

UiTM JOHOR Courier System Database Final Report

Version 1.0

SEMESTER OCT 2020 – FEB 2021

GROUP: CS1103A

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Final Report

1. Introduction

J&T Express which formerly called as PT Global Jet Express, is an Indonesian logistics company. It was founded in 2015 and the company is generally engaged in logistics and package delivery. After starting in Indonesia, it has expanded to Malaysia, Vietnam in 2017, the Philippines and Thailand in 2018, Singapore and Cambodia in 2019, and China in 2020. J&T Express has seen a rapid increase in business in Indonesia in the past years and has become the fourth biggest parcel company in Indonesia.

The purpose for this database system was created was for the implementation of the solutions to the determined problems for courier database system to be used throughout the organisation. This will ease the usage of database system for the targeted client. The purpose includes:

- i. To search and track the whereabouts of shipped out parcels.
- ii. To identify the evidence of payment that has been done by customers.
- iii. Track which employees that deliver the items.
- iv. Verify which hub that receives damaged products or items.

1.1 References

- Von Halle, B. (2001). *Business rules applied: building better systems using the business rules approach*. Wiley Publishing.
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- Kaulio, M. A. (2008). Project leadership in multi-project settings: Findings from a critical incident study. *International Journal of Project Management*, 26(4), 338-347.LI
- Acuña, S. T., & Juristo, N. (2004). Assigning people to roles in software projects. *Software: Practice and Experience*, 34(7), 675-696.
- Ballard, G. (2000). Phase scheduling. *LCI White Paper*, 7, 7-9.
- https://en.wikipedia.org/wiki/J%26T_Express

2. Project Overview

2.1 Problem Statement

- Cannot track the whereabouts of the items that have been shipped out.
- Cannot detect the evidence of payment that has been done by customers.
- Data of customers' personal information can nowhere to be found in database system.
- Employee that delivers the parcels can steal the items.
- Cannot track which hub that received damaged products/parcels.

2.2 Project Scope

The targeted customer is J&T Express company. The tables used for the database system are customer, transaction, seller, ship, parcel, hub, employee, and receiver. The covered areas that can use this database system is whole company in Indonesia, Malaysia, Vietnam, Philippines, Thailand, Singapore, Cambodia, and China.

2.3 Project Objectives

- Tracking number can be used to allow the receiver and the seller to track the parcels' whereabouts.
- Transaction ID is displayed as evidence.
- Customer ID can be used to save customers' personal information.
- Employee ID can be used as a way for determining who delivers the parcel to receivers' house so theft can be prevented.
- Hub ID can be used to elect which hub that receives parcels that has been damaged.

3. Project Organization

3.1 Organizational Structure

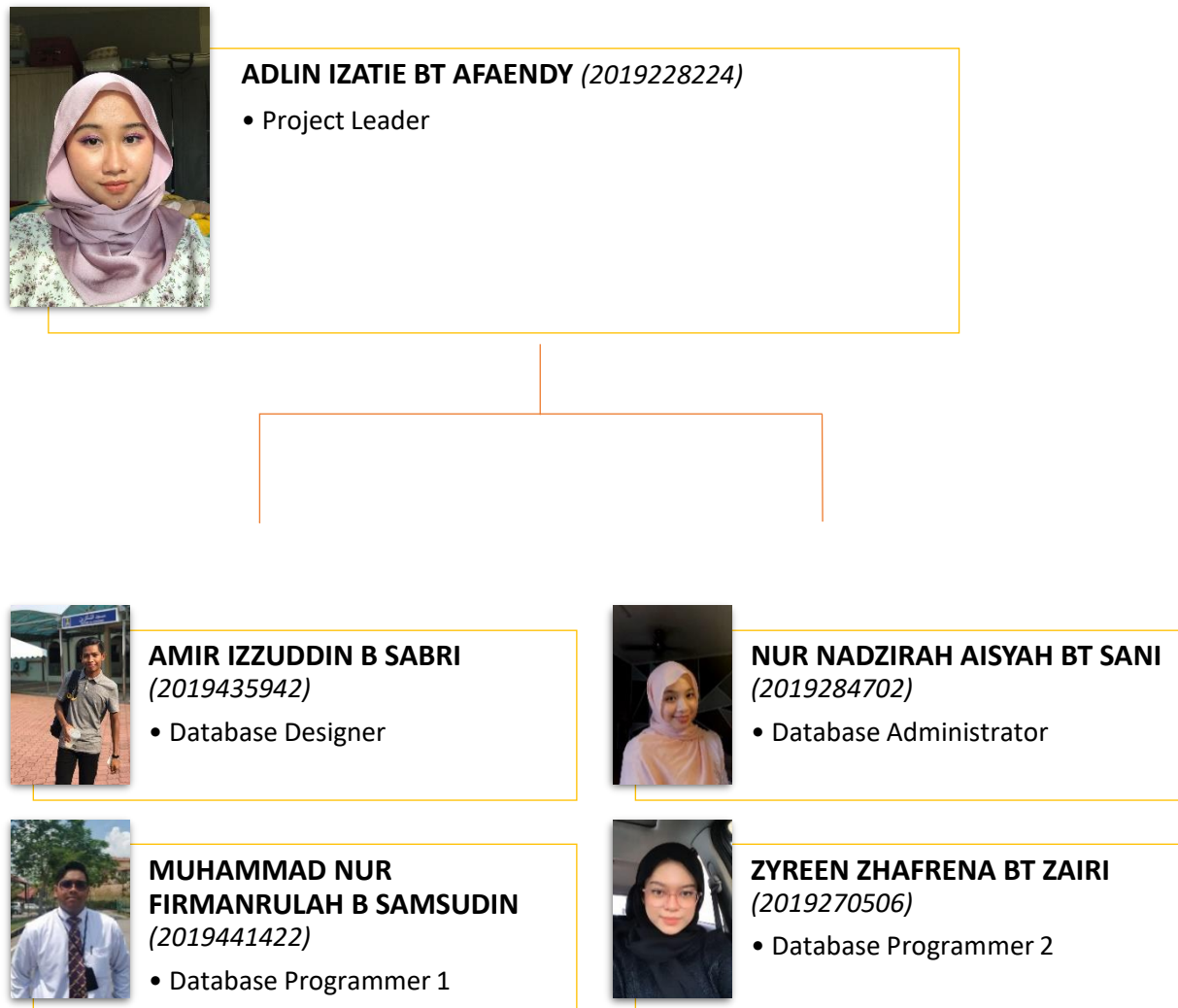


Figure 1

3.2 Roles and Responsibilities

1. Project Leader

- Responsible to set the direction for their team during project work.
- Act as a problem solver in a project and for conflict resolutions.
- Responsible in ensuring the team to do not stray from main goal and bring them back on track.

2. Database Designer

- Responsible in identifying the data (entities and attributes)
- Responsible in identifying the relationship between the data.
- Responsible in identifying the business rules on the data that is to be stored in the database.

3. Database Administrator

- Responsible in creating tables.
- Responsible in tuning the database performance.
- Responsible for maintaining data security and integrity.

4. Database Programmer

- Responsible to write scripts, store procedures, and functions for database system.
- Responsible to resolve database problems, queries, and error reports in accurate and timely manner.
- Responsible to coordinate with team members to perform database programming based on project requirements.
- Responsible in providing valid inputs in database architectural discussions.
- Responsible to assist in identifying process improvements for database performance, reliability, and stability.

