



## CMT321–MANAGEMENT & ENGINEERING OF DATABASES

SEMESTER I 2022/2023

### TUTORIAL 2

**Date: 13 January 2023 (Friday)**

**Time: 8:30 am – 10:00 am (CS Auditorium)**

Q1. Data unit of Ministry of higher education, Malaysia would like to prepare an OLAP cube for the students who are studying in public university throughout the Malaysia. They wish to explore which university, campus, school, and program (postgraduate or undergraduate) generate the most income for public universities every year.

- (a) Draw the OLAP cube for university income with 3 dimensions of Country, Year, and University.
- (b) Present typical dimensional hierarchies (with 4 levels of aggregation) for each dimension shown in the figure.

Q2. This case deals with inventory monitoring in a warehouse. We have three dimensions with the following hierarchical structure:

Table 1: A warehouse

<i>Dimension</i>	<i>Abbr. Level=0</i>	<i>Abbr. Level=1</i>	<i>Abbr. Level=2</i>	<i>Abbr. Level=3</i>
Product	<b>P_pr</b> product	<b>P_ca</b> category	<b>P_*</b> total	
Warehouse	<b>W_wh</b> warehouse	<b>W_di</b> district	<b>W_co</b> country	<b>W_*</b> total
Time	<b>T_d</b> day	<b>T_m</b> month	<b>T_y</b> year	<b>T_*</b> total

The single key figure in this example is the "inventory level". Please draw the Classic Star Schema for this example.

**Q3.** Using an OLAP cube figure, categorise a three-dimensional sales data with time (Q1, Q2, Q3, Q4), items (PC, Book, Shoes, Clothes) and location (Penang, Kuala Lumpur, Perth, Sydney).

(a) Roll up the location from cities to countries.

(b) Drill down the time from quarter to time.

(c) Slice the OLAP cube for quarter 1.

(d) Dice the OLAP cube for Perth and Sydney, Q1 and Q2, and book and clothes.

(e) Pivot the OLAP cube based on the item types from section (c).