OPEN LAB MANAGEMENT SYSTEM

DSO34AT

STUDENT#	SURNAME	INITIALS
214022796	NKOSI	SW
214189143	PHOKU	T
214214202	TIBA	MM
214394871	MOSUPYE	M
214551659	TLAKA	SW
215129110	HADEBE	NH

MAJIMBOS

LECTURER: MR F. HATTINGH

CONTENTS

INTRODUCTION

Only a handful open labs ware declared open for students to use as there were not enough computers for students to use. Back in the year 2014 the open labs would only be available to students from the hours of 6pm to 10pm as there were not enough computers for students to utilize

Open labs now open throughout the day until 11pm which is very advantageous to students who do not own a laptop or have access the internet. Students will now have ease option to book via a computer terminal anywhere on campus for an open lab using an online system.

DBMS SOFTWARE SELECTION

MICROSOFT SQL Server

MICROSOFT SQL Server is a relational database management system developed by Microsoft as a database server, it is a software product with the function of storing and retrieving data that is requested by other software applications. www.wikipedia.org/wiki/Microsoft_SQL_Server?

The system will work upon the Microsoft SQL Server since it is reliable, it has been there since 1989 and has adequate features and functions needed to support the database system to be developed

Cost:

Microsoft SQL Server comes in packages to meet each organisations needs weather small or big. packages are customised according to business needs and support. The SQL Server Express is free of charge and includes the core database engine

Hardware requirements:

The SQL Server Express requires at least 1GB of ram and 10GB database files

Portability:

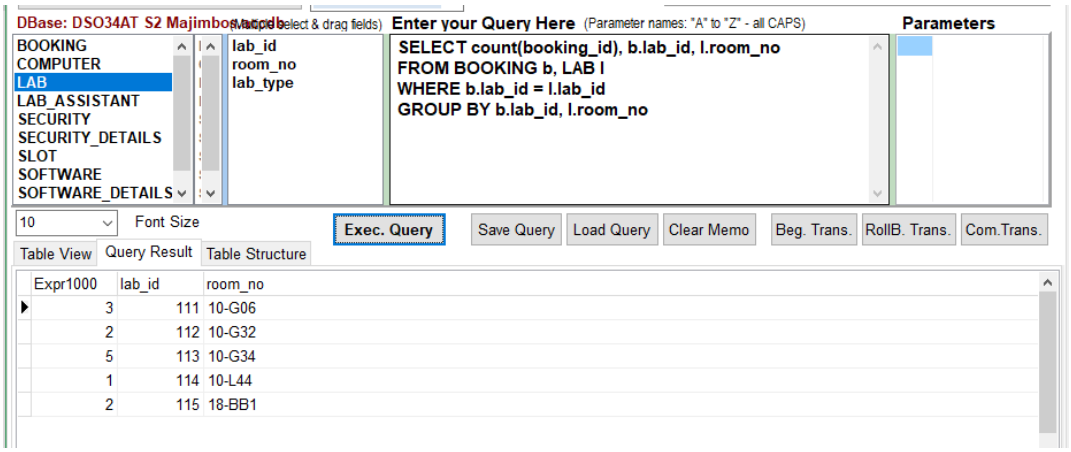
The database administration can be accessed from anywhere by authorised admin personals with the use of Azure SQL Server, an online dbms

- **DBMS Features and tool:**

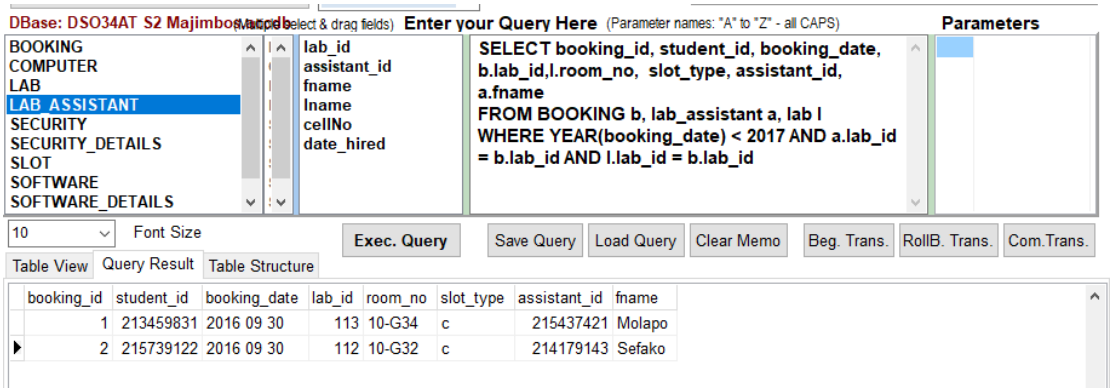
Features include the ability to set up a database admin users and password to ensure that authorised personals can only access the database itself

DECISION SUPPORT

The database will aid TUT an organisation in making informed decision about the use of utilization of the labs, for example: the number of labs open can be cut down or increased depending on and average use of each lab per week weather the number of students in a is full or hardly full.