4. Management Process

4.1 Project Plan

4.1.1 Phase Plan and Schedule

PROCESS WEEK	SCOPE PLANNING	PROJECT SCHEDULE PLANNING	RESOURCE PLANNING	TASK DISTRIBUTION PLANNING	BUDGET PLANNING	TASK EXECUTION	QUALITY PLANNING	PRESENTATION	COMPLETE PROJECT
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									

4.1.2 Project Deliverables

WEEK	DESCRIPTION	DUE DATE
1	Choose the targeted client	14 OCT 2020
2	Decides what name for the tables	21 OCT 2020
	Achieve an agreement amongst the team	28 OCT 2020
3	Decides when each plan should be completed	30 OCT 2020
4	Update the suggested dates	6 NOV 2020
5	Update the recent proposed dates	13 NOV 2020
	Achieve an agreement amongst the team	19 NOV 2020
6	Plans on how to get the sources to complete the project	20 NOV 2020
	Distributes each task to each teammate	21 NOV 2020
7	Achieve an agreement	26 NOV 2020
	Discuss budget expenditures	28 NOV 2020
8	Agree on proposed budget	7 DEC 2020
9	Database designer starts their task and do quality check respectively	16 DEC 2020
10	Database administrator starts their task and do quality check respectively	22 DEC 2020
11	Programmers starts their task and do quality check respectively	31 DEC 2020
12	Programmers starts their task and do quality check respectively	3 JAN 2021
	Starts recording video presentation	7 JAN 2021
13	Submit video presentation	14 JAN 2021
	Check final report	16 JAN 2021
14	<ul style="list-style-type: none"> – Final check for final report – Submit final report 	20 JAN 2021

5. Business Rules

5.1 List of business rules

- **Each customer can make only one transaction. A transaction is made by one customer.**
 - The CUSTOMER table stores data specific to each customer who made a courier service. It is linked to the TRANSACTION table in a one-to-one relationship, which automatically generate customer ID number (CUST_ID) serves as the CUSTOMER table's primary key.
- **A seller can ship many parcels. Many parcels can be shipped by sellers.**
 - The SELLER table is linked to PARCEL table in many-to-many relationship. It automatically creates a bridge table with SHIPMENT table. The TRANS_ID fields serve as the foreign key and SELLER_ID as primary key in the SELLER table.
- **Many parcels can receive by a hub. A hub can be received with many parcels.**
 - The PARCEL table stores all available data about the parcel that has been arrived at hub. This table is joined to the HUB table in many-to-one relationship, with HUB_ID serving as the foreign key in the PARCEL table.
- **A hub distributes to many employees. Many employees were distributed by one hub.**
 - The HUB table stores data specifically about every parcel that has been arrived at the hub. It is linked to the EMPLOYEE table in a one-to-many relationship, with HUB_ID automatically generated as the HUB table's primary key.
- **Each employee deliver parcel to many receivers. Many receivers have been delivered parcels by an employee.**
 - The EMPLOYEE table stores all available data about the employee that delivery the parcel to receiver. This table joined the RECEIVER table in one-to-many relationship, with HUB_ID serving as the foreign key in the EMPLOYEE table.

6. Entity Relationship Diagram

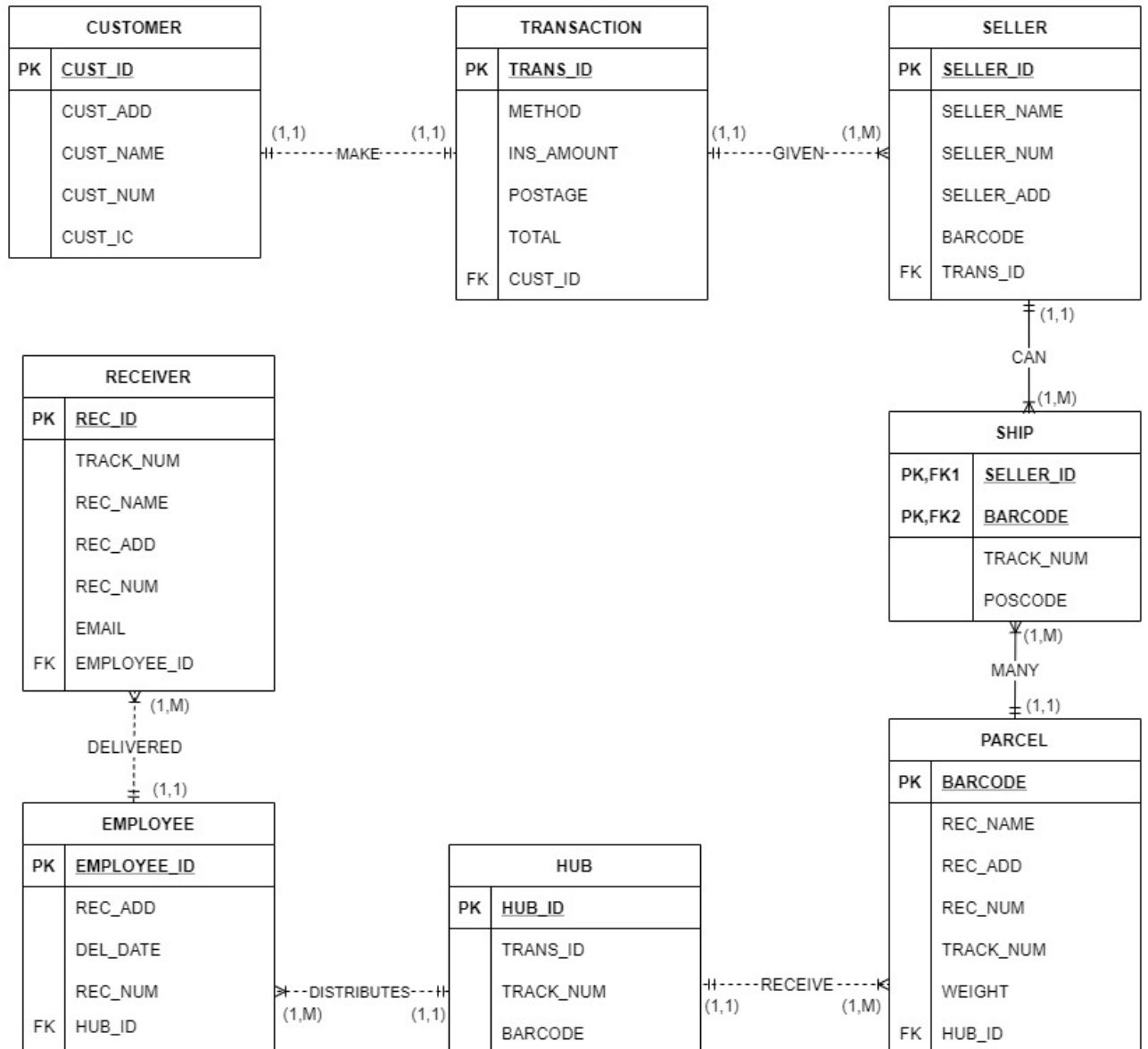


Figure 2

7. Sample of DB2 Queries and Output

1. List all the date once in a row in 2019.

```
SELECT DISTINCT DEL_DATE
FROM EMPLOYEE
WHERE DEL_DATE > '2019-06-14'
ORDER BY DEL_DATE DESC;
```

