Details of Assessment			
Term and Year		**Time allowed**	**N/A**
Assessment No	**1 of 2**	**Assessment Weighting**	**50%**
Assessment Type	**Written**		
Due Date	**Week 6**	**Room**	**George St**

Details of Subject	
Qualification	ICT40115 - Certificate IV in Information Technology
Subject Name	Systems Analysis
Details of Unit(s) of competency	
Unit Code	ICTSAD501 Model data objects ICTSAD502 Model data processes

Details of Student			
Student Name	**Marcus Rodrigues Nogueira de Macedo**		
College	**Australasia**	**Student ID**	**201837801**
Student Declaration: I declare that the work submitted is my own, and has not been copied or plagiarised from any person or source.		Signature: _____ Date: 30/01/2019	

Details of Assessor			
Assessor's Name			
Assessment Outcome			
Results	☐ **Competent** ☐ **Not Yet Competent**	**Marks**	**/50**

FEEDBACK TO STUDENT

Progressive feedback to students, identifying gaps in competency and comments on positive improvements:

_____
_____
_____
_____

Student Declaration: I declare that I have been assessed in this unit, and I have been advised of my result. I am also aware of my right to appeal and the reassessment procedure. Signature: _____ Date: ____/_____/_____	**Assessor Declaration:** I declare that I have conducted a fair, valid, reliable and flexible assessment with this student, and I have provided appropriate feedback ☐ Student did not attend the feedback session. Feedback provided on assessment. Signature: _____ Date: ____/_____/_____

Purpose of the Assessment

The purpose of this assessment is to assess the student in the following outcomes:	Competent (C)	Not yet Competent (NYC)
Performance Criteria: ICTSAD501 Model data objects		
Element 1. Identify entities and relationships		
1.1 Analyse business data to understand operations		
1.2 Identify boundaries of the system		
1.3 Identify entities, attributes, data types and relationships of data		
1.4 Review business rules to determine impact		
1.5 Document relationships in an entity relationship diagram		
Element 2. Develop normalisation		
2.1 Identify suitable business data		
2.2 Undertake normalisation of business data and document results		
2.3 Compare normalisation results with entity relationship diagram		
2.4 Reconcile differences between data		
Performance Criteria: ICTSAD502 Model data processes		
Element 1. Develop scope of model		
1.1 Identify relevant data processes and sources of information		
1.2 Identify information gathering method and modelling methodology to be used		
1.3 Document modelling information gathered		
1.4 Validate modelling information with client		
Element 2. Gather process data		
2.1 Identify business functions and collect process data using chosen method		
2.2 Identify external events, procedures and results		
2.3 Identify processes and required decomposition		

Assessment/evidence gathering conditions

Each assessment component is recorded as either Competent (C) or Not Yet Competent (NYC). A student can only achieve competence when all assessment components listed under “Purpose of the assessment” section are recorded as competent. Your trainer will give you feedback after the completion of each assessment. A student who is assessed as NYC (Not Yet Competent) is eligible for re-assessment.

Resources required for this assessment

- Computer with relevant software applications and access to internet
- Weekly eLearning notes relevant to the tasks/questions

Instructions for Students

Please read the following instructions carefully

- This assessment has to be completed ☒ In class ☐ At home
- The assessment is to be completed according to the instructions given by your assessor.
- Feedback on each task will be provided to enable you to determine how your work could be improved. You will be provided with feedback on your work within two weeks of the assessment due date. All other feedback will be provided by the end of the term.
- Should you not answer the questions correctly, you will be given feedback on the results and your gaps in knowledge. You will be given another opportunity to demonstrate your knowledge and skills to be deemed competent for this unit of competency.
- If you are not sure about any aspect of this assessment, please ask for clarification from your assessor.
- Please refer to the College re-assessment for more information (Student handbook).

