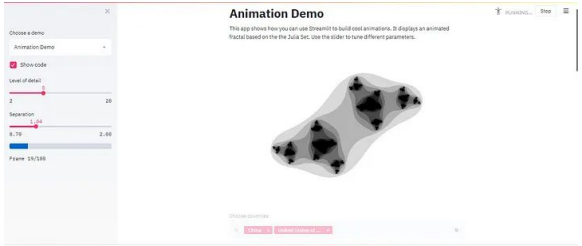
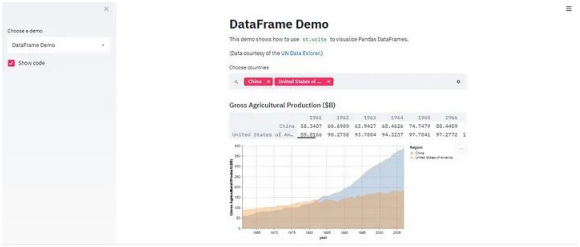
Database Final Project Report: Customized word reciting system

M11015026 盧敬元
B10830008 張瑄容
M11115016 蔡欣樺

Introduction

Streamlit + PostgreSQL





Data Collection

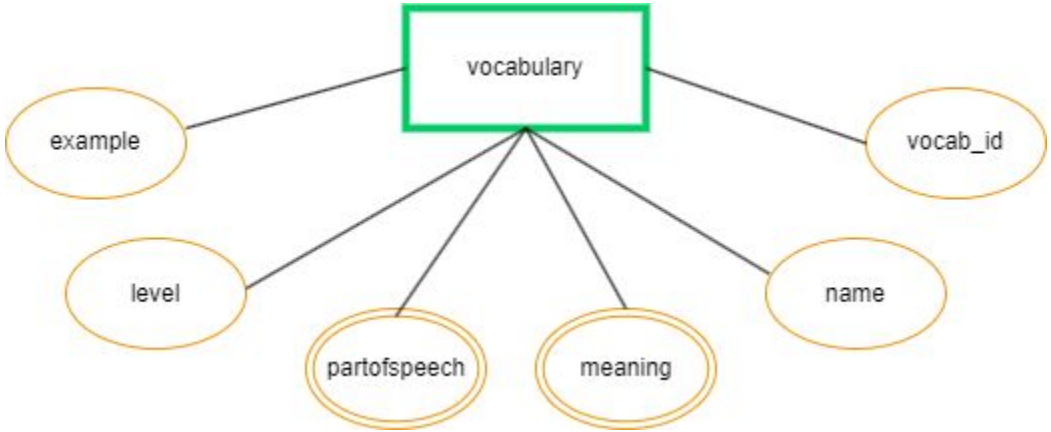
1. Choose some websites with a lot of TOEIC words

2. Organize and supplement words

3. Construct Database

1. Choose some websites with a lot of TOEIC words

ER Database diagram



1. Choose some websites with a lot of TOEIC words

1. Choose a website with a lot of TOEIC words

   Most websites do not have a well-categorized TOEIC word library.

Quizlet

AmazingTalker

立即對話AI家教

1. Choose some websites with a lot of TOEIC words

- But the information of vocabularies is too less.

attribute	歸咎於 歸因於
agriculture	農業
allocate	分派 分配
alter	改變 修改
assemble	裝配 組合
attain	達到 獲得

2. Organize and supplement words

Supplementary database 1 (Yahoo Dictionary)

2. Organize and supplement words

Supplementary database 2 (cambridge Dictionary)

present

noun

UK /ˈprez.ᵊnt/ US /ˈprez.ᵊnt/

present *noun* **(SOMETHING GIVEN)**

Add to word list

A2 [C]

(UK informal **prezzie**); (or **pressie**)

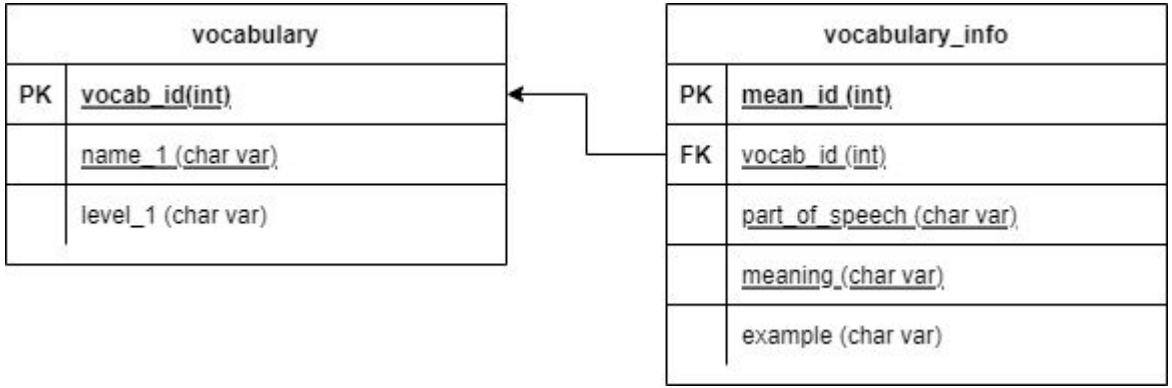
something that you are given, without asking for it, on a special occasion, especially to show friendship, or to say thank you

