Technical Test

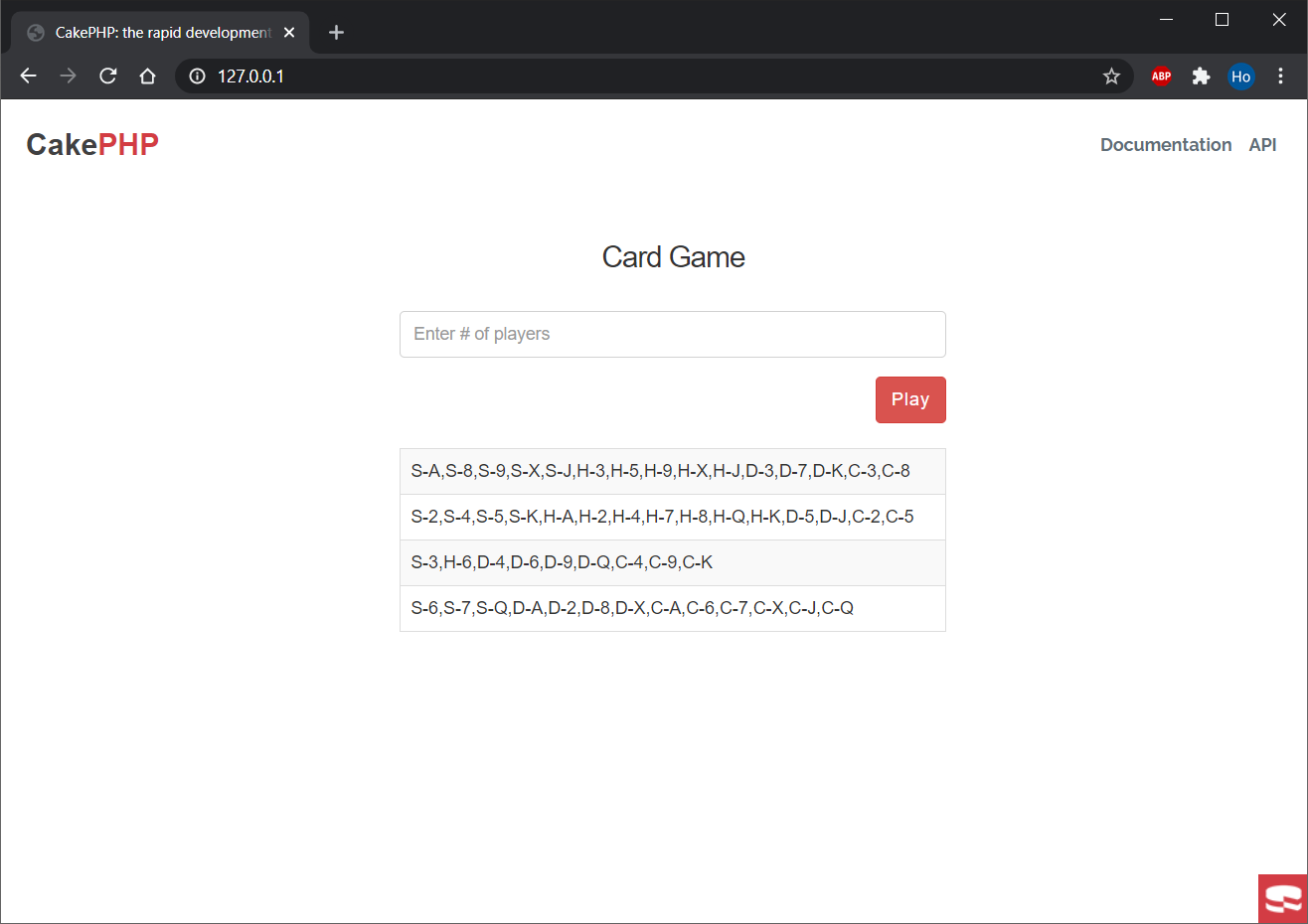
Candidate: Ho Hui Chung

Job - Web Developer - Tyrell Systems Sdn. Bhd.

# (A) Programming Test

Card Game

Hosted on <https://github.com/huichungho/cakephp-4.x-mysql-docker-card-game>



# (B) SQL Improvement Logic Test

Purpose: These are a SQL query that produces a search result. The query produces results in

approximately 8 seconds.