Assessment – Marking Sheet

TASK DESCRIPTION	MARKS
PART A – MODEL DATA OBJECTS	
TASK 1: What is a System	**/4**
TASK 2: Important Systems Concept	**/4**
TASK 3; Approaches in Systems Analysis	**/4**
TASK 4: Systems Development Life Cycle	**/4**
TASK 5: Entity Relationship Diagram Concepts	**/4**
TASK 6: ER Diagram and Normalization (1NF)	**/5**
SUB-TOTAL PART A	**/25**

PART B – MODEL DATA PROCESSES	
TASK 1: Data Flow Diagram Definitions	**/5**
TASK 2: DFD Rules GUIDELINES	**/5**
TASK 3: Developing DFD - Context Diagram	**/5**
TASK 4: Developing LEVEL-0 DFD	**/10**
SUB-TOTAL PART B	**/25**

TOTAL	**/50**

Assessment - Written *Report*

Systems Analysis

Assessment 1

Case Study: Norman South lift security company and FASHIONWAVE e-Commerce Retail Company

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PART A: MODEL DATA OBJECTS

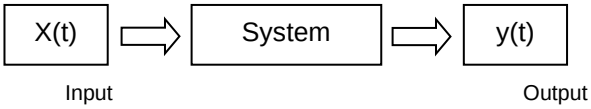
Task1 : SYSTEM DEFINITIONS

The word System is little bit generic to define, because system everything that you create with purpose of organize specific subject inside of a workspace.

In a world globalized, we have different form of government, in other words, different system of government, companies use different system of work, it depends of your objective. We can exemplify the entry and exit of materials in a supermarket, FIFO System (First Input First Output). Sometimes supermarket make a discount in an specific food if this system fail.

In a diesel company for example, engineer create system to combine different products in different quantity.

This simple diagram is used with measure amount of specific content.



This expression in programming:

```
X=0;
If (y<11){
        Y= X+1;
}
```

It is a system: entry with specific thing, repeat this procediment until this liquid is sufficient for the result to be expected. This case, y(t) is our output and it is possible to have a sensor in y(t) and when the sensor change your state actual, the system close input of this liquid

In Information technology, the definition of a system is creating the best way to do something essential for your success company.

- Advertising of a product of your company or presentation what your company specializes in;

- Creating forms to send your product;

Nowadays, the internet is an important tool to advertise your product without spending a lot of money. Many companies are hardly investing in technology of information and contract professionals because it is necessary creating a dynamic and secure system work.

It is necessary understand each topic of your system in analysis and what is the best way to implement this system and the interface that it is used.
Components of a system is an aggregate of some subsystems, they are individuals components that work together inside of a purpose. Each component of a system can be connected or it is neighbour of other component.
Environment of a system is form that your project is used. It depends of interface that you implement this project and how you save the data of your client or yourself.

Key-words: Interface, objective, Input, output, environment, variables, tools and security system.

TASK 2: Important System Concept

System analysis in software development is important to the successful project development and can be time consuming. Under the circumstances, one goes from an idea to requirements, design, coding, testing, deployment, and then a maintenance phase, through different level of measurement and abstraction.

When you start a new project is necessary to define the overall architecture of the application, identify software classes that it will be implemented and define the method, hierarchy of variables and parameters of measure that it will be executed, for it is necessary to do a diagram, flow chart or as an algorithm to facilitate your project. Decomposition are details of components inside of system and modularity is the resolution of this parameters inside of system.

This area is necessary to know coupling and cohesion of the fragment of a system, because if you need changing something in a structure that be connected, it is possible there are system failure in your project.

