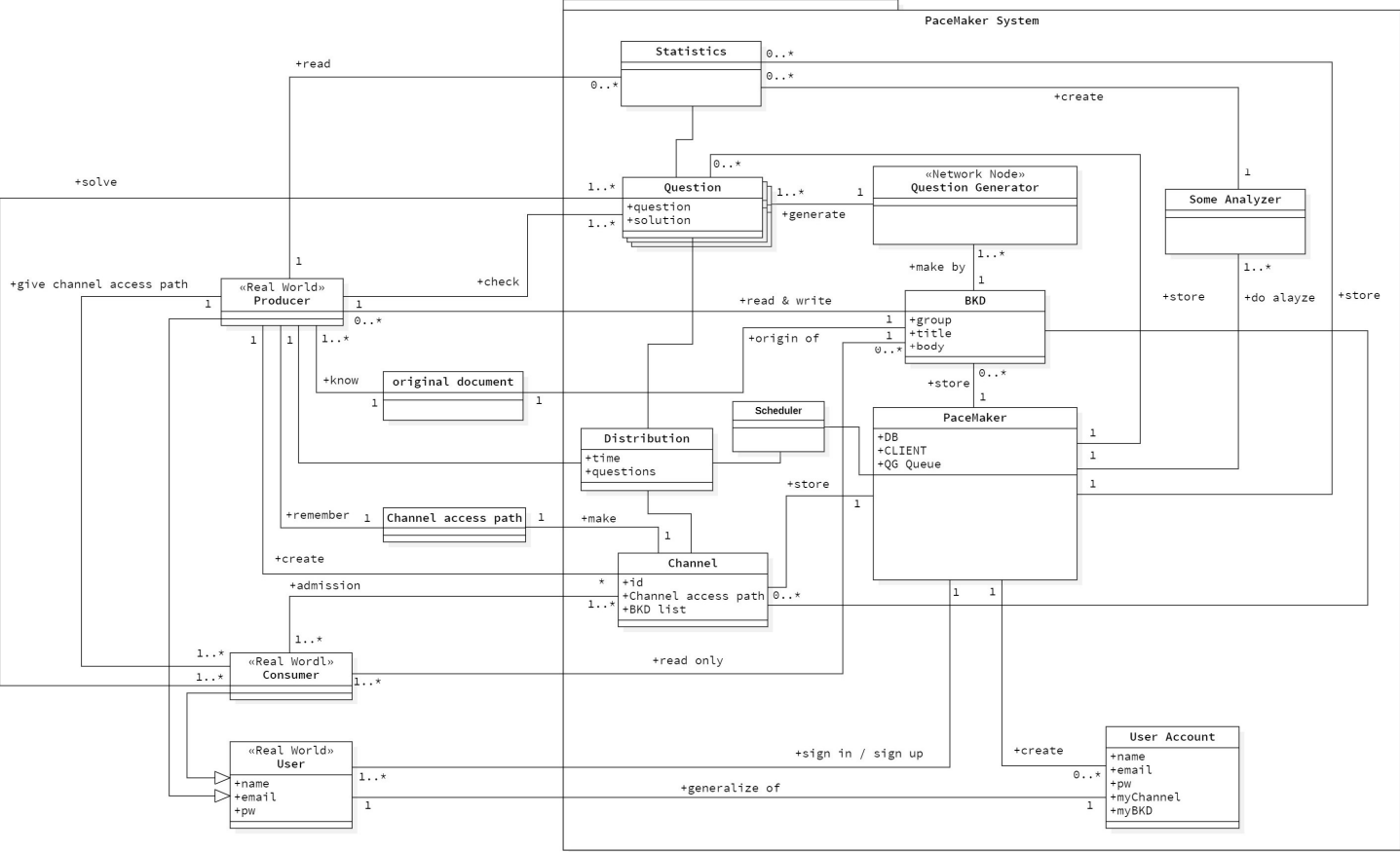
We are with you.

We cheer the way you go.