DEL_DATE
Dec 12, 2020
Sep 24, 2020
Sep 14, 2020
Apr 1, 2020
Jan 23, 2020
Jan 9, 2020
Jan 1, 2020
Sep 14, 2019
Sep 10, 2019

2. List all the last 10 details of the customers from Kelantan from the data.

```
SELECT * FROM CUSTOMER
WHERE CUST_ADD LIKE '%KELANTAN%'
AND CUST_ID BETWEEN 18444372
AND 18444382
ORDER BY CUST_NAME ASC;
```

CUST_ID	CUST_NAME	CUST_ADD	CUST_NUM	CUST_IC
18444378	ATHIRAH IWANI BIN...	C-100 JALAN TERAT...	011-12921381	960919-03-1296
18444379	MIZA HANNANI BINTI...	LOT 4506 KG LEPAR L...	019-98230812	990909-03-1964
18444374	MOHAMAD SHAKIRIN...	PANGKALAN CHEPA K...	014-1391301	990428-03-1931
18444375	NURFADZWANY BINT...	PT 1000 KG GAUNG L...	019-2930183	990725-03-0002
18444372	SITI NUR FATMA BIN...	TINGKAT 6 VIANA AP...	019-8882133	970831-03-1112
18444373	SITI NURAZYAN AUN...	LOT 501 LORONG EM...	011-2131801	970619-03-1928

3. Display seller's name and method of transaction made by customers where the amount of transaction made is more than RM50 which sequenced by the list of seller name.

```
SELECT T.METHOD, S.SELLER_NAME, T.TOTAL
FROM TRANSACTIONS T, SELLER S
WHERE T.TRANS_ID = S.TRANS_ID
AND T.TOTAL > 50.00
ORDER BY S.SELLER_NAME ASC;
```

METHOD	SELLER_NAME	TOTAL
PAYPALL	AZLEINDA BINTI ABD...	108.00
PAYPALL	FAQRUL AZMI BIN M...	87.00
PAYPALL	MOHAMED ZAINI BIN...	93.00
PAYPALL	MOHD ROSMANDI BI...	140.00
PAYPALL	MUHAMAD ALI HANA...	66.00
PAYPALL	MUHAMMAD SANI BI...	118.00
PAYPALL	NOR LIYANA BINTI A...	117.00
PAYPALL	NOR YUSLIZAWATI B...	84.00
PAYPALL	NORAZHA BIN TUKIMIN	59.55
PAYPALL	ZABEDAH BINTI JONED	100.00

4. List the customers' parcels that have been shipped to Malaysia from international customers. The listing should be ordered by descending of receivers' name and display receivers' address and the weight of the parcel.

```

SELECT C.CUST_NAME, T.TOTAL, S.SELLER_NAME, SH.TRACK_NUM, P.REC_NAME,
P.REC_ADD, P.REC_NUM, P.WEIGHT
FROM CUSTOMER C, TRANSACTIONS T, SELLER S, SHIP SH, PARCEL P
WHERE T.CUST_ID = C.CUST_ID
AND S.TRANS_ID = T.TRANS_ID
AND SH.SELLER_ID = S.SELLER_ID
AND SH.BARCODE = P.BARCODE
AND CUST_NUM LIKE '(%'
ORDER BY P.REC_NAME DESC;

```

CUST_NAME	TOTAL	SELLER_NAME	TRACK_NUM	REC_NAME	REC_ADD	REC_NUM	WEIGHT
FAHIM AMAR BIN RO...	100.00	ZABEDAH BINTI JONED	EP 50 898 289 31MY	NORAZLINA BINTI LA...	NO 61456 TAMAN KO...	014-5559898	2.5
LANA DEL REY	84.00	NOR YUSLIZAWATI B...	EP 57 898 289 38MY	MOHD AFFANI BIN IS...	NO 427 LORONG CER...	011-9217321	0.8
JOSEPH JOESTAR	118.00	MUHAMMAD SANI BI...	EP 51 898 289 32MY	MD YASIN BIN DAUD	PT 12454 TAMAN PU...	013-92117829	4.1
MICHAEL JACKSON	87.00	FAQRUL AZMI BIN M...	EP 55 898 289 36MY	KASIM BIN ISMAIL	NO 400-15 JALAN RA...	019-2374281	1.0
TANAKA	66.00	MUHAMAD ALI HANA...	EP 54 898 289 35MY	KAMARUZZAMN BIN ...	LOT NO 6277 JALAN ...	013-2210891	1.1
TAYLOR SWIFT	117.00	NOR LIYANA BINTI A...	EP 58 898 289 39MY	FARIZA BINTI AHAM...	21 CANGKAT BUKIT G...	013-0988081	2.7
JOTARO KUJO	140.00	MOHD ROSMANDI BI...	EP 52 898 289 33MY	CHE HAMID BIN ABD...	LOT NO 3636 KAMPU...	011-277639	2.3
SHERLOCK HOLMES	108.00	AZLEINDA BINTI ABD...	EP 59 898 289 40MY	CECELIA CROMER	1484 RJ 2/18 TAMAN...	019-827361	5.0
KENMA UZUMAKI	93.00	MOHAMED ZAINI BIN...	EP 53 898 289 34MY	AZMI BIN OTHMAN	NO 7103 TAMAN KET...	011-098807	1.4
SARAH LEE	59.55	NORAZHA BIN TUKIMIN	EP 56 898 289 37MY	AHMAD SAIFUL BIN A...	3453 LORONG SELAS...	011-9389821	0.5

5. List data for only employee between 3M70Y33ID01 to 3M70Y33ID45. Then exclude receiver from Perak on the list. Sequence the report by receiver name and email.

```
SELECT E.EMPLOYEE_ID, E.REC_ADD, R.REC_NAME, R.EMAIL FROM EMPLOYEE E,
RECEIVER R
WHERE E.EMPLOYEE_ID = R.EMPLOYEE_ID
AND E.EMPLOYEE_ID BETWEEN '3M70Y33ID01' AND '3M70Y33ID45'
AND E.REC_ADD NOT LIKE '%PERAK%'
ORDER BY E.REC_ADD, R.REC_NAME, R.EMAIL ASC;
```