TASK 3: Approaches in System Analysis

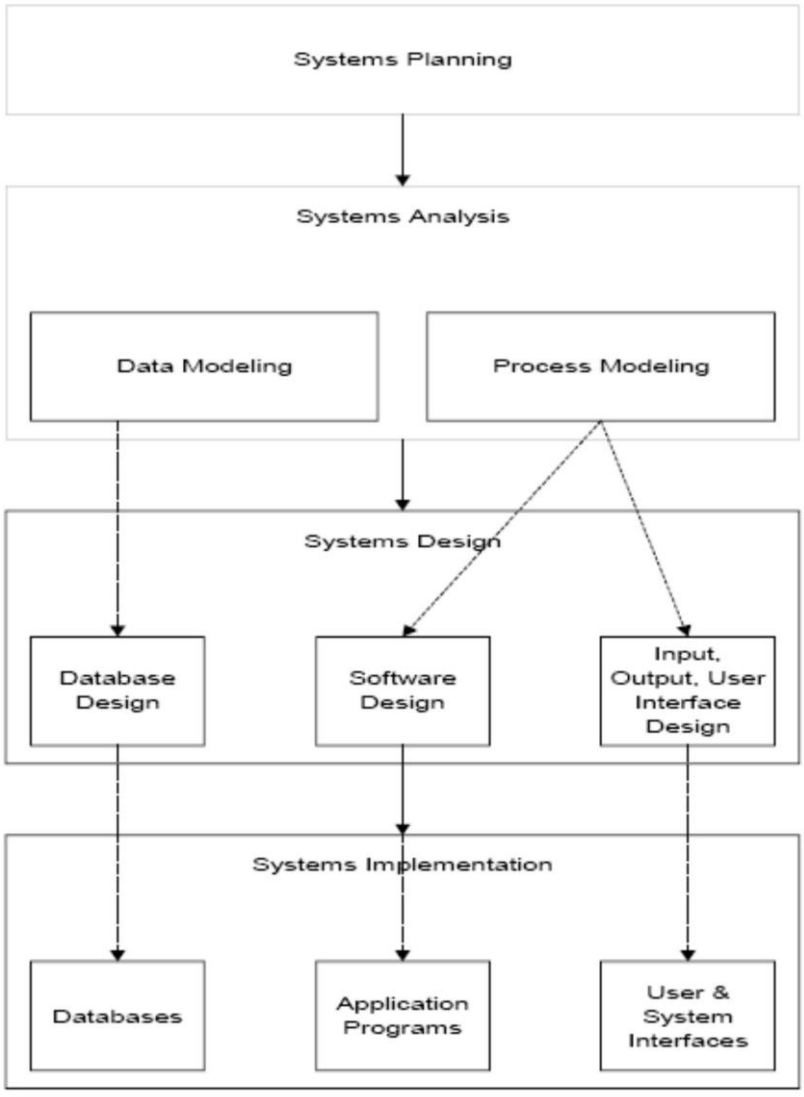
The development of a computer-based information system includes a system analysis phase. This helps produce the data model, a precursor to creating or enhancing a database. There are a number of different approaches to system analysis. When a computer-based information system is developed, system analysis might be suitable to adopt certain specific approach.

- Data Modelling is a process to define and analyse specific data requirements for business schedule, it can respond the question about time described in previous task and organization of document (relationship diagram);
- Process Modelling is a description at the type of process level, the model can be descriptive, prescriptive and explanatory. In add, the professional use your background, your felling about specific situation or your technique to correct what is wrong, in general, people use arguments pattern to do action.

TASK 4: Systems Development Life Cycle (SDLC)

The System Development Life Cycle is used in system of engineering and information systems. It describes a process of creation, planning, testing and application of system. The concept is based in a variation of software and hardware.

1. SDLC



2. System type hierarchies, including sub-types, super-types and root-types

TASK 5: Entity Relationship (ER) Diagram Concepts

An entity relationship diagram (also called ER diagram or ERD) shows the relationships of entity sets stored in a database. An entity in this context is a component of data. In other words, ER diagrams illustrate the logical structure of databases.

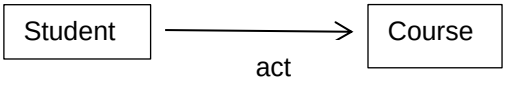
At first glance an entity relationship diagram looks very much like a flowchart. It is the specialized symbols, and the meanings of those symbols, that make it unique.

Entity: Entity is society with develop class activities. It can be person, object, company, corporation and others.

Entity Type:	Object, People, products, cars
Entity Set:	It is type of entity that is defined in a particular situation, time or process.
Entity Categories:	Some Entities have characteristic as strong, weak or associative. Strong entity can be defined by your attributes, in opposite weak cannot defined. Associative depends of the group of entity.
Entity Key:	This is a personal attribute of an entity. Entity key is divided in Super key, Candidate Key, Primary key and Foreign Key. Super Key: Set of attribute(s) that together to determine an entity in an entity set; Candidate Key: there are insufficient number of attribute to be a super key; Primary Key: A candidate key can chose the database designer for identify the entity set; Foreign Key: Identify the relationship between entities;

Relationship:

This term is associated what the relation of an entity act upon each other entities. It is a link of entities or instance. For example, a student is enrolled in a course of university or college. Student, course and university are entities and register is relationship.