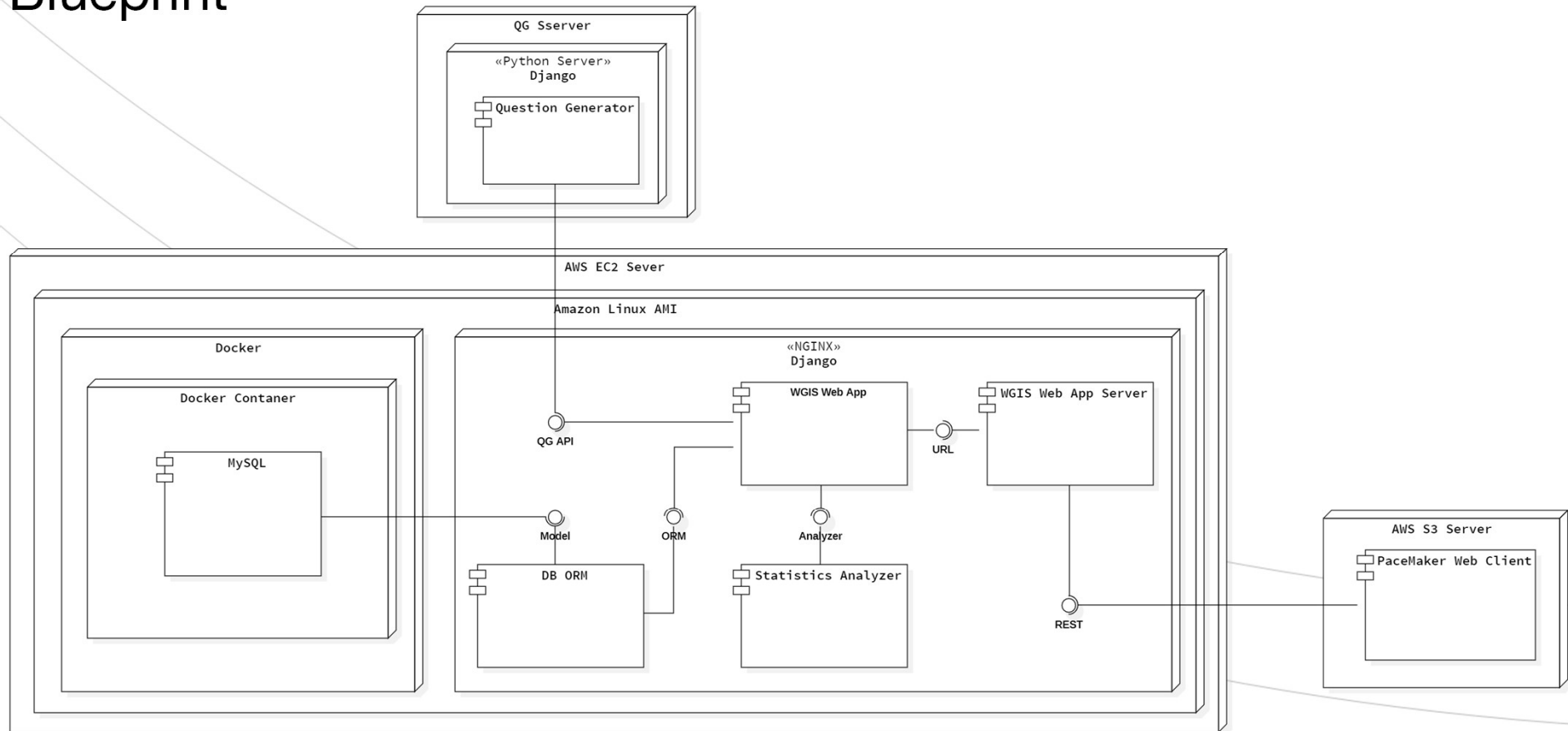
WHAT IS PACEMAKER

Domain Model



WHAT IS PACEMAKER

Blueprint



QUESTION GENERATION

What is Question Generation?

Paragraph

Since mid-May, Uber has required drivers to take selfies to verify they are wearing **a mask** or face covering before they are able to pick up riders.

Soon, **certain riders** will also be required to take a selfie prior to ordering a ride.

Question

What is required to be checked before Uber's drivers must take selfies?

Answer: a mask

Question

Who will be required to take a selfie before ordering a ride?

Answer: certain riders

QUESTION GENERATION

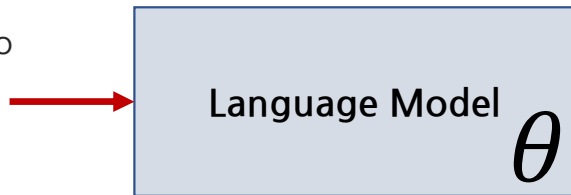
Question Generation using Language Model

$$S = (w_1, w_2, \dots, w_M)$$

Since mid-May, Uber has required drivers to take selfies to verify they are wearing a mask or face covering before they are able to pick up riders.

Soon, certain riders will also be required to take a selfie prior to ordering a ride. [정답]
a mask

Sequence to Sequence 변환



$$Q = (y_1, y_2, \dots, y_N)$$

What is required to be checked before Uber' s drivers must take selfies?

자연어를 이해하며 자연어를 생성할 수 있는 언어모델

- 자연어 단락과 정답 스파를 주입
- 정답과 연관되는 질문을 생성시킨다

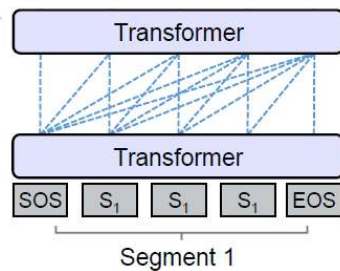
정답 스파 선택의 자동화

- 단어의 중요도를 평가하는 TF-IDF 메트릭 활용

QUESTION GENERATION

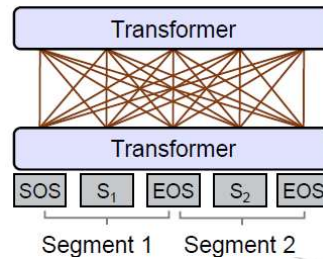
Microsoft Unified Language Model

- 하나의 트랜스포머에 각기 다른 언어 모델에 특화된 태스크들을 학습시켰다
- 그래서 자연어 이해와 생성이 모두 가능한 **일반화된 언어모델을 목표함**