To do: Suggest what improvements should be done to the query in order to improve its

performance.

1. **Indexing** order by columns

**ALTER** Table `Jobs` ADD INDEX (`sort\_order`)

1. Use **subquery** to group Jobs table by id and serve the resulting table as an alias joining other tables. This can reduce the group size to number of rows in `Jobs` table rather than (`jobs`, `jobs\_personalities`, `personalities`, `jobs\_practical\_skills`, `practical\_skills`, `jobs\_basic\_abilities`, `basic\_abilities`, `jobs\_tools`)

**SELECT**

Jobs.id AS `Jobs\_\_id`,

Jobs.name AS `Jobs\_\_name`,

…

**FROM**

( SELECT \* FROM `jobs` WHERE publish\_status = 1 and deleted IS NULL GROUP BY id ORDER BY id) Jobs

**LEFT JOIN** jobs\_personalities JobsPersonalities

ON Jobs.id = (JobsPersonalities.job\_id)

**LEFT JOIN** personalities Personalities

ON (Personalities.id = (JobsPersonalities.personality\_id)

…

**ORDER BY** Jobs.sort\_order

**LIMIT** 50

**OFFSET** 0

1. Remove unnecessary string checking conditions and indexing the search column

Jobs.name **=** 'キャビンアテンダント'

**ALTER** Table `Jobs` ADD INDEX (`name `)

1. Putting **inner join** before **left join** to reduce unnecessary check computations *(only if the intention is to exclude records that has already removed from `*JobCategories*` or `* JobTypes*`)*

**…**

**INNER JOIN** job\_categories JobCategories

ON (JobCategories.id = (Jobs.job\_category\_id)

AND (JobCategories.deleted) IS NULL)

**INNER JOIN** job\_types JobTypes

ON (JobTypes.id = (Jobs.job\_type\_id)

AND (JobTypes.deleted) IS NULL)

**LEFT JOIN** jobs\_personalities JobsPersonalities

ON Jobs.id = (JobsPersonalities.job\_id)