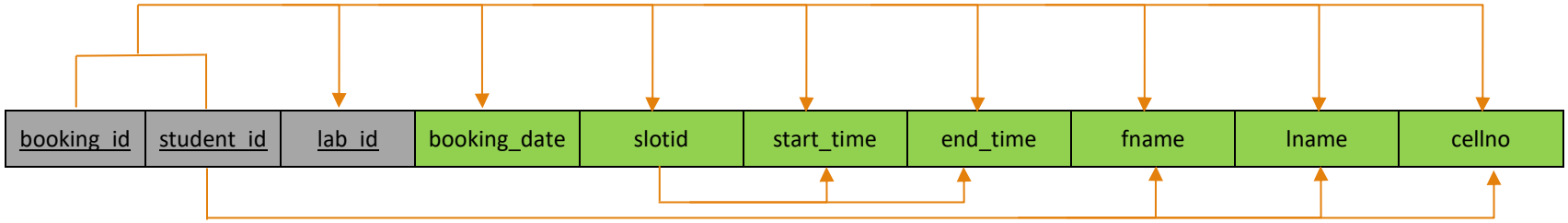
From the report we can see whether the labs are utilised fully or not, in this case lab id 114 is the least booked lab of them all, TUT can further use this report to close this lab since it is now evident it is not utilised fully. students can still use other open labs hence they are no crowded, TUT will benefit from future energy consumptions of one or more lab closed. but however, if it is crowded then an extra lab must be opened to accompany more student who need to use the computers



THE online systems database can pull old historic records, the image above illustrates this by showing old booking records from the past year as well with which student made the booking, the specific date the booking was made as well as who was responsible for managing that lab

NORMALISATION AND DEPENDENCY DIAGRAM

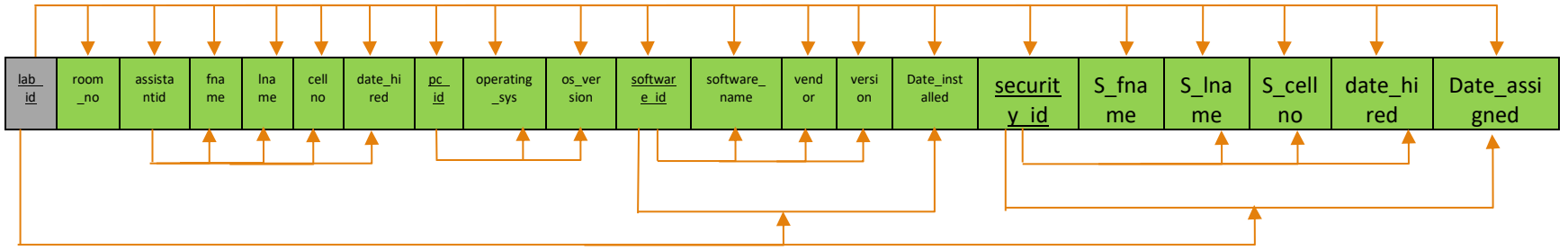
1NF



Relational schema: 1NF (booking_id , student_id , lab_id , booking_date , slotid , start_time, end_time)

Partial dependency : student_id → fname, lname, cellno

Transitive dependency: slotid start_time, end_time



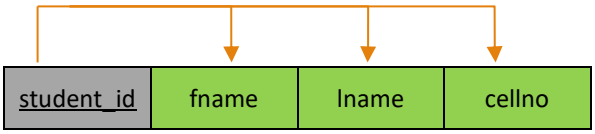
Relational schema: 1NF (lab_id, room_no, assistantid, fname, lname, cellno, date_hired, pc_id, operating_sys, os_version, software_id, software_name, vendor, version, Date_installed, security_id, S_fname, S_lname, S_cellno, date_hired, Date_assigned)