Student<study> section

Course<schedule> section

Student<enroll> section

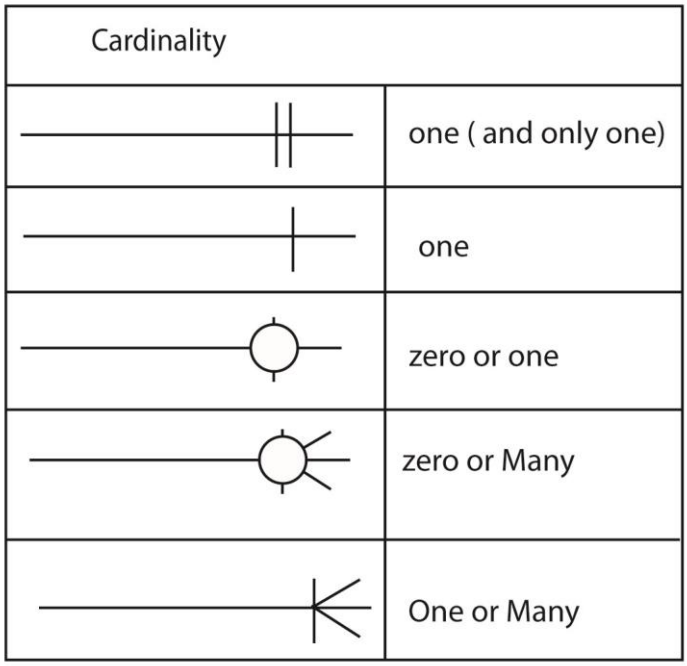
Cardinality and Composite Entities:

This term demonstrated specific number of attributes that each entity have upon each other. The cardinal relationships between instances or entities are one-to-one, one-to-many or many-to-many.

One-to-one: Personal information about one student, for example: mobile-phone, address, age and others instances, but analysing separately;

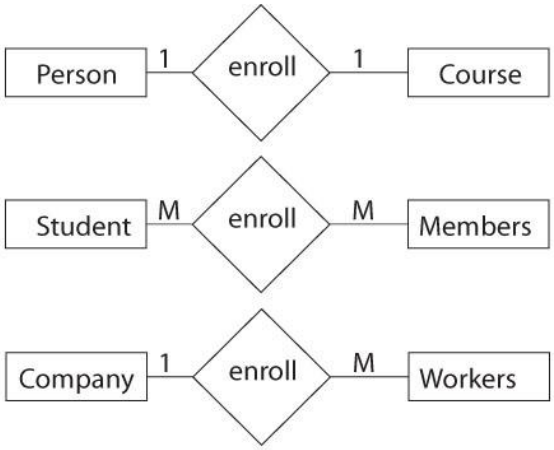
One-to-many: Disciplines that is composed the course;

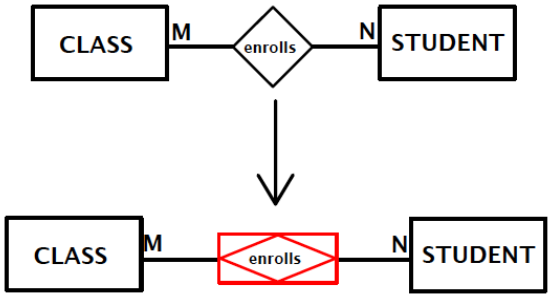
Many-to-many: Group of people in a group of social media.



The figure above shows some forms of representation of relationship of entities in a flowchart. It is necessary to understand what symbol and notation represent in a flowchart, for example: the instances hierarchy, if the object is mandatory or optional, if the relationship between instances is mandatory or optional and other

circumstances that turn your project complete. When the relationship between instances is mandatory, the symbol is full line and dashed line when it is optional.





The image above and right show that is possible converts the composition of entity, we can combine the relationship with instance or we can change the relationship words, for example: change Verb (action) to Noum (enrols to enrolment).

Attribute can be represented oval cycle.

a) Degree Binary Teacher (1,1) <teach> (0,m) section
Student (1,m) <enroll> (1,m) section

b) Degree Unary Employee <Manage>
It is used to represent the hierarchy of instances or the function that team workers do in a company, for example: director, supervisor, foreman and labour.

```
Emp_entity( Emp_no,Emp_Fname, Emp_Lname, Emp_DOB,
Emp_NI_Number, Manager_no);

Manager no - (this is the employee no of the
employee's manager)
```

Case Study: Norman South lift Security Company

Norman South is a specialized server room security company. They are not really a very big company. However due to the fact that they have a key technology patented under their company name, they can outsource and contract many staff members over different cities in different countries for their services there.