…

Optimized Query

**ALTER** Table `Jobs` ADD INDEX (`sort\_order`);

**ALTER** Table `Jobs` ADD INDEX (`name `);

**SELECT**

Jobs.id AS `Jobs\_\_id`,

Jobs.name AS `Jobs\_\_name`,

Jobs.media\_id AS `Jobs\_\_media\_id`,

Jobs.job\_category\_id AS `Jobs\_\_job\_category\_id`,

Jobs.job\_type\_id AS `Jobs\_\_job\_type\_id`,

Jobs.description AS `Jobs\_\_description`,

Jobs.detail AS `Jobs\_\_detail`,

Jobs.business\_skill AS `Jobs\_\_business\_skill`,

Jobs.knowledge AS `Jobs\_\_knowledge`,

Jobs.location AS `Jobs\_\_location`,

Jobs.activity AS `Jobs\_\_activity`,

Jobs.academic\_degree\_doctor AS `Jobs\_\_academic\_degree\_doctor`,

Jobs.academic\_degree\_master AS `Jobs\_\_academic\_degree\_master`,

Jobs.academic\_degree\_professional AS `Jobs\_\_academic\_degree\_professional`,

Jobs.academic\_degree\_bachelor AS `Jobs\_\_academic\_degree\_bachelor`,

Jobs.salary\_statistic\_group AS `Jobs\_\_salary\_statistic\_group`,

Jobs.salary\_range\_first\_year AS `Jobs\_\_salary\_range\_first\_year`,

Jobs.salary\_range\_average AS `Jobs\_\_salary\_range\_average`,

Jobs.salary\_range\_remarks AS `Jobs\_\_salary\_range\_remarks`,

Jobs.restriction AS `Jobs\_\_restriction`,

Jobs.estimated\_total\_workers AS `Jobs\_\_estimated\_total\_workers`,

Jobs.remarks AS `Jobs\_\_remarks`,

Jobs.url AS `Jobs\_\_url`,

Jobs.seo\_description AS `Jobs\_\_seo\_description`,

Jobs.seo\_keywords AS `Jobs\_\_seo\_keywords`,

Jobs.sort\_order AS `Jobs\_\_sort\_order`,

Jobs.publish\_status AS `Jobs\_\_publish\_status`,

Jobs.version AS `Jobs\_\_version`,

Jobs.created\_by AS `Jobs\_\_created\_by`,

Jobs.created AS `Jobs\_\_created`,

Jobs.modified AS `Jobs\_\_modified`,

Jobs.deleted AS `Jobs\_\_deleted`,

JobCategories.id AS `JobCategories\_\_id`,

JobCategories.name AS `JobCategories\_\_name`,

JobCategories.sort\_order AS `JobCategories\_\_sort\_order`,

JobCategories.created\_by AS `JobCategories\_\_created\_by`,

JobCategories.created AS `JobCategories\_\_created`,

JobCategories.modified AS `JobCategories\_\_modified`,

JobCategories.deleted AS `JobCategories\_\_deleted`,

JobTypes.id AS `JobTypes\_\_id`,

JobTypes.name AS `JobTypes\_\_name`,

JobTypes.job\_category\_id AS `JobTypes\_\_job\_category\_id`,

JobTypes.sort\_order AS `JobTypes\_\_sort\_order`,

JobTypes.created\_by AS `JobTypes\_\_created\_by`,

JobTypes.created AS `JobTypes\_\_created`,

JobTypes.modified AS `JobTypes\_\_modified`,

JobTypes.deleted AS `JobTypes\_\_deleted`

**FROM**

( SELECT \* FROM `jobs` WHERE publish\_status = 1 and deleted IS NULL GROUP BY id ORDER BY id ) Jobs

**LEFT JOIN**

jobs\_personalities JobsPersonalities

ON Jobs.id = (JobsPersonalities.job\_id)

**LEFT JOIN**

personalities Personalities

ON (Personalities.id = (JobsPersonalities.personality\_id)

AND (Personalities.deleted) IS NULL)

**LEFT JOIN**

jobs\_practical\_skills JobsPracticalSkills

ON Jobs.id = (JobsPracticalSkills.job\_id)

**LEFT JOIN**

practical\_skills PracticalSkills

ON (PracticalSkills.id = (JobsPracticalSkills.practical\_skill\_id)

AND (PracticalSkills.deleted) IS NULL)

**LEFT JOIN**

jobs\_basic\_abilities JobsBasicAbilities

ON Jobs.id = (JobsBasicAbilities.job\_id)

**LEFT JOIN**

basic\_abilities BasicAbilities

ON (BasicAbilities.id = (JobsBasicAbilities.basic\_ability\_id)

AND (BasicAbilities.deleted) IS NULL)

**LEFT JOIN**

jobs\_tools JobsTools

ON Jobs.id = (JobsTools.job\_id)

**LEFT JOIN**

affiliates Tools

ON (Tools.type = 1

AND Tools.id = (JobsTools.affiliate\_id)

AND (Tools.deleted) IS NULL)

**LEFT JOIN**

jobs\_career\_paths JobsCareerPaths

ON Jobs.id = (JobsCareerPaths.job\_id)

**LEFT JOIN**

affiliates CareerPaths

ON (CareerPaths.type = 3

AND CareerPaths.id = (JobsCareerPaths.affiliate\_id)

AND (CareerPaths.deleted) IS NULL)

**LEFT JOIN**

jobs\_rec\_qualifications JobsRecQualifications

ON Jobs.id = (JobsRecQualifications.job\_id)

**LEFT JOIN**

affiliates RecQualifications

ON (RecQualifications.type = 2

AND RecQualifications.id = (JobsRecQualifications.affiliate\_id)

AND (RecQualifications.deleted) IS NULL)

**LEFT JOIN**

jobs\_req\_qualifications JobsReqQualifications

ON Jobs.id = (JobsReqQualifications.job\_id)

**LEFT JOIN**

affiliates ReqQualifications

ON (ReqQualifications.type = 2

AND ReqQualifications.id = (JobsReqQualifications.affiliate\_id)

AND (ReqQualifications.deleted) IS NULL)

**INNER JOIN**

job\_categories JobCategories

ON (JobCategories.id = (Jobs.job\_category\_id)

AND (JobCategories.deleted) IS NULL)

**INNER JOIN**

job\_types JobTypes

ON (JobTypes.id = (Jobs.job\_type\_id)

AND (JobTypes.deleted) IS NULL)

**WHERE**

Jobs.name = 'キャビンアテンダント'

**ORDER BY** Jobs.sort\_order

**LIMIT** 50

**OFFSET** 0