Partial dependencies: assistantid→ fname, lname, cellno, date_hired; security_id → S_fname, S_lname, S_cellno, date_hired

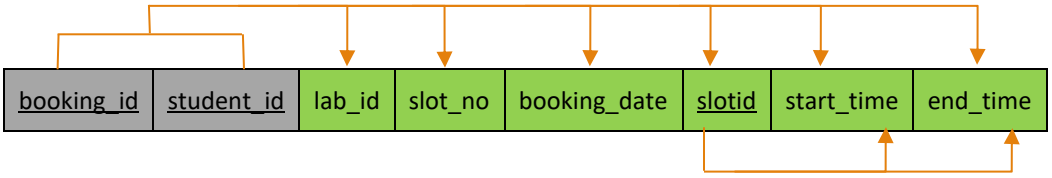
software_id → software_name, vendor, version

Functional dependency: software_id → Date_installed; security_id → Date_assigned; pc_id → operating_sys, os_version

2NF



Relational schema: 2NF (student_id, fname, lname, cellno)



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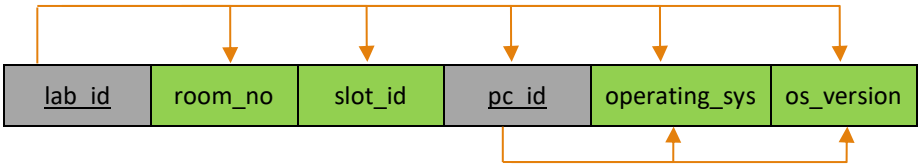
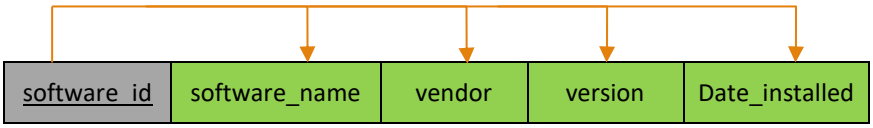
Partial dependency: 2NF (slotid, start_time, end_time)

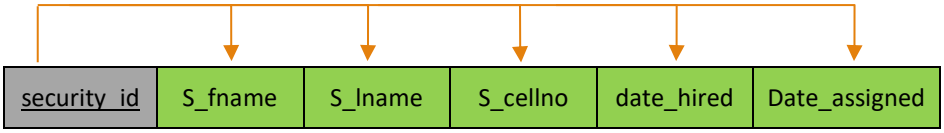


Relational schema: 2NF (lab_id, room_no, slot_id, pc_id, operating_sys, os_version)

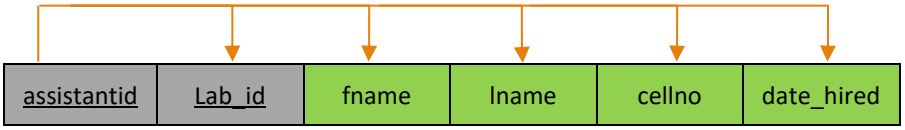
Transitive dependency pc_id → operating_sys , os_version



Relational schema: 2NF (software_id, software_name, vendor, version, Date_installed)

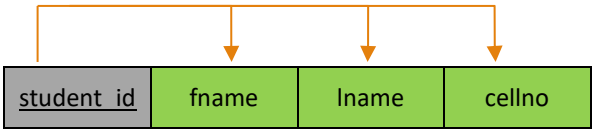


Relational schema: 2NF (security_id, S_fname, S_lname, S_cellno, date_hired, Date_assigned)

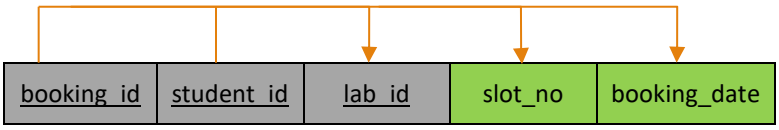


Relational schema : 2NF (assistantid, fname, lname, cellno, date_hired)

3NF



Relational schema: 3NF (student_id, fname, lname, cellno)



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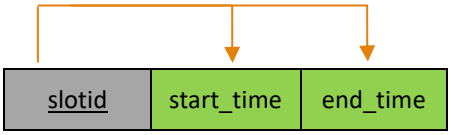
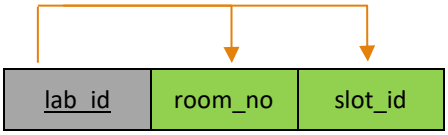
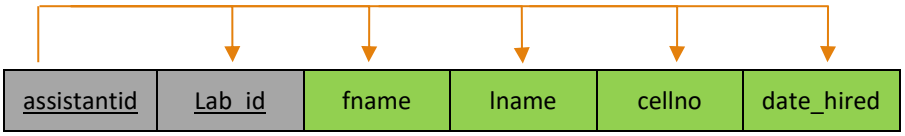