EMPLOYEE_ID	REC_ADD	REC_NAME	EMAIL
3M70Y33ID36	3453 LORONG SELASIH 2B/4 TAMAN SELAMSIH 09000 KULIM	AHMAD SAIFUL BIN AHMAD	ahmad_saiful@gmail.com
3M70Y33ID06	LORONG 22 KAMUNTING AMAN 34600 KAMUNTING	AYU NATASYA FARISAH BINTI FAIZUL	ayunatasya@gmail.com
3M70Y33ID33	NO 7103 TAMAN KETAPANG 4 BUKIT KUJANG 24000 KEMAMAN TERENGGANU	AZMI BIN OTHMAN	azmiothamn@gmail.com
3M70Y33ID39	1484 RJ 2/18 TAMAN RASAH JAYA 70300 SEREMBAN	CECELIA CROMER	ceceliacromer@gmail.com
3M70Y33ID32	LOT NO 3636 KAMPUNG RHU RENGGEH RUSILA 21060 MERANG TERENGGANU	CHE HAMID BIN ABDULLAH	chehamid@gmail.com
3M70Y33ID38	21 CANGKAT BUKIT GAMBIR 1 11700 GELUGOR PULAU PINANG	FARIZA BINTI AHMAD PUJIZI	farizaahmad@gmail.com
3M70Y33ID22	JB 4471 JALAN DEBUNGA 2 TAMAN DEBUNGA 77200 MERLIMAU MELAKA	ISMAYANTE BINTI RAMLI	ismayanter_ranli99@gmail.com
3M70Y33ID41	612 JALAN SG G11 GARDEN AVENUE SEREMBAN 2 70400	JORDON BRIGHT	jordonbright@gmail.com
3M70Y33ID34	LOT NO 6277 JALAN YAHYA AHMAD 23000 DUNGUIN TERENGGANU	KAMARUZZAMIN BIN RIBUT	kamaruzaman56@gmail.com
3M70Y33ID35	NO 400-15 JALAN RAHMAT KAMPUNG MAK CHILI CUKAI 24000 KEMAMAN TERENGGANU	KASIM BIN ISMAIL	kasimismail@gmail.com
3M70Y33ID43	NO 827 JALAN HARUAN 13 TAMAN OAKLAND FASA2 70300 SEREMBAN	KOON KUAN FU	koonkuan@gmail.com
3M70Y33ID11	NO7 JALAN SUNGAI GAMA GAGAH 20 TAMAN TELUK GEDUNG INDAH 42000 PELABUH KLANG SELANGOR	LADY UMLEIE AK GALIE	ladyumile@gmail.com
3M70Y33ID45	238 JALAN PI 6 TAMAN PEDAS INDAH 71400 PEDAS NEGERI SEMBILAN	LEE KI YEE	leekiye@gmail.com
3M70Y33ID27	JALAN JB 4306 JALAN SERI HILIR 8 TAMAN SERI HILIR 77500 SELANDAR MELAKA	MANSOOR BIN HALIL	mansoorbinhalil@gmail.com
3M70Y33ID31	PT 12454 TAMAN PURNAMA INDAH RUSILA 21600 MARANG TERENGGANU	MD YASIN BIN DAUD	mdyasin@gmail.com
3M70Y33ID12	JALAN HULUBALANG 37A RAJA NONG TAMAN SENTOSA KLANG 42000 SELANGOR	MOHAMAD AFHAM AIDMANI BIN MOHAMAD ASRI	afhamaiman@gmail.com
3M70Y33ID13	B-4-28 CHERAS PERDANA APRTMENT 23400 CHERAS SELANGOR	MOHAMAD AIDMAN BIN ZAINUDIN	aiman22@gmail.com
3M70Y33ID14	NO 11-03 BLOK 5 PANGSAPURI ERA JALAN NASAGARI 36/2 40470 SEKSYEN 36 SHAH ALAM SELANGOR	MOHAMAD AMIRUL NIZAM BIN AKMAL ZAHED	amirul_nizam@gmail.com
3M70Y33ID15	JALAN CAKERA PURNAMA 12/15 SEKSYEN 12 42300 PUNCAK ALAM SELANGOR	MOHAMAD SHAKIRIN BIN SULAIMAN	shakirinsulaiman@gmail.com
3M70Y33ID16	D4-02 CHERAS JALAN CHERAS AWANA 13 TAMAN CHERAS AWANA BATU 9 43200 CHERAS SELANGOR	MOHAMAD ZULFADHLI BIN FADIL	zulfadhl@gmail.com
3M70Y33ID37	NO 427 LORONG CERIA 8 BANDAR UTAMA 08000 SUNGAI PETANI KEDAH	MOHD AFFANI BIN ISMAIL	affanismail@gmail.com
3M70Y33ID40	NO 164 JALAN SEREMBAN 3 EMPAT TAMAN SEREMBAN 70200	MONA EASLY	mona_perry@gmail.com
3M70Y33ID17	NO 87 JALAN LP 4/1 TAMAN LESTARI PERDANA BANR. PUTRA PERMAI 43300 SERI KEMBANGAN SELANGOR	MUHAMMAD DANIAL HAIDAL BIN MOHD HAMDAN	daniehaidal33@gmail.com
3M70Y33ID19	35 JALAN 16 AMPANG JAYA 68000 AMPANG SELANGOR	MUHAMMAD FIRDAUS BIN ABD AZIZ	firdausahaziz@gmail.com
3M70Y33ID20	LOT 148 JALAN HAJI SUPI KG SALAK TINGGI 43900 SEPANG SELANGOR	MUHAMMAD IZZUDDIN SHAH BIN ZAMRI	izzudinrock98@gmail.com
3M70Y33ID21	NO 34 JALAN SERI KRUBONG 8 TAMAN SERI KRUBONG 75250 MELAKA	NOORSHIDAH BINTI MOHD NASIR	noorshidahnasir@gmail.com
3M70Y33ID25	NO SI 11 JALAN SERULING JAYA 2 TAMAN SERULING JAYA 78300 MASJID TANAH MELAKA	NOR DALLAH BINTI ADB RAHMAN	nordallah88@gmail.com
3M70Y33ID30	NO 61456 TAMAN KOPERASI PERDANA BINJAI 24000 KEMAMAN TERENGGANU	NORAZLINA BINTI LATIB	norazlina@gmail.com
3M70Y33ID28	NO JB 4471 JALAN DEBUNGA 2 TAMAN DEBUNGA 77200 MERLIMAU MELAKA	RAHIM BIN DIN	rahimdin32@gmail.com
3M70Y33ID18	JALAN SETIA TROPIKA 4/1 SETIA TROPIKA 81200 JOHOR. BAHRU JOHOR	RAIDAH BINTI HASAN	raidahhassa12@gmail.com
3M70Y33ID26	JB 2641 JALAN PULAI INDAH 7 TAMAN PULAI INDAH MERLIMAU MELAKA 77300	RUSHIAH BINTI OTHMAN	rushiahthman77@gmail.com
3M70Y33ID42	64 JALAN MERBOK 2 TAMAN BUNGA BLOSSM 70100 SEREMBAN	SEOW CHI SIA	seowchia@gmail.com
3M70Y33ID24	NO JB 7225 JALAN TEMBUSU 3H TAMAN JASIN HEIGHTS 77000 JASIN MELAKA	SITI ASIAHAH BINTI SARMIN	sitiasiahah@gmail.com
3M70Y33ID23	NO 6 JALAN DESA TAMING SARI 3 TAMAN DESA TAMING SARI SUNGAI UDANG 76400 MELAKA	WAN AZLAN BIN WAN HASSAN	wanazlan@gmail.com
3M70Y33ID44	6681 FLOOR. JALAN RU 1/2 TAMAN FASAH JAYA 70300 SEREMBAN	WONG SIEW YI	wongsiewyi@gmail.com
3M70Y33ID29	NO 12 JALAN TTP 11 TAMAN TAMBAK PAYA PERMAI AYER MOLEK 75460 MELAKA	ZAINAL ABIDIN BIN IBRAHIM	zainalabidin@gmail.com

6. List the amount total of payment as NEEDTOPAY. But the amount must be more than 70 and the transaction id is between 56IDT7820 and 56IDT7835. Please arrange according to customers' id and method.

```
SELECT CUST_ID, METHOD, INS_AMOUNT + POSTAGE AS NEEDTOPAY
FROM TRANSACTIONS
WHERE INS_AMOUNT > 70.00
AND TRANS_ID BETWEEN '56IDT7820' AND '56IDT7835'
ORDER BY CUST_ID, METHOD ASC;
```