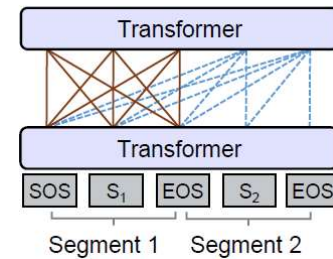
Unidirectional LM

문장 맥락을 이전에 등장한 단어와의 연관으로 이해



Bidirectional LM

문장 맥락을 모든 단어와의 연관으로 이해

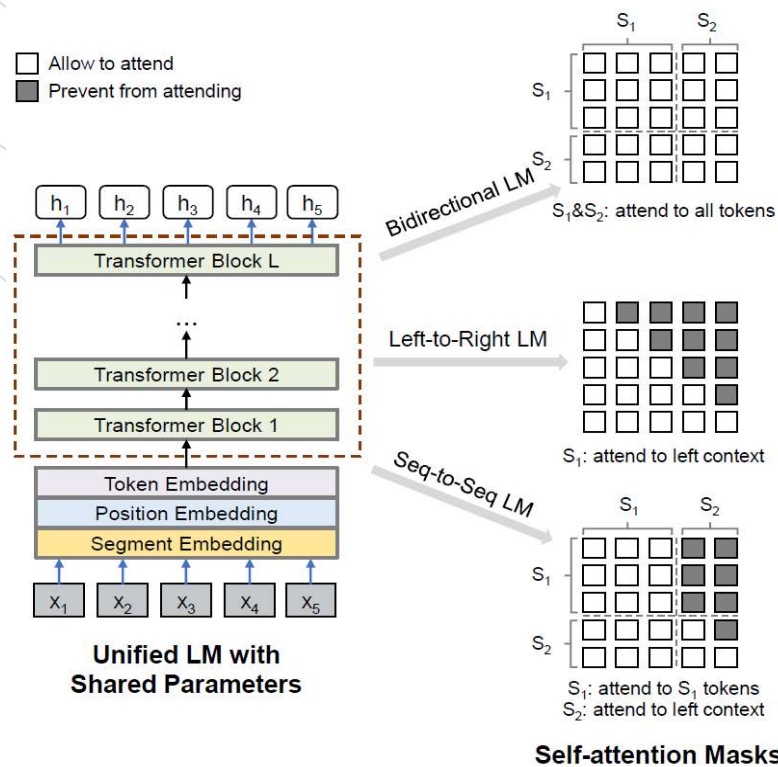


Sequence to Sequence LM

주어진 맥락에 적절한 문장을 생성하는 법을 이해

QUESTION GENERATION

UniLM-v1 Architecture



하나의 멀티레이어 트랜스포머

- 동일 가중치를 쓰며 다양한 언어모델이 학습된다
- 학습하는 언어모델에 따라 어텐션 마스크와 태스크가 다르다

태스크에 따라 어텐션 마스크를 달리 사용

QUESTION GENERATION

TF-IDF Metric

TF-IDF = (문서 내 단어 빈도) * $\log(\text{전체 문서 수}) / (\text{단어가 나타나는 문서 수})$

- 한 문서에 빈번히 등장하는 단어는 중요할 것이다
- 여러 문서에 계속해서 등장하는 단어는 덜 중요할 것이다

QG 모델의 입력 = (단락, 정답 스파ن)

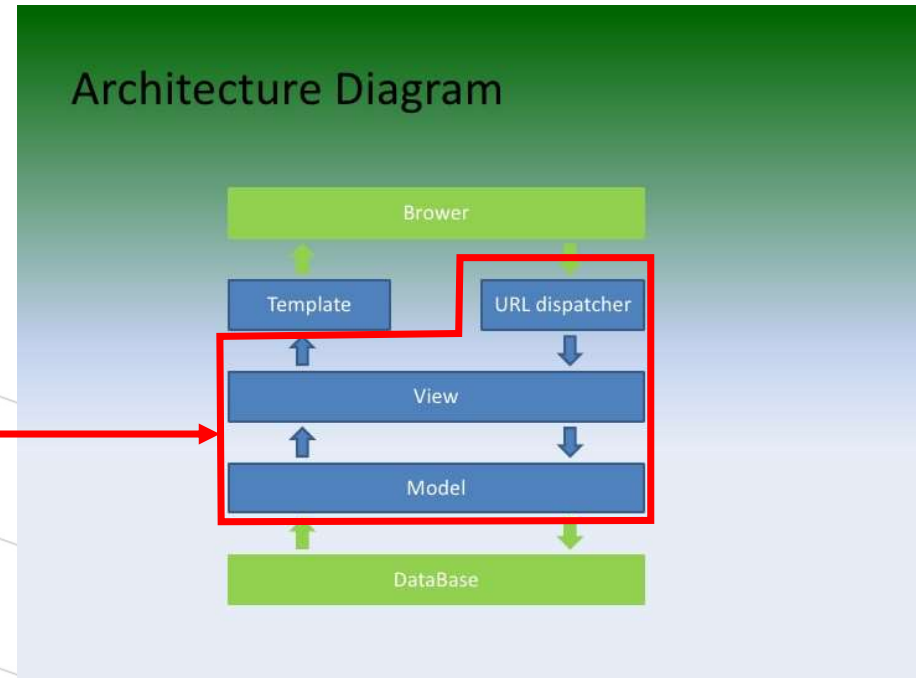
- 정답 스파ن 선택을 자동화하기 위해 명사들의 TF-IDF 값 정렬 후 선택

Since **mid-May**, **Uber** has required **drivers** to take **selfies** to verify they are wearing a **mask** or **face covering** before they are able to pick up **riders**.

Soon, certain riders will also be required to take a **selfie** prior to ordering a **ride**.