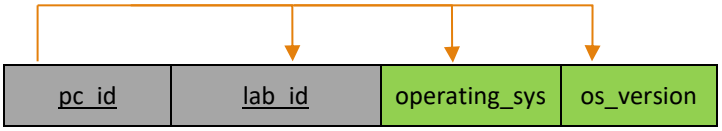
Relational schema : 3NF (slotid, start_time, end_time)



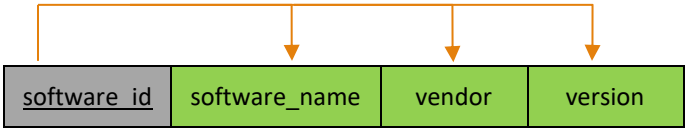
Relational schema: 3NF (lab_id, room_no, slot_id)



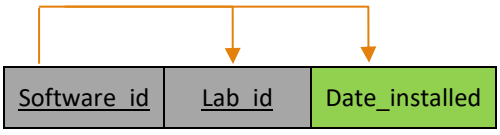
Relational schema: 3NF (assistantid, fname, lname, cellno, date_hired)



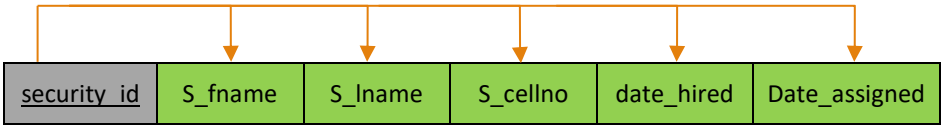
Relational schema: 3NF (pc_id, lab_id, operating_sys, os_version)



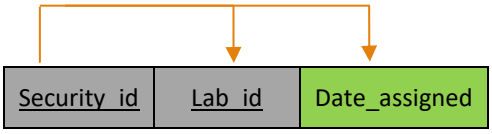
Relational schema : 3NF (software_id, software_name, vendor, version)



Relational schema : 3NF (Software_id, Lab_id, Date_installed)

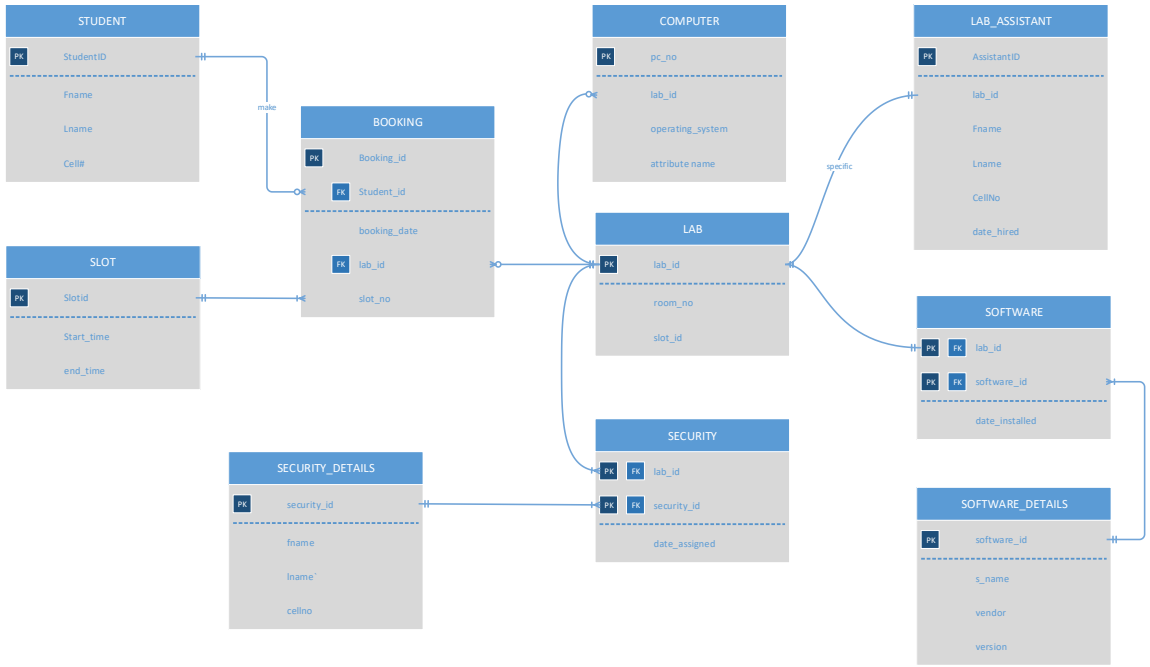


Relational schema: 3NF (security_id, S_fname, S_lname, S_cellno, date_hired, Date_assigned)