（尤指表示友誼或致謝的）禮物，贈品

- *a birthday/Christmas/wedding present*
  生日 / 聖誕 / 結婚禮物
- *They gave me theatre tickets as a present.*
  他們送給我戲票作為禮物。

3. Database construct

Relational Model



3. Database construct

Relational Model

vocabulary table

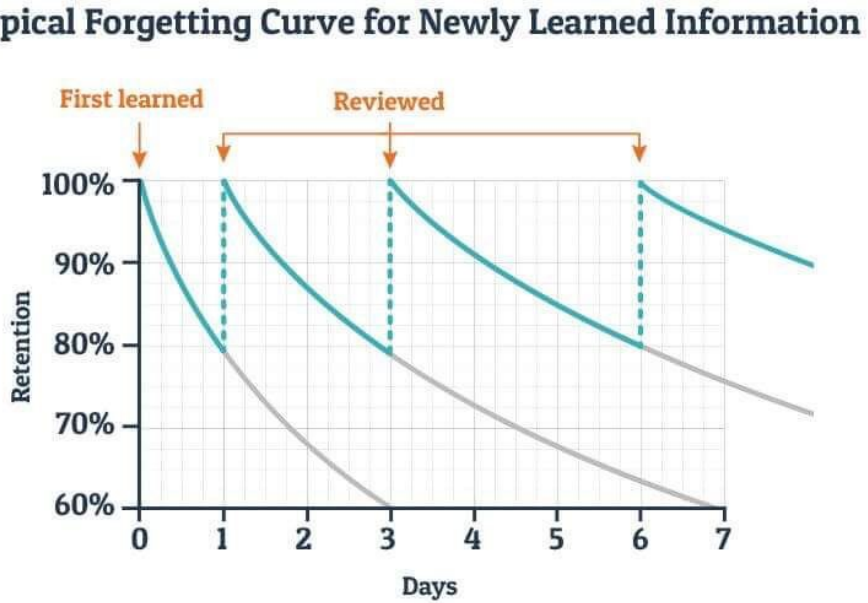
	vocab_id [PK] integer	name_1 character varying	level_1 character varying
1	1	resume	C1

vocabulary_info table

	vocab_id integer	part_of_speech character varying	meaning character varying	mean_id [PK] integer	example character varying
1	1	vt.	重新開始，繼續[+v-ing]；恢復；重返；重新佔用	1	[+ -ing verb] He stopped to take a sip of water and then resumed speaking.

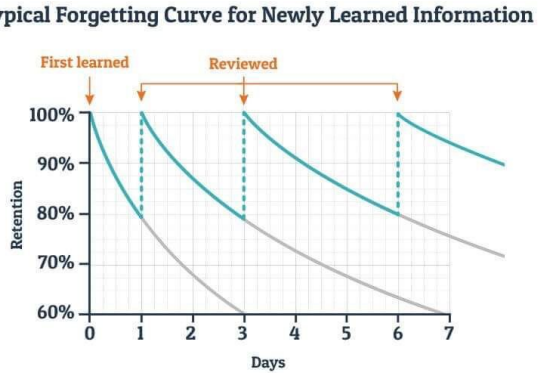
4. Algorithm

- Forgetting Curve



4. Algorithm 1

- Review each word 4 times
- The review time is followed by forgetting curve rules
- After reviewing, user will learn new word