CUST_ID	METHOD	NEEDTOPAY
18444362	PAYPALL	100.00
18444363	PAYPALL	118.00
18444364	PAYPALL	140.00
18444365	PAYPALL	93.00

7. List the amount total of payment as NEEDTOPAY. Where the amount must be more than 70, the insurance is less than RM10 and the transaction id is between 56IDT7820 and 56IDT7835. Please arrange according to customers' id and method.

```
SELECT CUST_ID, METHOD, INS_AMOUNT, COALESCE(INS_AMOUNT,0) + POSTAGE AS
NEEDTOPAY
FROM TRANSACTIONS
WHERE TRANS_ID BETWEEN '56IDT7820' AND '56IDT7835'
AND INS_AMOUNT < 10
ORDER BY CUST_ID, METHOD, INS_AMOUNT ASC;
```

CUST_ID	METHOD	INS_AMOUNT	NEEDTOPAY
18444351	CASH ON DELIVERY	0.00	8.00
18444352	BANK TRANSFER	0.00	8.00
18444354	BANK TRANSFER	0.00	8.00
18444355	BANK TRANSFER	0.00	8.00
18444356	BANK TRANSFER	0.00	8.00
18444357	BANK TRANSFER	0.00	8.00
18444358	BANK TRANSFER	0.00	8.00
18444359	BANK TRANSFER	0.00	8.00
18444360	BANK TRANSFER	0.00	8.00
18444361	BANK TRANSFER	0.00	8.00

8. I need you to display method, total, customer id and customer that made payment using PayPal or credit card method where customer that add insurance more than RM 7. Create new column as Tax to charge the customer. Charge them 6% from the amount that they paid. Please arrange it according to customers' id, method and total.

```
SELECT CUST_ID, METHOD, TOTAL, DECIMAL(COALESCE(TOTAL,0) * 1.06,6,2) AS TAX
FROM TRANSACTIONS
WHERE INS_AMOUNT >= 8
AND METHOD = 'PAYPALL' OR METHOD = 'CREDIT CARD'
ORDER BY CUST_ID, METHOD, TOTAL ASC;
```

CUST_ID	METHOD	TOTAL	TAX
18444332	CREDIT CARD	10.50	11.13
18444333	CREDIT CARD	8.00	8.48
18444334	CREDIT CARD	8.00	8.48
18444335	CREDIT CARD	8.00	8.48
18444336	CREDIT CARD	18.00	19.08
18444337	CREDIT CARD	8.00	8.48
18444338	CREDIT CARD	10.50	11.13
18444339	CREDIT CARD	8.00	8.48
18444340	CREDIT CARD	8.00	8.48
18444341	CREDIT CARD	18.00	19.08
18444362	PAYPALL	100.00	106.00
18444363	PAYPALL	118.00	125.08
18444364	PAYPALL	140.00	148.40
18444365	PAYPALL	93.00	98.58
18444366	PAYPALL	66.00	69.96
18444367	PAYPALL	87.00	92.22
18444368	PAYPALL	59.55	63.12
18444369	PAYPALL	84.00	89.04
18444370	PAYPALL	117.00	124.02
18444371	PAYPALL	108.00	114.48

9. Please display that sales we made by this year. I also need you to display 6 last character of each employee id. Display receivers' number and their delivery date and hub id. Sequence the delivery date in descending order.

```
SELECT SUBSTR(EMPLOYEE_ID,6,11) AS LAST6, REC_NUM, DEL_DATE, HUB_ID,
CURRENT_DATE - DEL_DATE AS DURATION
FROM EMPLOYEE
WHERE CURRENT_DATE - DEL_DATE <= 010000
ORDER BY DEL_DATE DESC;
```

LAST6	REC_NUM	DEL_DATE	HUB_ID	DURATION
33ID01	017-5202248	Dec 12, 2020	1010HU800	30
33ID11	017-678923	Sep 24, 2020	1110HU800	317
33ID35	019-2374281	Sep 14, 2020	1350HU800	327
33ID36	011-9389821	Sep 14, 2020	1360HU800	327
33ID37	011-9217321	Sep 14, 2020	1370HU800	327
33ID38	013-0988081	Sep 14, 2020	1380HU800	327
33ID39	019-827361	Sep 14, 2020	1390HU800	327
33ID40	011-3871212	Sep 14, 2020	1400HU800	327
33ID41	019-2731314	Sep 14, 2020	1410HU800	327
33ID42	013-0203910	Sep 14, 2020	1420HU800	327
33ID46	012-9987323	Sep 14, 2020	1460HU800	327
33ID47	017-19238813	Sep 14, 2020	1470HU800	327
33ID19	017-1830173	Apr 1, 2020	1190HU800	910
33ID20	016-2712321	Apr 1, 2020	1200HU800	910
33ID21	018-2372910	Apr 1, 2020	1210HU800	910
33ID22	013-2301992	Apr 1, 2020	1220HU800	910
33ID34	013-2210891	Apr 1, 2020	1340HU800	910
33ID28	017-6623450	Jan 23, 2020	1280HU800	1,119
33ID29	011-2492301	Jan 23, 2020	1290HU800	1,119
33ID30	014-5559898	Jan 23, 2020	1300HU800	1,119
33ID31	013-92117829	Jan 23, 2020	1310HU800	1,119
33ID32	011-277639	Jan 23, 2020	1320HU800	1,119
33ID33	011-098807	Jan 23, 2020	1330HU800	1,119

10. I want you to display customers from Selangor. Combine customers' name, address, and phone number in one column and list each customer last 4 digit of IC accordingly.

```
SELECT SUBSTR(CUST_IC,11,14) AS IC, CUST_NAME CONCAT ' , ' CONCAT CUST_ADD
CONCAT ' , ' CONCAT CUST_NUM AS DETAILS
FROM CUSTOMER
WHERE CUST_ADD LIKE '%SELANGOR%'
ORDER BY IC;
```

IC	DETAILS
0829	MUHAMMAD FIRDAUS BIN ABD AZIZ , 5 JALAN 16 AMPANG JAYA 68000 AMPANG SELANGOR , 017-1830173
1113	MOHAMAD AMIRUL NIZAM BIN AKMAL ZAHED , NO 11-03 BLOK 5 PANGSAPURI ERA JALAN NASAGARI 36/2 40470 SEKSYEN 36 SHAH ALAM SELANGOR , 019-8327320
1119	MOHAMAD ZULFADHLI BIN FADIL , D4-02 CHERAS JALAN CHERAS AWANA 13 TAMAN CHERAS AWANA BATU 9 43200 CHERAS SELANGOR , 014-2834719
1129	MUHAMMAD DANIAL HAIKAL BIN MOHD HAMDAN , NO 87 JALAN LP 4/1 TAMAN LESTARI PERDANA BANR PUTRA PERMAI 43300 SERI KEMBANGAN SELANGOR , 011-91318731
1247	MUHAMMAD IZZUDDIN SHAH BIN ZAMRI , LOT 148 JALAN HAJI SUPI KG SALAK TINGGI 43900 SEPANG SELANGOR , 016-2712321
1248	LADY UELIE AK GALIE , NO7 JALAN SUNGAI GAMA GAGAH 20 TAMAN TELUK GEDUNG INDAH 42000 PELABUH KLANG SELANGOR , 017-678923
2457	MOHAMAD AFHAM AIDAN BIN MOHAMAD ASRI , JALAN HULUBALANG 37A RAJA NONG TAMAN SENTOSA KLANG SELANGOR , 019-07580345
3721	MOHAMAD AIDAN BIN ZAINUDIN , B-4-28 CHERAS PERDANA APRTMENT 23400 CHERAS SELANGOR , 012-4587201
8273	MOHAMAD SHAKIRIN BIN SULAIMAN , JALAN CAKERA PURNAMA 12/15 SEKSYEN 12 42300 PUNCAK ALAM SELANGOR , 018-7322613