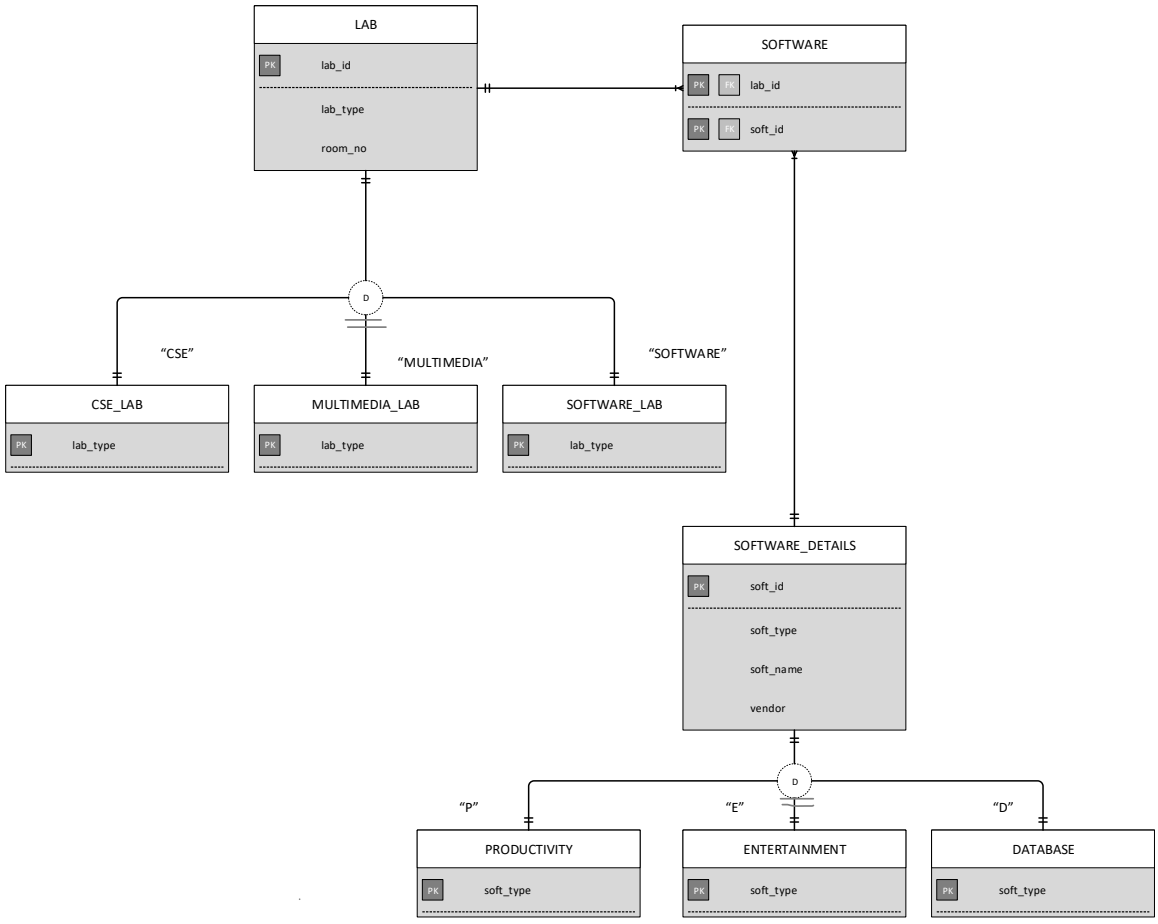
Relational schema : 3NF (slotid, start_time, end_time)

ENTITY RELATIONSHIP DIAGRAM



Entity relationship diagram showing database tables and their relations to other tables

ENHANCED ENTITY RELATIONSHIP DIAGRAM



Enhanced entity relationship diagram derived from the tables LAB and SOFTWARE_DETAILS