SEREVER AND DATABASE

App Server Runtime Environment



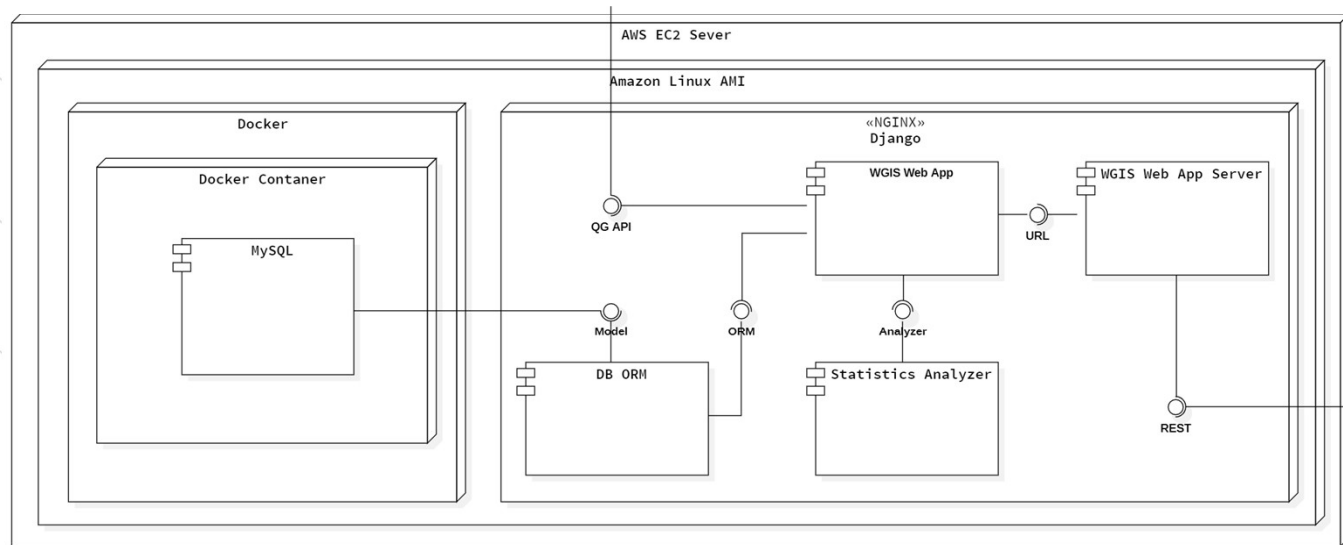
SEREVER AND DATABASE

Data Base Runtime Environment



SEREVER AND DATABASE

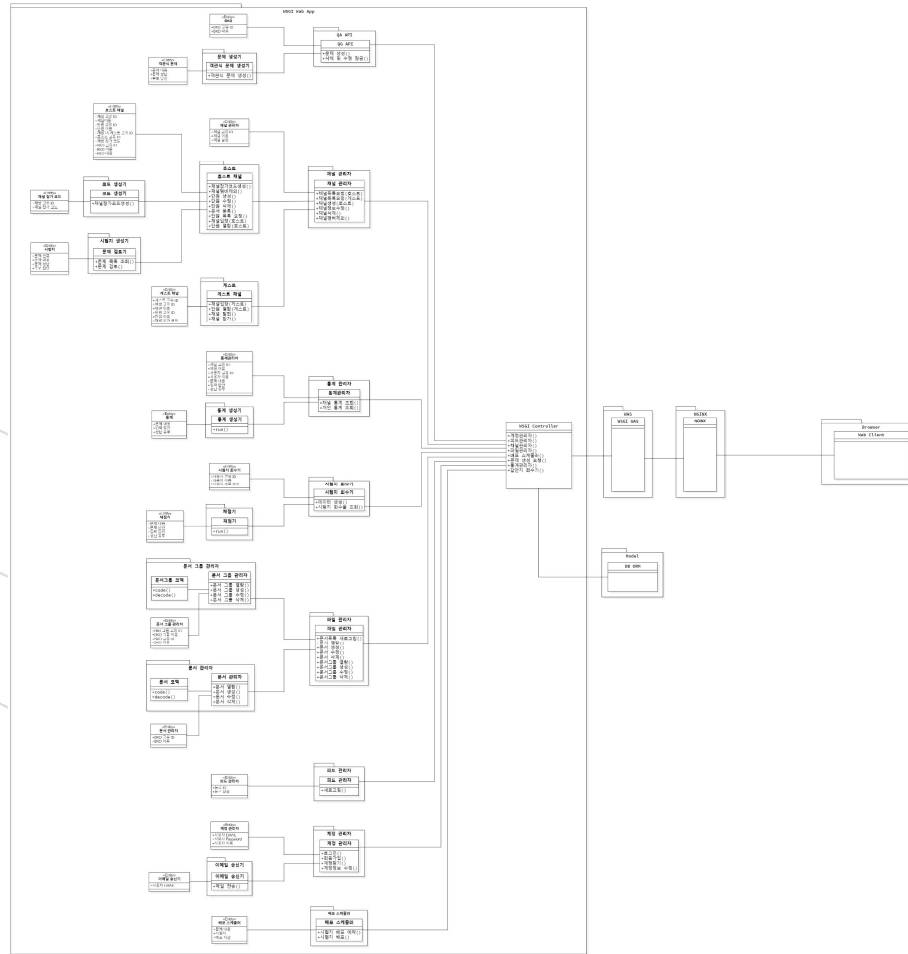
Server-DB Communication



- 기본적으로 Django에서 지원하는 ORM 통신을 사용한다.
- Docker 사용에 의해 보안성이, Django에서 지원하는 ORM에 의해 속도가 다소 확보되었기에 Query가 복잡해지는 경우에는 ORM이 아닌 Query를 작성하여 직접 통신하는 방법 역시 고려한다.