At this moment, they are receiving their solutions as product packages. However, they are taking order and selling them by email and post. Your company's task is to help them setting up an eCommerce system in their website, so that the selling can be streamlined and done from online via Internet.

You studied their current traditional way selling recording system in hardcopy and desktop applications in their computer system. You have been able to find and summarize the following as their selling activities.

Part I analysis:

Customer	order	product	transaction
Customer_ID	Order_ID	Product_ID	Transaction_ID
Name	Date_of_order	Product_name	Costumer_ID
Email-address	Postage	Description_price	Product_ID
postcode	GST	On_hand	Packing_ID
Phone_number	Costumer_ID		Shipped_date
Postal_address	Shipping_method_ID		Arrival_date
	Payment_method_ID		
	Destination		
	Postcode		
	Pastal_address		
	Phone_number		

However, according to the staff they will need help with their HR system as well. As this part of the system contains the record of the selling staff over different cities.

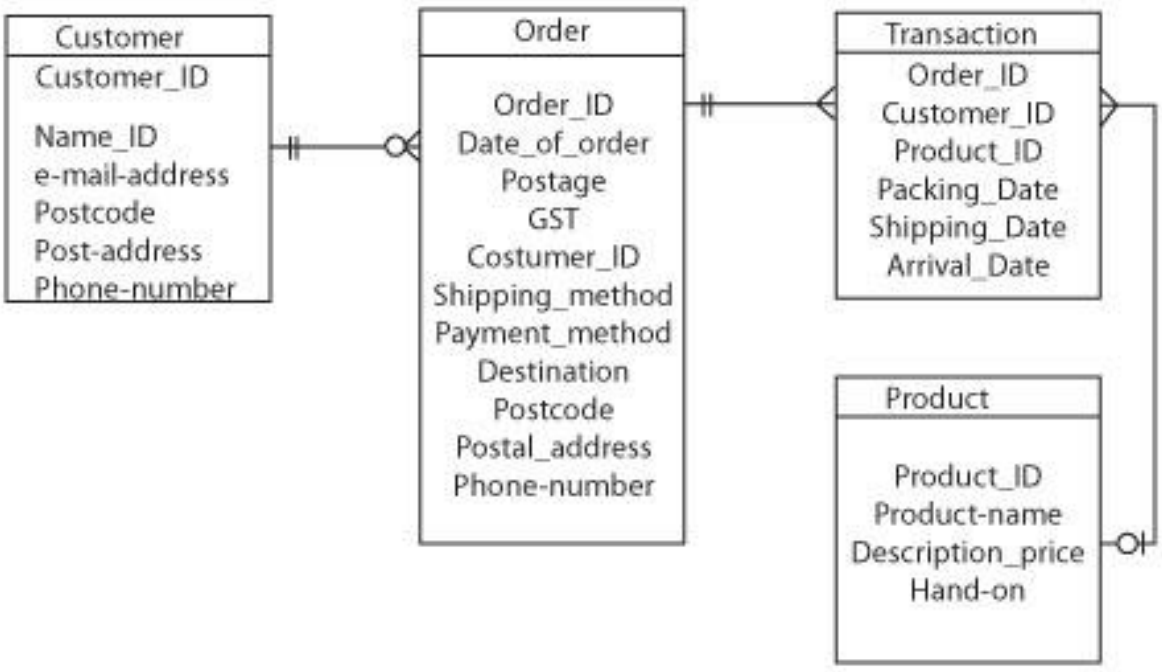
This part is having a lot of the problems. You studied and found the following record from this part that is having problems.