POPULATED TABLE AND TEST DATA

Table: BOOKING

BOOKING

booking_id	student_id	booking_da	lab_id	slot_type
1	213459831	30 Sep 2017	113	c
2	215739122	30 Sep 2017	112	c
3	217218147	30 Sep 2017	114	a
4	217488441	30 Sep 2017	113	c
5	215739122	01 Oct 2017	115	b
6	215739122	01 Oct 2017	112	a
7	217488441	03 Oct 2017	111	a
8	217218147	03 Oct 2017	111	c
9	213459831	03 Oct 2017	113	c
10	214182143	03 Oct 2017	113	c
11	215156843	03 Oct 2017	111	c
12	217488441	03 Oct 2017	115	b
13	214182143	04 Oct 2017	113	c
(New)				

Table: STUDENT

STUDENT

student_id	fname	lname	cell#
213459831	Lebang	Emily	(078)-651-3512
214182143	khoza	Zanele	(061)-213-5152
215156843	Thanjekwayo	Dineo	(012)-484-6516
215739122	Maje	Nkosi	(082)-161-0344
216218512	Kgatle	Anele	(062)-265-1683
217218147	Stuurman	Jafta	(074)-166-5061
217488441	Khoza	Johannah	(084)-651-5138
0			

The student_id field refers to the student_id PK field in the STUDENT table.

Therefore it would not be possible to delete a record from the STUDENT table if there is still some session records that relate to it in the booking table

SLOT

slot_id	start_time	end_time
a	09:00	13:00
b	13:00	17:00
c	17:00	22:00

Table: BOOKING

BOOKING

booking_id	student_id	booking_da	lab_id	slot_type
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6	215739122	01 Oct 2017	112	a
7	217488441	03 Oct 2017	111	a
8	217218147	03 Oct 2017	111	c
9	213459831	03 Oct 2017	113	c
10	214182143	03 Oct 2017	113	c
11	215156843	03 Oct 2017	111	c
12	217488441	03 Oct 2017	115	b
13	214182143	04 Oct 2017	113	c
(New)				

LAB

lab_id	room_no	lab_type
111	10-G06	Multimedia
112	10-G32	Software
113	10-G34	Software
114	10-L44	Software
115	18-BB1	CSE
116	18-BB3	CSE
0		

Table: LAB

LAB_ASSISTANT

lab_id	assistant_id	fname	lname	cellNo	date_hired
111	213989376	Baloi	Beauty	(061)-838-5457	07 Aug 2017
112	214179143	Sefako	Celia	(074)-193-7602	23 Mar 2017
113	215437421	Molapo	John	(061)-234-5983	23 Mar 2017
114	215465884	Stuurman	Kabelo	(076)-849-5251	09 Aug 2017
115	216764828	Maputla	Kyle	(082)-923-4858	23 Mar 2017
116	214684518	Mbulala	Charlie	(073)-163-1586	07 Aug 2017

COMPUTER

pc_no	lab_id	operating_s
111PC01	111	Windows 10
111PC02	111	Windows 10
111PC03	111	Windows 10
112PC01	112	Windows 7
113PC01	113	Windows 8
113PC02	113	Windows 8
114PC01	114	Windows 7
115PC01	115	Windows 7
116PC01	116	Windows 7
116PC02	116	Windows 7
116PC03	116	Windows 7

Table: SOFTWARE

SOFTWARE

software_id	lab_id	date_install
10	111	24 Jan 2017
11	112	24 Apr 2017
11	111	25 Jan 2017
11	113	26 Jan 2017
11	114	28 Jan 2017
11	115	02 Feb 2016
11	116	04 Feb 2016
12	111	24 Jan 2017
13	112	24 Apr 2017
13	113	25 Jan 2017
13	114	26 Jan 2017
13	115	04 Feb 2016
13	116	02 Feb 2016
14	111	24 Apr 2017
14	112	25 Jan 2017
14	113	26 Jan 2017
14	114	28 Jan 2017
14	115	02 Feb 2016
14	116	04 Feb 2016
16	111	24 Apr 2016
17	111	24 Jan 2017
17	116	04 Feb 2016

SOFTWARE_DETAILS

software_id	s_name	vendor	version
10	creative suit	adobe	2015
11	office suit	Microsoft	2013
12	Visual Studio	Microsoft	2015
13	Visual Studio	Microsoft	2013
14	Notepad ++	Notepad++	2010
15	Embarcadero C	Embacadero	2011
16	3DS Max Cad	3DS Max	2015
17	Chrome	Google	2017 58.00
18	Firefox	mozilla	2017
19	Arduino	Arduino inc	2017
20	Photoshop	Adobe inc	CC2016
21	After Effects	Adobe inc	CC2016
0			