11. List all the total of each method of payment between 56IDT7805 and 56IDT7845. Where insurance is less than RM 50.00. List only total of method payment that is less and equal to 1000. Sequence the method in ascending.

```
SELECT METHOD, SUM(TOTAL) AS G_TOTAL FROM TRANSACTIONS
WHERE METHOD IN ('CREDIT CARD','CASH ON DELIVERY','BANK
TRANSFER','PAYPALL','PREPAID CARD')
AND TRANS_ID BETWEEN '56IDT7805' AND '56IDT7845'
AND INS_AMOUNT < 50.00
GROUP BY METHOD HAVING SUM(TOTAL) <= 1000
ORDER BY METHOD ASC;
```

METHOD	G_TOTAL
BANK TRANSFER	72.00
CASH ON DELIVERY	94.50
CREDIT CARD	70.50
PAYPALL	125.55
PREPAID CARD	40.00

- 12. Count each column of method payment that have more than 3 columns. Sequence according to method in ascending.**

```
SELECT METHOD, COUNT (DISTINCT TRANS_ID) AS METHOD_COUNT
FROM TRANSACTIONS
WHERE METHOD IN ('CREDIT CARD','CASH ON DELIVERY','BANK
TRANSFER','PAYPALL','PREPAID CARD')
GROUP BY METHOD HAVING COUNT (DISTINCT TRANS_ID) > 3
ORDER BY METHOD ASC;
```

METHOD	METHOD_COUNT
BANK TRANSFER	9
CASH ON DELIVERY	11
CREDIT CARD	10
PAYPALL	10
PREPAID CARD	10

- 13. List minimum and the maximum weight parcel from Perak between barcode 70B4RC0D301 and 70B4RC0D330.**

```
SELECT MAX(WEIGHT) AS MAX_WEIGHT, MIN(WEIGHT) AS MIN_WEIGHT
FROM PARCEL
WHERE BARCODE BETWEEN '70B4RC0D301' AND '70B4RC0D330'
AND REC_ADD LIKE '%PERAK%';
```

MAX_WEIGHT	MIN_WEIGHT
3.0	0.5

14. List the total average set 2 to 6 decimal place for each column of method payment made by customers and count each column of method that has more than 8 in new column as **METHOD_COUNT**. Sequence the report by method as ascending.

```
SELECT METHOD, COUNT(TRANS_ID) AS METHOD_COUNT, DECIMAL(AVG(TOTAL),6,2)
AS AVG_TOTAL
FROM TRANSACTION
WHERE METHOD IN ('CREDIT CARD','CASH ON DELIVERY','BANK
TRANSFER','PAYPALL','PREPAID CARD')
GROUP BY METHOD HAVING COUNT (DISTINCT TRANS_ID) > 8.
ORDER BY METHOD ASC;
```

METHOD	METHOD_COUNT	AVG_TOTAL
BANK TRANSFER	9	8.00
CASH ON DELIVERY	11	8.59
CREDIT CARD	10	10.50
PAYPALL	10	97.25
PREPAID CARD	10	8.80

15. Create column as **G_TOTAL** as total of payment, **AVG_TOTAL** as the average of payment, **MAX_PRICE** as the maximum of payment and **MIN_PRICE** as the minimum of payment. Please count total column of transaction id.

```
SELECT SUM(TOTAL) AS G_TOTAL, DECIMAL(AVG(TOTAL),6,2) AS AVG_TOTAL,
MAX(TOTAL) AS MAX_PRICE, MIN(TOTAL) AS MIN_PRICE, COUNT(TRANS_ID) AS
METHOD_COUNT
FROM TRANSACTIONS;
```

G_TOTAL	AVG_TOTAL	MAX_PRICE	MIN_PRICE	METHOD_COUNT
1,332.05	26.64	140.00	8.00	50

16. Please list our customers' details excluding customer from Perak. Sequence the report by ascending.

```
SELECT BARCODE, REC_NAME, REC_NUM, TRACK_NUM
FROM PARCEL
WHERE REC_ADD NOT IN (SELECT REC_ADD
FROM PARCEL
WHERE REC_ADD LIKE '%PERAK%')
ORDER BY REC_NAME ASC;
```

BARCODE	REC_NAME	REC_NUM	TRACK_NUM
70B4RCOD336	AHMAD SAIFUL BIN A...	011-9389821	EP 56 898 289 2MY
70B4RCOD306	AYU NATASYA FARIS...	018-075698	EP 26 898 289 2MY
70B4RCOD333	AZMI BIN OTHMAN	011-098807	EP 53 898 289 2MY
70B4RCOD339	CECELIA CROMER	019-827361	EP 59 898 289 2MY
70B4RCOD332	CHE HAMID BIN ABD...	011-277639	EP 52 898 289 2MY
70B4RCOD338	FARIZA BINTI AHAM...	013-0988081	EP 58 898 289 2MY
70B4RCOD322	ISMAYANTE BINTI RA...	013-2301992	EP 42 898 289 2MY
70B4RCOD341	JORDON BRIGHT	019-2731314	EP 61 898 289 2MY
70B4RCOD334	KAMARUZZAMN BIN ...	013-2210891	EP 54 898 289 2MY
70B4RCOD349	KAREENA	011-5858763	EP 69 898 289 2MY
70B4RCOD335	KASIM BIN ISMAIL	019-2374281	EP 55 898 289 2MY
70B4RCOD343	KOON KUAN FU	019-83649112	EP 63 898 289 2MY
70B4RCOD311	LADY UELIE AK GALIE	017-678923	EP 31 898 289 2MY
70B4RCOD345	LEE KI YEE	019-9998745	EP 65 898 289 2MY
70B4RCOD327	MANSOOR BIN HALIL	012-992356	EP 47 898 289 2MY
70B4RCOD331	MD YASIN BIN DAUD	013-92117829	EP 51 898 289 2MY
70B4RCOD312	MOHAMAD AFHAM AI...	019-07580345	EP 32 898 289 2MY
70B4RCOD313	MOHAMAD AIMAN BI...	012-4587201	EP 33 898 289 2MY
70B4RCOD314	MOHAMAD AMIRUL N...	019-8327320	EP 34 898 289 2MY
70B4RCOD315	MOHAMAD SHAKIRIN...	018-7322613	EP 35 898 289 2MY
70B4RCOD316	MOHAMAD ZULFADH...	014-2834719	EP 36 898 289 2MY
70B4RCOD337	MOHD AFFANI BIN IS...	011-9217321	EP 57 898 289 2MY
70B4RCOD340	MONA EASLY	011-3871212	EP 60 898 289 2MY
70B4RCOD317	MUHAMMAD DANIAL ...	011-91318731	EP 37 898 289 2MY
70B4RCOD319	MUHAMMAD FIRDAU...	017-1830173	EP 39 898 289 2MY
70B4RCOD320	MUHAMMAD IZZUDDI...	016-2712321	EP 40 898 289 2MY
70B4RCOD321	NOORSHIDAH BINTI ...	018-2372910	EP 41 898 289 2MY
70B4RCOD325	NOR DALILAH BINTI ...	011-0983302	EP 45 898 289 2MY
70B4RCOD330	NORAZLINA BINTI LA...	014-5559898	EP 50 898 289 2MY
70B4RCOD328	RAHIM BIN DIN	017-6623450	EP 48 898 289 2MY
70B4RCOD318	RAIDAH BINTI HASAN	011-1923813	EP 38 898 289 2MY
70B4RCOD346	RAVIVARMA A/L SUD...	012-9987323	EP 66 898 289 2MY
70B4RCOD326	RUSHIAH BINTI OTH...	019-2399830	EP 46 898 289 2MY
70B4RCOD348	SAURABH M KOVOOR	017-666241	EP 68 898 289 2MY
70B4RCOD342	SEOW CHI SIA	013-0203910	EP 62 898 289 2MY
70B4RCOD324	SITI ASIAHAH BINTI ...	019-998367	EP 44 898 289 2MY
70B4RCOD350	STEPHANIE A/P PAR...	018-2039812	EP 70 898 289 2MY

