

INFS601 Case Study for Database Project Assignment¹

AsiaPacific Technology Sales (APTS) is an information technology consulting company with many offices located throughout New Zealand. The company matches highly skilled employees with projects according to region. APTS has contacted you to design a database so that its managers can keep track of their customers, employees, projects, project schedules, assignments, and invoices.

The APTS database must support all of APTS's operations and information requirements. A basic description of the main requirements follows:

- The employees working for APTS have an employee ID, an employee last name, a middle initial, a first name, a region, and a date of hire.
- Valid regions are as follows: Northwest (NW), Southwest (SW), Midwest North (MN), Midwest South (MS), Northeast (NE), and Southeast (SE).
- Each employee has many skills, and many employees have the same skill.
- Each skill has a skill ID, description, and rate of pay. Valid skills are shown in Table I in appendix A at the end of this document.
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- APTS has many customers. Each customer has a customer ID, customer name, phone number, and region.
- APTS works by projects. A project is based on a contract between the customer and APTS to design, develop, and implement a computerized solution. Each project has specific characteristics such as the project ID, the customer to which the project belongs, a brief description, a project date (that is, the date on which the project's contract was signed), a project start date (an estimate), a project end date (also an estimate), a project budget (total estimated cost of project), an actual start date, an actual end date, an actual cost, and one employee assigned as manager of the project.
- The actual cost of the project is updated each Friday by adding that week's cost (computed by multiplying the hours each employee worked by the rate of pay for that skill) to the actual cost.
- The employee who is the manager of the project must complete a project schedule, which is, in effect, a design and development plan. In the project schedule (or plan), the manager must determine the tasks that will be performed to take the project from beginning to end. Each task has a task ID, a brief task description, the task's starting and ending date, the type of skill needed, and the number of employees (with the required skills) required to complete the task. General tasks are initial interview, database and system design, implementation, coding, testing, and final evaluation

¹ Appendix A (pages 3 – 5) has supplemental information for this case study.

and sign-off. For example, APTS might have the project schedule shown in Table 2 (see Appendix A).

- Assignments: APTS pools all its employees by region, and from this pool, employees are assigned to a specific task scheduled by the project manager. For example, for the first project's schedule, you know that for the period 3/1/16 to 3/6/16, a Systems Analyst II, a Database Designer I, and a Project Manager are needed. (The project manager is assigned when the project is created and remains for the duration of the project). Using that information, APTS searches the employees who are located in the same region as the customer, matching the skills required and assigning them to the project task.
- Each project schedule task can have many employees assigned to it, and a given employee can work on multiple project tasks. However, an employee can work on only one project task at a time. For example, if an employee is already assigned to work on a project task from 2/20/16 to 3/3/16, (s)he cannot work on another task until the current assignment is closed (ends). The date on which an assignment is closed does not necessarily match the ending date of the project schedule task, because a task can be completed ahead of or behind schedule.
- Given all the preceding information, you can see that the assignment associates an employee with a project task, using the project schedule. Therefore, to keep track of the assignment, you require at least the following information: assignment ID, employee, project schedule task, date assignment starts, and date assignment ends (which could be any dates as some projects run ahead of or behind schedule). Table 3 in Appendix A shows a sample assignment form.
- The hours an employee works are kept in a work log containing a record of the actual hours worked by an employee on a given assignment. The work log is a weekly form that the employee fills out at the end of each week. The form contains the date, the assignment ID, the total hours worked that week, and the number of the bill to which the work log entry is charged. Obviously, each work log entry can be related to only one bill. A sample list of the current work log entries for the first sample project is shown in Table 4 in Appendix A.
- Finally, every 15 days, a bill is written and sent to the customer, totaling the hours worked on the project that period. When APTS generates a bill, it uses the bill number to update the work-log entries that are part of that bill. In summary, a bill can refer to many work log entries, and each work log entry can be related to only one bill. APTS sent one bill on 3/15/16 for the first project (See Rocks), totaling the hours worked between 3/1/16 and 3/15/16. Therefore, you can safely assume that there is only one bill in this table and that that bill covers the work-log entries shown in the form in Table 4.

Your assignment is to create a database that will fulfill the operations described in this problem. Please refer to the Assignment Specification document for details on the specific tasks.

Appendix A

Skill	Employee
Data Entry I	Seaton Amy; Williams Josh; Underwood Trish
Data Entry II	Williams Josh; Seaton Amy
Systems Analyst I	Craig Brett; Sewell Beth; Robbins Erin; Bush Emily; Zebras Steve
Systems Analyst II	Chandler Joseph; Burklow Shane; Robbins Erin
DB Designer I	Yarbrough Peter; Smith Mary
DB Designer II	Yarbrough Peter; Pascoe Jonathan
Oracle Developer I	Kattan Chris; Epahnor Victor; Summers Anna; Ellis Maria
Oracle Developer II	Kattan Chris; Epahnor Victor; Batts Melissa
C++ I	Smith Jose; Rogers Adam; Cope Leslie
C++ II	Rogers Adam; Bible Hanah
ASP I	Duarte Miriam; Bush Emily
ASP II	Duarte Miriam; Newton Christopher
Oracle DBA	Smith Jose; Pascoe Jonathan
SQL Server DBA	Yarbrough Peter; Smith Jose
Network Engineer I	Bush Emily; Smith Mary
Network Engineer II	Bush Emily; Smith Mary
Web Administrator	Bush Emily; Smith Mary; Newton Christopher
Technical Writer	Kilby Surgena; Bender Larry
Project Manager	Paine Brad; Mudd Roger; Kenyon Tiffany; Connor Sean