Table: SOFTWARE_DETAILS

SECURITY

security_id	lab_id	date_assign
213028	111	28 Feb 2017
213551	112	28 Feb 2017
216364	116	30 Jan 2017
216364	115	30 Jan 2017
216543	114	28 Jan 2017
216543	113	16 Jul 2017
217965	115	30 Jan 2017
217965	116	30 Jan 2017

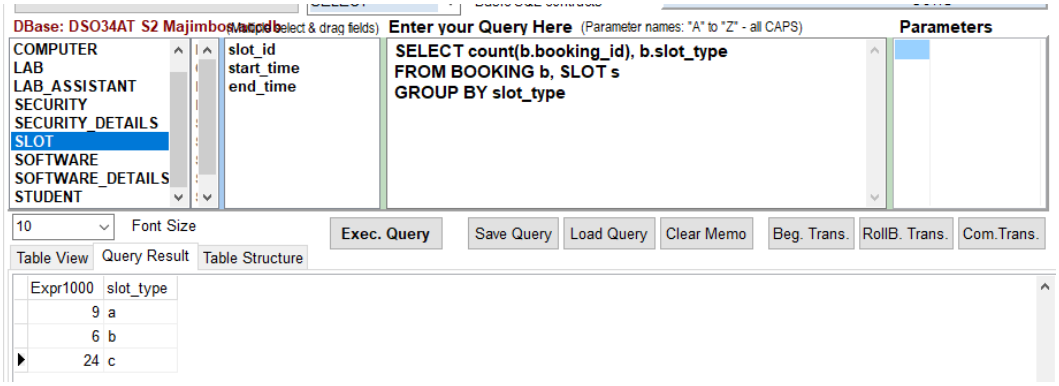
SECURITY_DETAILS

security_id	fname	lname	cellno
213028	Mahlangu	shakes	(084)-315-8616
213551	Tshabalala	August	(061)-051-3851
216364	Ramose	Nthabiseng	(076)-345-1381
216543	Baloyi	Francinah	(084)-351-5863
217965	Thenjikwayo	Neo	(078)-861-3584

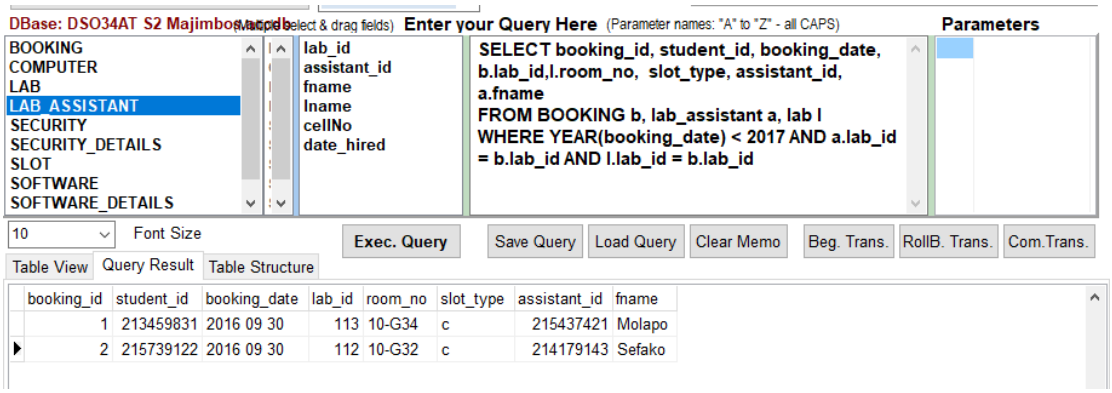
table:

SECURITY_DETAILS

FORMS/REPORTS



From the report above one can assume students are more likely to book for a lab on slot c, which is in the evening from 5pm to 10pm. this is due to the fact during the day students are either busy with something or attending classes.