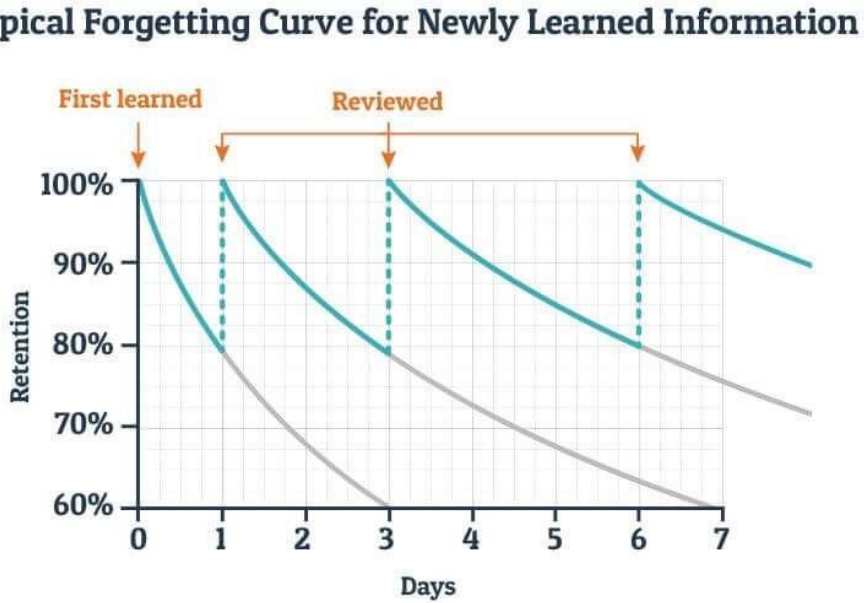


4. Algorithm 2

1. Our app update review time constantly according to learner's learning status
2. A vocabulary will occur only when it reaches the review time
3. How do we update our review time?
    a. If the vocabs incorrectly answered are more than 25%, we decrease or increase the time between reviewing
    b. If the vocabs incorrectly answered are less than 15%, we decrease the time between reviewing

4. Assumption

1. Forgetting curve exist
2. Different people may have different forgetting curve



5. Learners’ Behaviours Simulations

- Learning
- Effort
- Forgetting

5. Learning Simulation

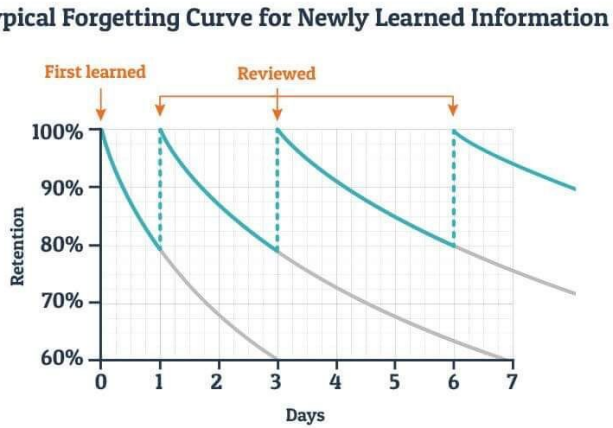
- How to decide whether a vocab is learned?
  - If a known vocabulary has been correctly answered twice => learned
  - If a newly learned vocab has been practice three time and correctly answered twice => learned
- How to distinguish known and newly learned vocab?

5. Effort Simulation

- A learner use 1 unit of effort to learn a known vocab
- A learner use 3 unit of effort to learn a newly learned vocab
- A learner use 0.5 unit of effort to review a remembered vocab
- A learner use 1.5 unit of effort to review a forgotten vocab

5. Forgetting Simulation

- A learner forgets according to his forgetting curve which is not known by our learning app.
- What happen when a person review a vocab before or after the suitable review time of that learner?
  - meaningless review



6. Experiment

Learning History

user_id	vocab_id	mean_id	learn_id	learn_date	r_count	is_right	new_ learned

last_r	forget	forget_rate	ready_for_ review	complete_ count

6. Experiment

def recite_new_vocab(.....)

def create_record_after_first_day(.....)

def forget(.....)

def update_review_time(.....)

def check_if_complete(.....)

6. Experiment

vocab_num = 300

review_time = [0, 1, 3, 6]

forget_curve = [0, 2, 4, 8]

last_update = [0, 0, 0, 0]

last_per = [0, 0, 0, 0]

quota = 40

day = 1

6. Experiment

```
1   initilaize variables
2   recite_new_vocab(.....)
3   while incomplete:
4       forget(.....)
5       create_record_after_first_day(.....)
6       update_review_time(.....)
7       check_if_complete(.....)
8       day += 1
```

7. Experiment Results

User's Forgetting Curve	Fixed Review Time	Dynamic Review Time
[0, 2, 4, 8]	50	40
[0, 1, 3, 6]	53	41
[0, 2, 5, 8]	49	42
[0, 1, 2, 5]	56	45
[0, 1, 3, 8]	51	44
[0, 1, 3, 7]	55	49
[0, 1, 3, 8]	53	46
[0, 2, 4, 6]	52	47
[0, 2, 5, 9]	48	41

8. User Interface Demo

Database: PostgreSQL

Python Framework: Streamlit

https://docs.google.com/presentation/d/1-Viw1zCptd1VzPqJtoCo1aQ9WFIJ7gM_lGL_q9YvAII/edit#slide=id.g226ff72f7bf_0_27