Table 1 Skills Inventory

Project ID: 1		Description: Sales Management System		
Company : See Rocks		Contract Date: 2/12/2016		Region: NW
Start Date: 3/1/2016		End Date: 7/1/2016		Budget: \$15,500
Start Date	End Date	Task Description	Skill(s) Required	Quantity Required
3/1/16	3/6/16	Initial Interview	Project Manager	1
			Systems Analyst II	1
			DB Designer I	1
3/11/16	3/15/16	Database Design	DB Designer I	1
3/11/16	4/12/16	System Design	Systems Analyst II	1
			Systems Analyst I	2
3/18/16	3/22/16	Database Implementation	Oracle DBA	1
3/25/16	5/20/16	System Coding & Testing	Oracle Developer I	2
			Oracle Developer II	1
			Oracle DBA	1
			Tester	
3/25/16	6/7/16	System Documentation	Technical Writer	1
6/10/16	6/14/16	Final Evaluation	Project Manager	1
			Systems Analyst II	1
			DB Designer I	1
			Oracle Developer II	1
6/17/16	6/21/16	On-Site System Online and Data Loading	Project Manager	1
			Systems Analyst II	1
			DB Designer I	1
			Oracle Developer II	1
7/1/16	7/1/16	Sign-Off	Project Manager	1

Table 2 Project Schedule Form

Appendix A

Project ID: 1		Description: Sales Management System				
Company: See Rocks		Contract Date: 2/12/2010			As of: 03/29/10	
SCHEDULED				ACTUAL ASSIGNMENTS		
Project Task	Start Date	End Date	Skill	Employee	Start Date	End Date
Initial Interview	3/1/16	3/6/16	Project Mgr.	101—Connor S.	3/1/16	3/6/16
			Sys. Analyst II	102—Burklow S.	3/1/16	3/6/16
			DB Designer I	103—Smith M.	3/1/16	3/6/16
Database Design	3/11/16	3/15/16	DB Designer I	104—Smith M.	3/11/16	3/14/16
System Design	3/11/16	4/12/16	Sys. Analyst II	105—Burklow S.	3/11/16	
			Sys. Analyst I	106—Bush E.	3/11/16	
			Sys. Analyst I	107—Zebras S.	3/11/16	
Database Implementation	3/18/16	3/22/16	Oracle DBA	108—Smith J.	3/15/16	3/19/16
System Coding & Testing	3/25/16	5/20/16	Oracle Developer	109—Summers A.	3/21/16	
			I Oracle	110—Ellis M.	3/21/16	
			Developer II	111—Ephanor V.	3/21/16	
			Oracle DBA	112—Smith J.	3/21/16	
System Documentation	3/25/16	6/7/16	Tech. Writer	113—Kilby S.	3/25/16	
Final Evaluation	6/10/16	6/14/16	Project Mgr. Sys. Analyst II DB Designer I Oracle DBA			
On-Site System Online and Data Loading	6/17/16	6/21/16	Project Mgr. Sys. Analyst II DB Designer I Oracle DBA			
Sign-Off	7/1/16	7/1/16	Project Mgr.			

Table 3 Project Assignment Form

(Note: The assignment number is shown as a prefix of the employee name; for example, 101, 102.) Assume that the assignments shown previously are the only ones existing as of the date of this design. The assignment number can be whatever number matches your database design.

Appendix A

Employee Name	Week Ending	Assignment Number	Hours Worked	Bill Number
Burklow S.	3/1/16	1-102	4	xxx
Connor S.	3/1/16	1-101	4	xxx
Smith M.	3/1/16	1-103	4	xxx
Burklow S.	3/8/16	1-102	24	xxx
Connor S.	3/8/16	1-101	24	xxx
Smith M.	3/8/16	1-103	24	xxx
Burklow S.	3/15/16	1-105	40	xxx
Bush E.	3/15/16	1-106	40	xxx
Smith J.	3/15/16	1-108	6	xxx
Smith M.	3/15/16	1-104	32	xxx
Zebras S.	3/15/16	1-107	35	xxx
Burklow S.	3/22/16	1-105	40	
Bush E.	3/22/16	1-106	40	
Ellis M.	3/22/16	1-110	12	
Ephanor V.	3/22/16	1-111	12	
Smith J.	3/22/16	1-108	12	
Smith J.	3/22/16	1-112	12	
Summers A.	3/22/16	1-109	12	
Zebras S.	3/22/16	1-107	35	
Burklow S.	3/29/16	1-105	40	
Bush E.	3/29/16	1-106	40	
Ellis M.	3/29/16	1-110	35	
Ephanor V.	3/29/16	1-111	35	
Kilby S.	3/29/16	1-113	40	
Smith J.	3/29/16	1-112	35	
Summers A.	3/29/16	1-109	35	
Zebras S.	3/29/16	1-107	35	

Note: xxx represents the bill ID. Use the one that matches the bill number in your database.

Table 4 Project Work-Log Form as of 3/29/16