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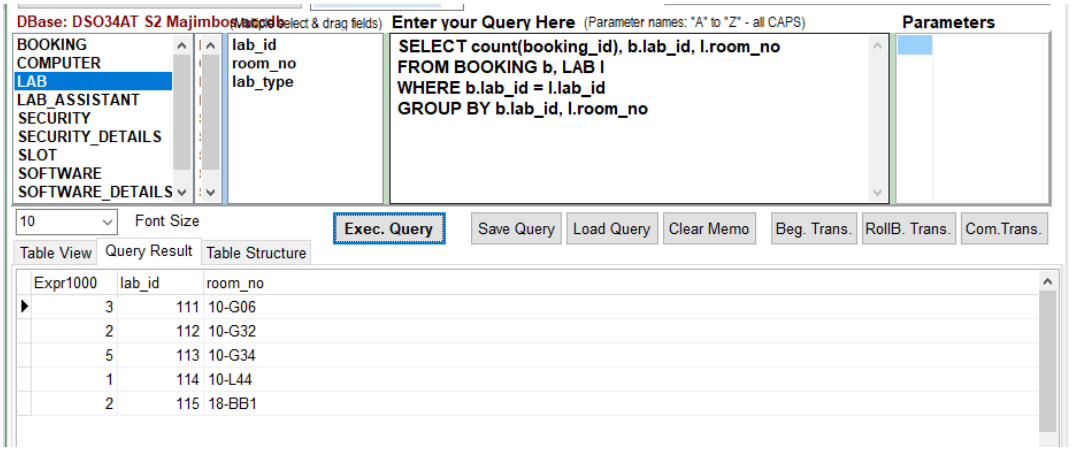
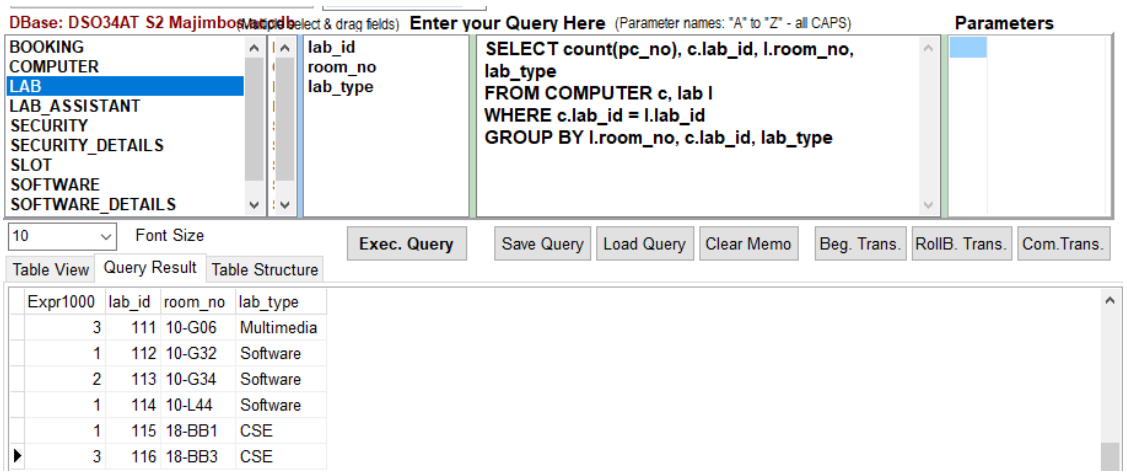


From the report we can see whether the labs are utilised fully or not, in this case lab id 114 is the least booked lab of them all, TUT can further use this report to close this lab since it is now evident it is not utilised fully. students can still use other open labs hence they are no crowded, TUT will benefit from future energy consumptions of one or more lab closed. but however, if it is crowded then an extra lab must be opened to accompany more student who need to use the computers



Above is a report / query to show the number of computers found in each lab as well as the description of the lab, thus can also tell us how many students can be catered for per lab or in total

MARK SHEET

	Description	Comments	Mark
1	DBMS Software Selection Justification and others Hardware, OS & DBMS specifications and motivations. (5) Will your system allow government to pull several historical, or any other business decision support records? Give examples of such records which might be needed by government. (15)		— 20
2	Conceptual Design Proper Entity, Attributes, relation names & representation (10) Entity Relationship Diagram in 3rd Normal Form (30) Take at least two relations from your existing ERD diagram and represent them in EERD format (15)		— 55
3	Test Data and DB Dump Screen Shot of populated Tables (in a tabular format) with at least 5 records each. (5) Does the data within tables reflect the relationships as per your ERD? (5)		— 10
4	Forms/Reports Designs & describe at least 4 reports based on the data from your DB and/or queries applicable to the business operations. (5) At least 2 reports generated from your database. (10)		— 15
	TOTAL		— 100