SEREVER AND DATABASE

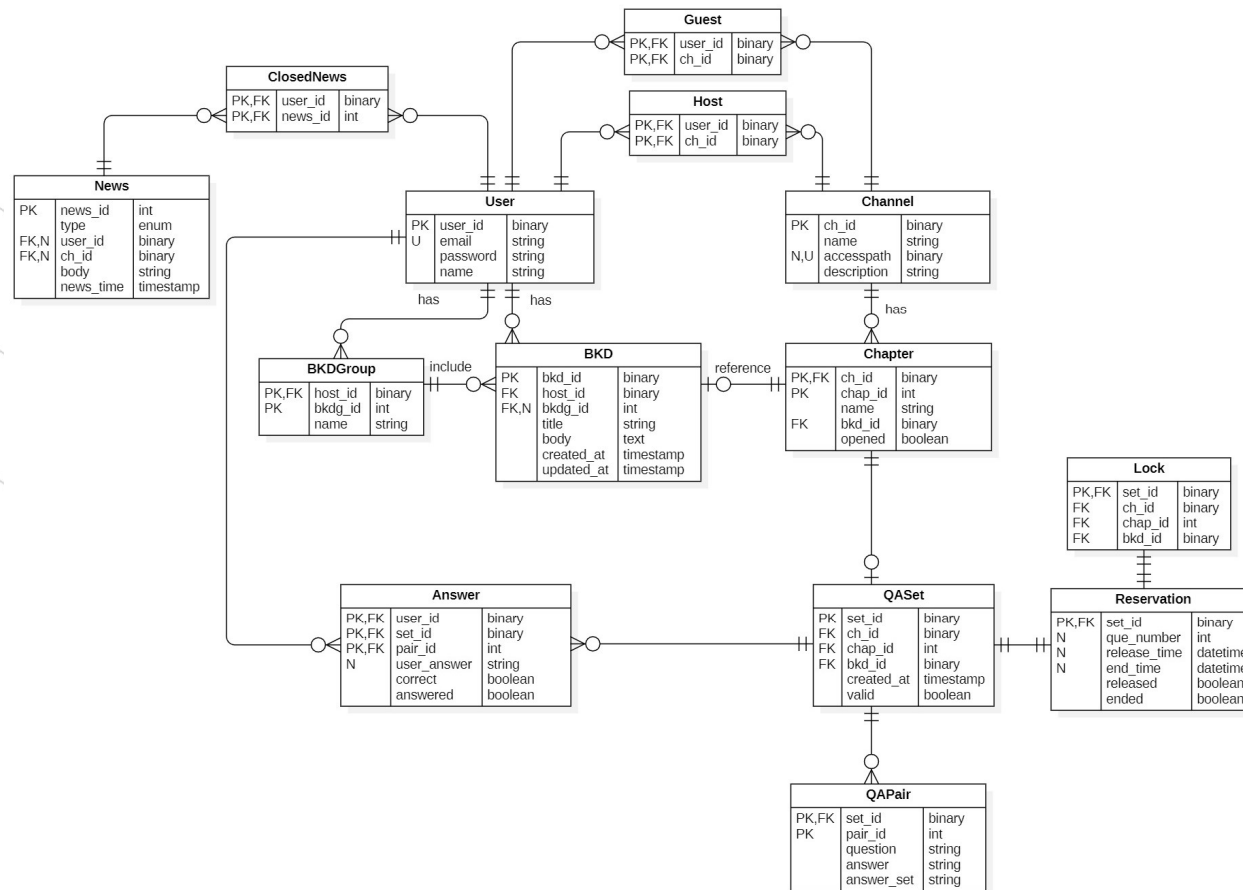
App Server Model



PACEMAKER

SEREVER AND DATABASE

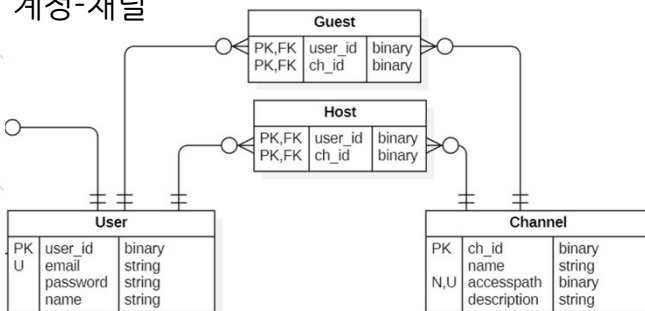
Data Base Model



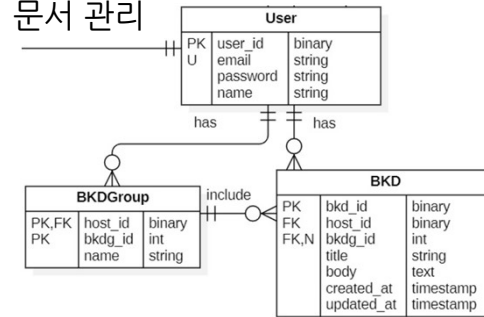
SEREVER AND DATABASE

Data Base Model

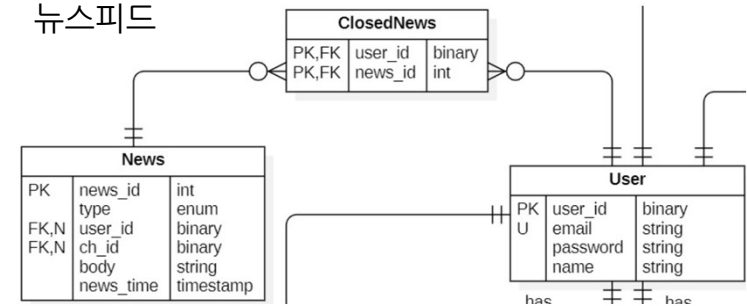
