

## Laboratory 8

### PTE Academic Test Case Study

#### Description

PTE Academic Test (administered by Pearson Inc.) is the world's leading computer-based test of English for study abroad and immigration, which is recognized by universities worldwide, and is approved by the Australian Government for visa applications. PTE Test consists of four main components: Listening, Reading, Speaking, and Writing. A student taking a PTE test will have one score for each of these four components, as well as one overall score. The score is a numerical score, ranging from 10 to 90. The Australian Immigration Department use PTE score to identify an application's English level of proficiency. The band-scale is shown in Table 1.

Proficiency Level	Grade	Test Component	Test Score
Functional	4.5	Overall score	30-35
Vocational	5	Listening	36-49
		Reading	
		Writing	
		Speaking	
Competent	6	Listening	50-64
		Reading	
		Writing	
		Speaking	
Proficient	7	Listening	65-78
		Reading	
		Writing	
		Speaking	
Superior	8-9	Listening	79-90
		Reading	
		Writing	
		Speaking	

**Table 1:** PTE band-scale

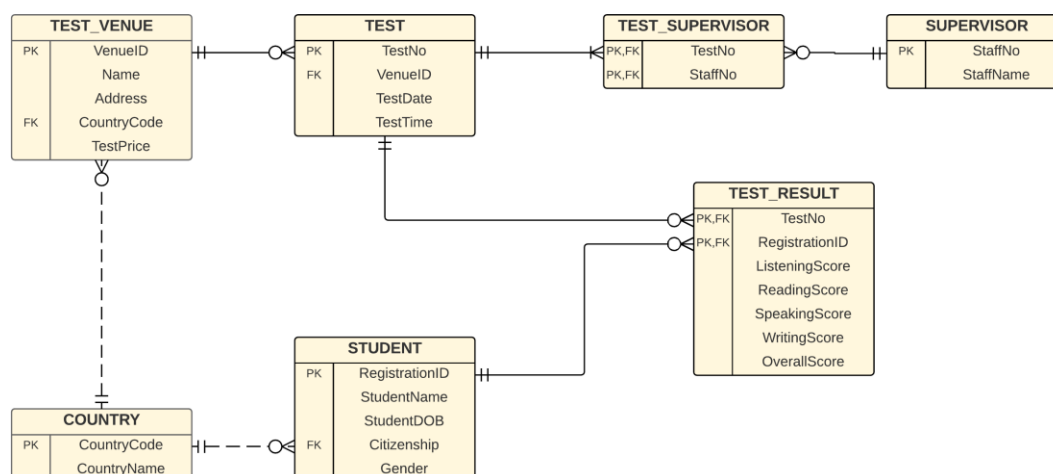
PTE Academic Test has many test venues (all major cities in Australia, and overseas as well). Each country may have a different price setting. For example, taking a PTE test in China is cheaper than taking the same test in Melbourne. PTE Academic Test is a computer-based test. During the test, there is one or more supervisors supervising the test. PTE Academic Test results will normally be released five days after the actual test date. A typical score card contains the student's details, and the five test scores: Listening, Reading, Writing, Speaking, and Overall.

Generally, universities and the Australian Government look at each component score, rather than the overall score. For example, for an applicant to be able to apply for a Permanent Residence in Australia, he/she must have at least a score of 65 in all of the four components (e.g. proficient in all components: listening, reading, writing, and speaking), regardless his/her overall score.

It is quite common that a student takes a PTE Academic Test several times, in order to improve the score. A student is identified by his/her RegistrationID. The

RegistrationID for the same student stays the same and is not changed every time this student sits for a test.

The E/R diagram of the operational system is shown in Figure 1.



**Figure 1:** PTE Academic Test E/R Diagram

You are required to build a data warehouse for this PTE Academic Test system. The data warehouse must be able to answer at least the following questions:

- How many students received a Competent grade in their overall score?
- How many students took the test in 2017?
- How many Korean citizen students took test?
- How many students took the test in Australia?
- How many Chinese students received a Proficient Grade in the Listening part in 2017?

## Task A

Given the requirements above, complete the following:

1. Create a star schema for the PTE Academic Test.
2. Define the dimensions and attributes for the PTE Academic Test star schema.
3. Write the SQL statements for the implementation of the star schema.

The operational database tables can be copied from the **ptetest** account, using:

```
Select * from ptetest.<table_name>;
```

Or

```
Create Table <your_table_name> As
Select ...
From ptetest.<table_name>
Where ...
```

4. Write the SQL statements to produce the following reports:
  - a. How many students received a Competent grade in their overall score?
  - b. How many students took the test in 2017?
  - c. How many Korean citizen students took test?
  - d. How many students took the test in Australia?
  - e. How many Chinese students received a Proficient Grade in the Listening part in 2017?

### **Task B:**

1. Design another star schema for the PTE Academic Test that uses **Pivoted Fact Table**.
2. Write the SQL statements for the implementation of the star schema with the Pivoted Fact Table.
3. Write the SQL statements to produce the following reports:
  - a. How many students received a Competent grade in their overall score?
  - b. How many students took the test in 2017?
  - c. How many Korean citizen students took test?
  - d. How many students took the test in Australia?
  - e. How many Chinese students received a Proficient Grade in the Listening part in 2017?
  - f. How many Japanese students received a Competent Grade in 2017?
4. Based on both Task A and Task B, compare the star schema with Determinant Dimension vs. star schema with Pivoted Fact Table.

**THE END**