17. List details of our customers' details which is customer id, customer name, method payment and total where the total payment they made is RM8.00

```
SELECT C.CUST_ID, C.CUST_NAME, T.METHOD, T.TOTAL
FROM CUSTOMER C, TRANSACTIONS T
WHERE C.CUST_ID = T.CUST_ID AND TOTAL IN (SELECT TOTAL
FROM TRANSACTIONS
WHERE TRANS_ID = '56IDT7802');
```

CUST_ID	CUST_NAME	METHOD	TOTAL
18444333	ABDUL HAKIM BIN N...	CREDIT CARD	8.0
18444334	ABDUL LOQMAN BIN ...	CREDIT CARD	8.0
18444335	ADLIN IZATIE BINTI ...	CREDIT CARD	8.0
18444337	AYU NATASHA FARIS...	CREDIT CARD	8.0
18444339	HANIF IMRAN BIN RA...	CREDIT CARD	8.0
18444340	HASYIMAH BINTI MO...	CREDIT CARD	8.0
18444342	LADY UELIE AK GALIE	CASH ON DELIVERY	8.0
18444343	MOHAMAD AFHAM AI...	CASH ON DELIVERY	8.0
18444344	MOHAMAD AIMAN BI...	CASH ON DELIVERY	8.0
18444345	MOHAMAD AMIRUL N...	CASH ON DELIVERY	8.0
18444346	MOHAMAD SHAKIRIN...	CASH ON DELIVERY	8.0
18444347	MOHAMAD ZULFADH...	CASH ON DELIVERY	8.0
18444348	MUHAMMAD DANIAL ...	CASH ON DELIVERY	8.0
18444351	MUHAMMAD IZZUDDI...	CASH ON DELIVERY	8.0
18444352	MUHAMMAD MUIZ FI...	BANK TRANSFER	8.0
18444353	NUR FARAH ZUHAIR...	CASH ON DELIVERY	8.0
18444354	NUR FATIAH ATHIR...	BANK TRANSFER	8.0
18444355	NUR INTAN AD LYNA ...	BANK TRANSFER	8.0
18444356	PUTRI AMIRA SYAFI...	BANK TRANSFER	8.0
18444357	RAIDAH BINTI HASAN	BANK TRANSFER	8.0
18444358	SHAHIR AZRIE BIN A...	BANK TRANSFER	8.0
18444359	ZYREEN ZHAFRENA B...	BANK TRANSFER	8.0
18444360	ISKANDAR BIN AHMAD	BANK TRANSFER	8.0
18444361	AHMAD HAKIM BIN H...	BANK TRANSFER	8.0
18444372	SITI NUR FATMA BIN...	PREPAID CARD	8.0
18444373	SITI NURAZYAN AUN...	PREPAID CARD	8.0
18444374	MOHAMAD SHAKIRIN...	PREPAID CARD	8.0
18444375	NURFADZWANY BINT...	PREPAID CARD	8.0
18444377	AKMAL ASNA BT KAM...	PREPAID CARD	8.0
18444378	ATHIRAH IWANI BIN...	PREPAID CARD	8.0
18444379	MIZA HANNANI BINTI...	PREPAID CARD	8.0
18444380	NIA NATASHA BINTI ...	PREPAID CARD	8.0

18. Display customer information where the seller name begins with A. Sequence the result by total in descending.

```
SELECT C.CUST_ID, C.CUST_NAME, T.METHOD, T.TOTAL, S.SELLER_NAME,
S.SELLER_NUM FROM CUSTOMER C, TRANSACTIONS T, SELLER S
WHERE C.CUST_ID = T.CUST_ID AND S.TRANS_ID = T.TRANS_ID AND SELLER_NAME IN
(SELECT SELLER_NAME
FROM SELLER
WHERE SELLER_NAME LIKE 'A%')
ORDER BY TOTAL DESC;
```

CUST_ID	CUST_NAME	METHOD	TOTAL	SELLER_NAME	SELLER_NUM
18444371	SHERLOCK HOLMES	PAYPALL	108.00	AZLEINDA BINTI ABD...	017-3232446
18444336	AHMAD SHAZWAN BI...	CREDIT CARD	18.00	AZLAN BIN ENJAH	019-98292923
18444332	NURUL AMIRAH BINT...	CREDIT CARD	10.50	AIZON BINTI ABDULLAH	013-9869643
18444337	AYU NATASHA FARIS...	CREDIT CARD	8.00	ADNAN BIN SAFAR	013-9381964
18444340	HASYIMAH BINTI MO...	CREDIT CARD	8.00	ARDHY BIN ADNAN	019-9835426
18444346	MOHAMAD SHAKIRIN...	CASH ON DELIVERY	8.00	AFRAH ALHANA BINT...	012-9595741
18444355	NUR INTAN AD LYNA ...	BANK TRANSFER	8.00	AHMAD MALIKE BIN ...	019-6508092

19. List our customer we made since 14th December 2020. Display all the information where the date and receiver name are in ascending order. Please do not forget display the information of our receiver, employee, hub id tracking number and the barcode of the parcel.

```

SELECT P.BARCODE, P.TRACK_NUM, H.HUB_ID, E.EMPLOYEE_ID, E.DEL_DATE, R.REC_ID,
R.REC_NAME
FROM PARCEL P, HUB H, EMPLOYEE E, RECEIVER R
WHERE P.HUB_ID = H.HUB_ID AND E.HUB_ID = H.HUB_ID
AND R.EMPLOYEE_ID = E.EMPLOYEE_ID
AND DEL_DATE >= (SELECT DEL_DATE
FROM EMPLOYEE
WHERE EMPLOYEE_ID = '3M70Y33ID37')
ORDER BY E.DEL_DATE ASC, R.REC_NAME ASC;