계정-채널



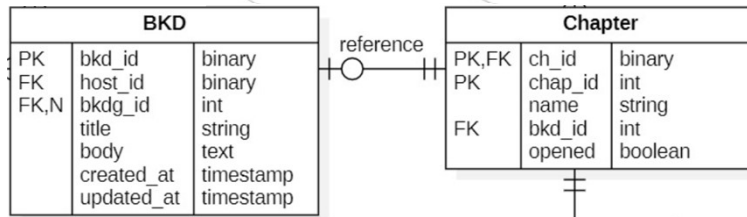
문서 관리



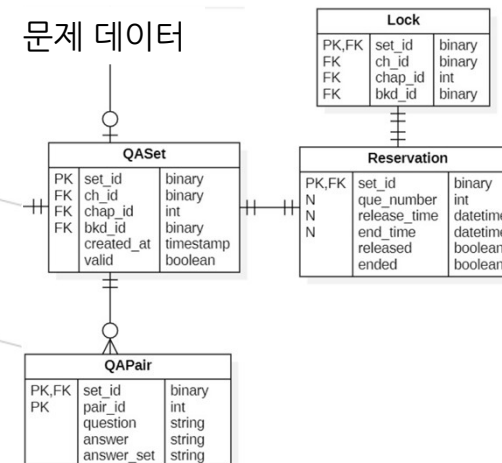
뉴스피드



단원별 관리



문제 데이터

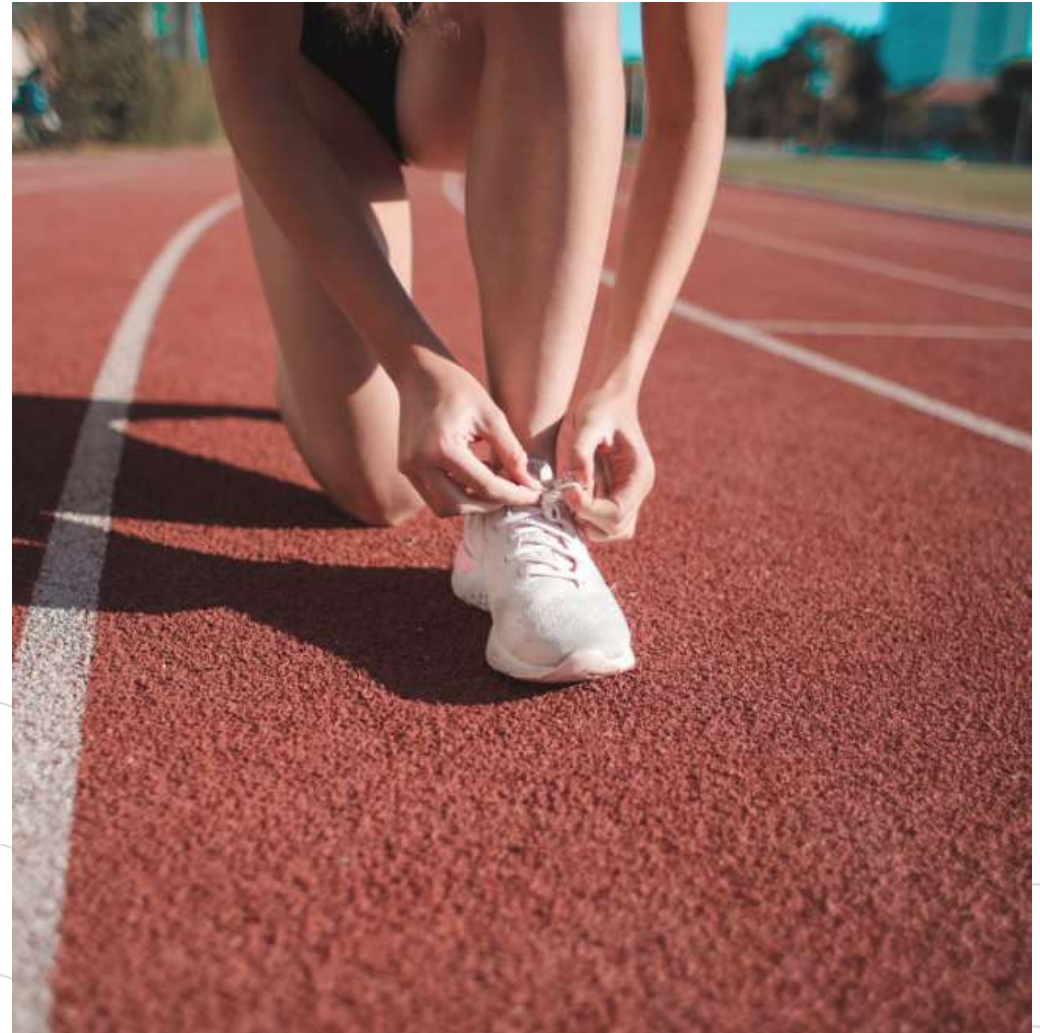


USER INTERFACE

UI Concept

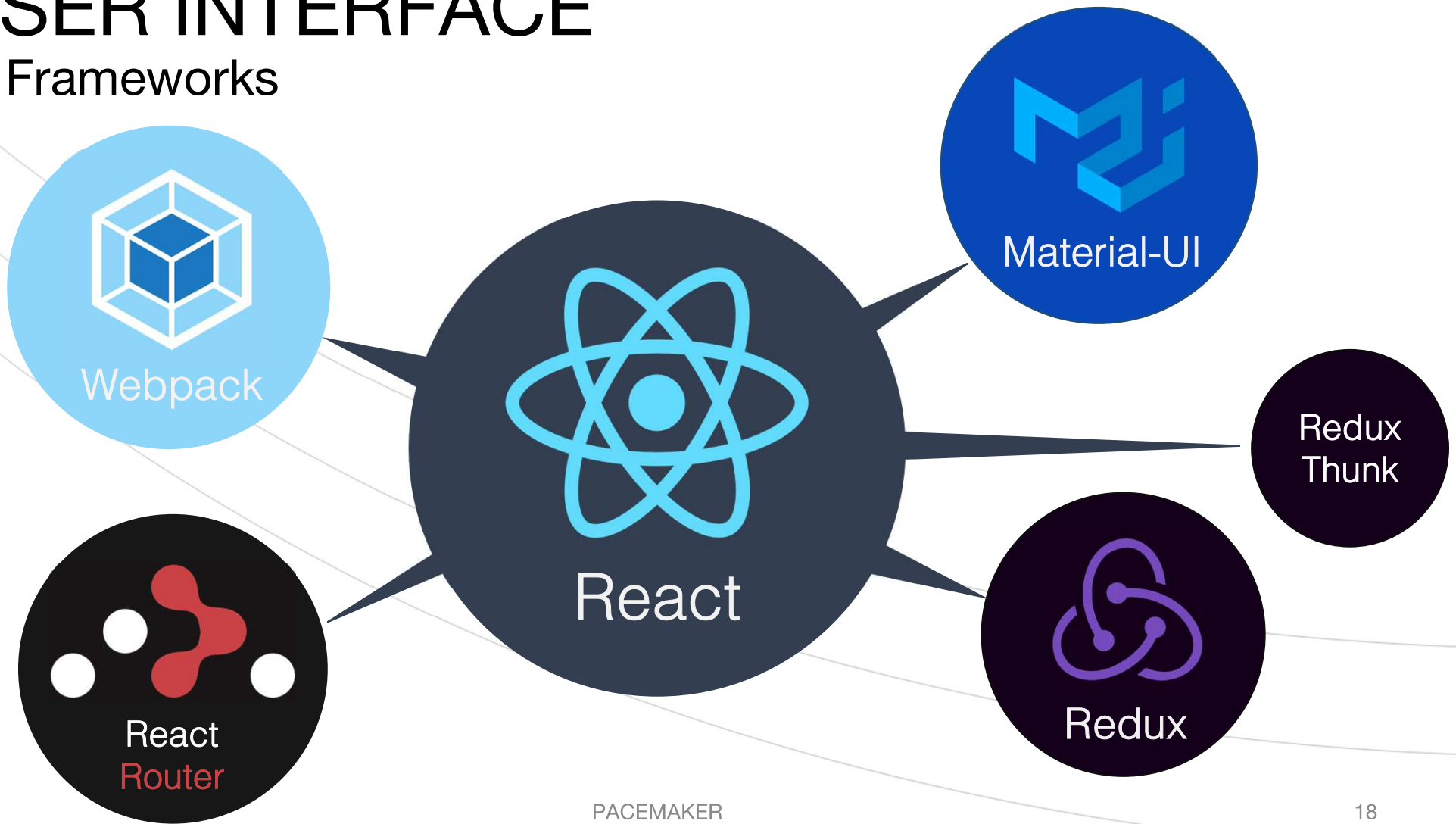
목표를 완주하기까지 교사와 학생의 옆에서 '페이스메이커'로서 함께 달린다는 컨셉을 바탕으로 한다.