```

BARCODE	TRACK_NUM	HUB_ID	EMPLOYEE_ID	DEL_DATE	REC_ID	REC_NAME
70B4RC0D336	EP 56 898 289 2MY	1360HU800	3M70Y33ID36	Sep 14, 2020	0173CID36	AHMAD SAIFUL BIN A...
70B4RC0D339	EP 59 898 289 2MY	1390HU800	3M70Y33ID39	Sep 14, 2020	0173CID39	CECELIA CROMER
70B4RC0D338	EP 58 898 289 2MY	1380HU800	3M70Y33ID38	Sep 14, 2020	0173CID38	FARIZA BINTI AHAM...
70B4RC0D341	EP 61 898 289 2MY	1410HU800	3M70Y33ID41	Sep 14, 2020	0173CID41	JORDON BRIGHT
70B4RC0D335	EP 55 898 289 2MY	1350HU800	3M70Y33ID35	Sep 14, 2020	0173CID35	KASIM BIN ISMAIL
70B4RC0D337	EP 57 898 289 2MY	1370HU800	3M70Y33ID37	Sep 14, 2020	0173CID37	MOHD AFFANI BIN IS...
70B4RC0D340	EP 60 898 289 2MY	1400HU800	3M70Y33ID40	Sep 14, 2020	0173CID40	MONA EASLY
70B4RC0D346	EP 66 898 289 2MY	1460HU800	3M70Y33ID46	Sep 14, 2020	0173CID46	RAVIVARMA A/L SUD...
70B4RC0D342	EP 62 898 289 2MY	1420HU800	3M70Y33ID42	Sep 14, 2020	0173CID42	SEOW CHI SIA
70B4RC0D347	EP 67 898 289 2MY	1470HU800	3M70Y33ID47	Sep 14, 2020	0173CID47	VARSHAN A/L SHANKER
70B4RC0D311	EP 31 898 289 2MY	1110HU800	3M70Y33ID11	Sep 24, 2020	0173CID11	LADY UELIE AK GALIE
70B4RC0D301	EP 21 898 289 2MY	1010HU800	3M70Y33ID01	Dec 12, 2020	0173CID01	NURUL AMIRAH BINT...

20. List the customer details that made payment other than cash on delivery. Also, display the method and total of the payment. Sequence the customer name in ascending order.

```
SELECT C.CUST_ID, C.CUST_NAME, C.CUST_NUM, T.METHOD, T.TOTAL
FROM CUSTOMER C, TRANSACTIONS T
WHERE C.CUST_ID = T.CUST_ID AND METHOD NOT IN (SELECT METHOD
FROM TRANSACTIONS
WHERE METHOD = 'CASH ON DELIVERY')
ORDER BY C.CUST_NAME ASC;
```

CUST_ID	CUST_NAME	CUST_NUM	METHOD	TOTAL
18444333	ABDUL HAKIM BIN N...	012-4759653	CREDIT CARD	8.00
18444334	ABDUL LOQMAN BIN ...	011-9867531	CREDIT CARD	8.00
18444335	ADLIN IZATIE BINTI ...	018-15679001	CREDIT CARD	8.00
18444361	AHMAD HAKIM BIN H...	010-1381313	BANK TRANSFER	8.00
18444336	AHMAD SHAZWAN BI...	019-7771818	CREDIT CARD	18.00
18444377	AKMAL ASNA BT KAM...	011-123987	PREPAID CARD	8.00
18444378	ATHIRAH IWANI BIN...	011-12921381	PREPAID CARD	8.00
18444337	AYU NATASHA FARIS...	018-0756980	CREDIT CARD	8.00
18444338	ERVIENA SHAHIRA BI...	019-2238790	CREDIT CARD	10.50
18444362	FAHIM AMAR BIN RO...	(907) 488-6419	PAYPALL	100.00
18444339	HANIF IMRAN BIN RA...	013-4672301	CREDIT CARD	8.00
18444340	HASYIMAH BINTI MO...	011-236791	CREDIT CARD	8.00
18444360	ISKANDAR BIN AHMAD	019-1038134	BANK TRANSFER	8.00
18444341	IZZAH MAISARAH BI...	014-87902234	CREDIT CARD	18.00
18444363	JOSEPH JOESTAR	(907) 459-2355	PAYPALL	118.00
18444364	JOTARO KUJO	(907) 451-1942	PAYPALL	140.00
18444365	KENMA UZUMAKI	(907) 262-7090	PAYPALL	93.00
18444369	LANA DEL REY	(209) 951-9763	PAYPALL	84.00
18444367	MICHAEL JACKSON	(907) 622-1725	PAYPALL	87.00
18444379	MIZA HANNANI BINTI...	019-98230812	PREPAID CARD	8.00
18444374	MOHAMAD SHAKIRIN...	014-1391301	PREPAID CARD	8.00
18444382	MUHAMMAD DANISH ...	018-274093	PREPAID CARD	12.00
18444352	MUHAMMAD MUIZ FI...	019-8343432	BANK TRANSFER	8.00
18444380	NIA NATASHA BINTI ...	018-1083120	PREPAID CARD	8.00
18444381	NUR AMISYA BALQIS ...	019-19830123	PREPAID CARD	12.00
18444354	NUR FATIAH ATHIR...	019-73492734	BANK TRANSFER	8.00
18444355	NUR INTAN AD LYNA ...	012-8213913	BANK TRANSFER	8.00
18444375	NURFADZWANY BINT...	019-2930183	PREPAID CARD	8.00
18444332	NURUL AMIRAH BINT...	017-5202248	CREDIT CARD	10.50
18444356	PUTRI AMIRA SYAFI...	011-21461013	BANK TRANSFER	8.00
18444357	RAIDAH BINTI HASAN	011-1923813	BANK TRANSFER	8.00
18444368	SARAH LEE	(661) 213-3079	PAYPALL	59.55
18444358	SHAHIR AZRIE BIN A...	012-1873190	BANK TRANSFER	8.00
18444371	SHERLOCK HOLMES	(619) 293-4630	PAYPALL	108.00
18444372	SITI NUR FATMA BIN...	019-8882133	PREPAID CARD	8.00
18444373	SITI NURAZYAN AUN...	011-2131801	PREPAID CARD	8.00
18444366	TANAKA	(907) 561-3344	PAYPALL	66.00

21. I need you to give permission to public to make use select in our hub table. Since we have problem in our operations yesterday. After this evening, please revoke the ability of public to make any changes in our table and system.

DCL 1

GRANT SELECT ON HUB TO PUBLIC;

```
----- Commands Entered -----  
GRANT SELECT  
ON HUB  
TO PUBLIC;  
-----  
GRANT SELECT ON HUB TO PUBLIC  
DB20000I The SQL command completed successfully.
```

DCL 2

REVOKE SELECT ON HUB
FROM PUBLIC;

```
----- Commands Entered -----  
REVOKE SELECT  
ON HUB  
FROM PUBLIC;  
-----  
REVOKE SELECT ON HUB FROM PUBLIC  
DB20000I The SQL command completed successfully.
```

8. Conclusion

Every related person such database programmers and database administrators agree that the business rules and entity relationship diagram (ERD) were created to make it easier for the programmers to generate database. The database system that was created has been proven that it made all the affirmed problems can be surmount. Thus, having a business rules and ERD are very critical to ensure the system works fine and to assure all the problems can be overcome. The purpose of this project has been achieved.

9. References

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