러닝트랙을 형상화한 직선과 곡선으로 기본 레이아웃과 아이콘을 구성하고, 고해상도 사진으로 강조를 주는 디자인.



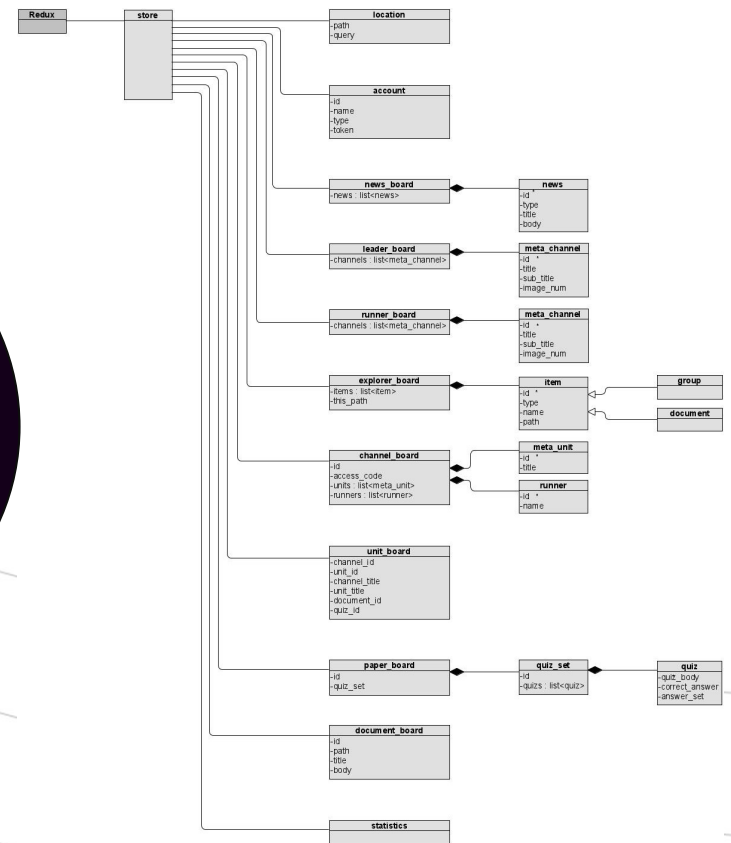
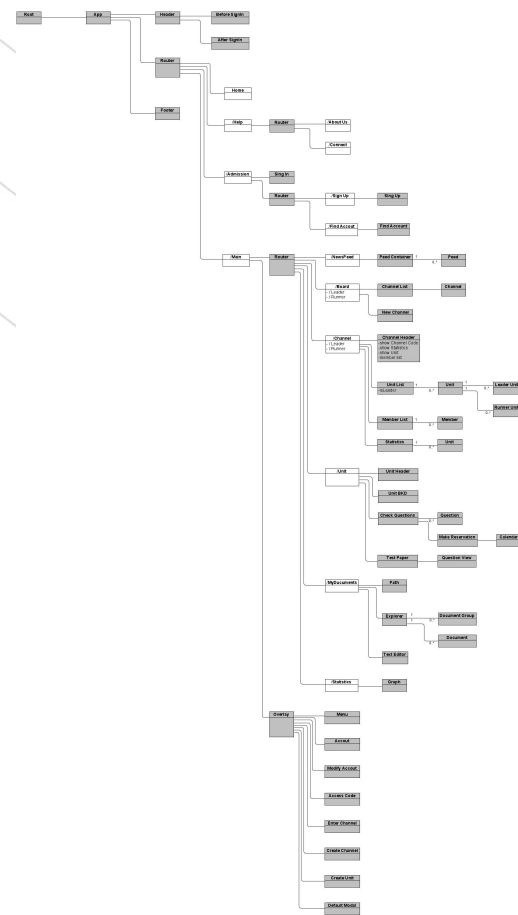
USER INTERFACE

UI Frameworks



USER INTERFACE

UI Structure



SAMPLE

Select Channel and Leader Channel

The image shows two screenshots of a web application interface. The left screenshot displays a channel selection screen with three options: 'Basic Computer Programming' (Tue. 15:00-18:00), 'Data Structure' (Wed. 15:00-18:00), and 'Algorithm' (Thu. 12:00-15:00). A 'FOR LEADER' section is visible on the left. The right screenshot shows a 'Reviews of Student News' page for the 'Algorithm' channel, featuring a table with columns for Channel Code, Unit, Runner List, and Statistics. The table lists five units: '2020 Election', 'Mosquitoes', 'Food and Drink', 'Architecture', and 'Impact Your World'. A navigation bar at the top includes 'MENU', 'SEARCH', 'PACEMAKER', and 'MY ACCOUNT'. A copyright notice '© Pacemaker. All rights reserved.' is visible at the bottom of both screenshots.

MENU SEARCH PACEMAKER MY ACCOUNT

FOR LEADER

Basic Computer Programming
Tue. 15:00-18:00

Data Structure
Wed. 15:00-18:00

Algorithm
Thu. 12:00-15:00

MENU SEARCH PACEMAKER MY ACCOUNT

Reviews of Student News

Wed. 15:00-18:00
Pr. Kelvin

| | CHANNEL CODE | UNIT | RUNNER LIST | STATISTICS |
|--------|-------------------|------|-------------|------------|
| Unit 1 | 2020 Election | | | |
| Unit 2 | Mosquitoes | | | |
| Unit 3 | Food and Drink | | | |
| Unit 4 | Architecture | | | |
| Unit 5 | Impact Your World | | | |

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SAMPLE

Make BKD and Request QG

MENU SEARCH PACEMAKER MY ACCOUNT

←

Reviews of Student News

Wed. 15:00-18:00

CHANNEL CODE UNIT RUNNER LIST STATISTICS

Unit 2 Mosquitoes

How to reduce harmful mosquitoes. ✎

A controversial plan is moving ahead to release genetically modified mosquitoes into the Florida Keys. More than 750,000 of the insects are set to be introduced there. Why? The aedes aegypti mosquito can carry dangerous diseases like the Zika virus, Dengue fever and yellow fever. Officials are looking for new ways to kill of these insects without using pesticides and genetically modified mosquitoes might be a way to do this. Only female mosquitoes bite people. The altered insects that are set to be released in Florida are male. They've been modified so that the female offspring they produce will die before they hatch from their eggs and grow big enough to bite people. And the company that developed these GMO mosquitoes say they've been very successful in controlling mosquito populations in Panama, Brazil and the Cayman Islands.

✓

📄

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f @ y

MENU SEARCH PACEMAKER MY ACCOUNT

←

Reviews of Student News

Wed. 15:00-18:00

CHANNEL CODE UNIT RUNNER LIST STATISTICS

Unit 2 Mosquitoes

DO YOU WANT TO MAKE YOUR OWN QUIZ?

It will take few minutes, and it can't be cancelled in progress.

YES NO

How to reduce harmful

A controversial plan is moving ahead to release genetically modified mosquitoes into the Florida Keys. More than 750,000 of the insects are set to be introduced there. Why? The aedes aegypti mosquito can carry dangerous diseases like the Zika virus, Dengue fever and yellow fever. Officials are looking for new ways to kill of these insects without using pesticides and genetically modified mosquitoes might be a way to do this. Only female mosquitoes bite people. The altered insects that are set to be released in Florida are male. They've been modified so that the female offspring they produce will die before they hatch from their eggs and grow big enough to bite people. And the company that developed these GMO mosquitoes say they've been very successful in controlling mosquito populations in Panama, Brazil and the Cayman Islands.

✓

📄

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f @ y

SAMPLE

Make Reservation and Receive

MENU SEARCH PACEMAKER MY ACCOUNT

←

Reviews of Student News

Wed. 15:00-18:00

CHANNEL CODE UNIT RUNNER LIST STATISTICS

| | |
|---|-----------------------|
| Unit 2 Mosquitoes | MAKE RESERVATION |
| QUIZ | TIME SEP 7 2020 16:00 |
| What is being put into place to release genetically m | NUMBERS 10 |
| Who can only female mosquitoes bite ? | DURATION 2 HOURS |
| What type of mosquitoes were developed to control | |
| A) Zika virus B) GMO mosquitoes C) Florida D) Deng | |
| What kind of insects are being released in Florida? | |
| Where have the company that developed GMO mosquito | |

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f @ y

MENU SEARCH PACEMAKER MY ACCOUNT

←

Reviews of Student News

Wed. 15:00-18:00

CHANNEL CODE UNIT RUNNER LIST STATISTICS

W2 Mosquitoes Q

3. What type of mosquitoes were developed to control the mosquito population in Panama?

- A) Zika virus
- B) GMO mosquitoes
- C) Florida
- D) Dengue fever

← 3/5 →

✓

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f @ y

SAMPLE

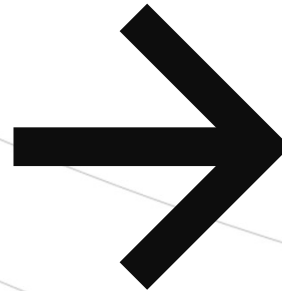
UniLM-v1 Sample

paragraph

Since mid-May, Uber has required **drivers** to take selfies to verify they are wearing a **mask** or face covering before they are able to pick up riders.

paragraph

Soon, **certain riders** will also be required to take a selfie prior to ordering a **ride**.



result

Q : Who has Uber required to take selfies?
A : drivers

result

Q : What kind of face covering does Uber require drivers to wear before they can pick?
A : a mask

result

Q : Who will be required to take a selfie prior to ordering a ride?
A : certain riders

result

Q : Who will be required to take a selfie before ordering what ?
A : a ride