Part II analysis

sales_staff						
staff_id	**sales_person**	**sales_office**	**office_number**	**customer1**	**customer2**	**customerr3**
1003	David Smith	Chicago	312-555-1212	Ford	GM	
1004	Jennifer Hugh	New York	212-555-1212	Dell	Apple	HP
1005	Frank Chu	Chicago	312-555-1212	Boeing		

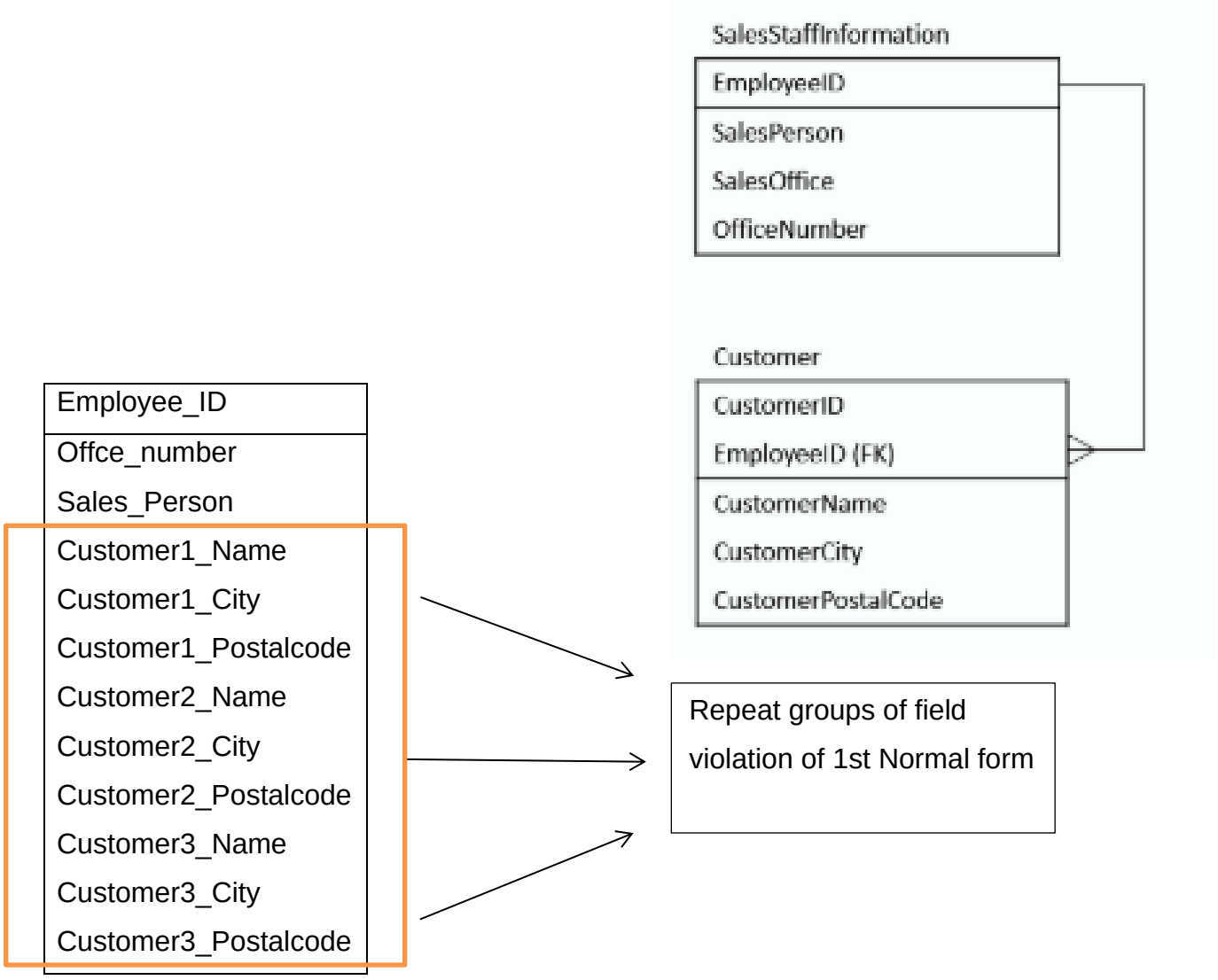
TASK 6: ER Diagram

For the Norman South lift security company case study, based on the Part I analysis, please draw a ER diagram of table customer, order, product and transaction. Please note, the ER diagram must be drawn by hand, and scan or take a photo and attached in here as the answer.



Normalization (1NF)

For the Norman South lift security company case study, based on the Part II analysis, please do normalization on at least 1NF level. For assessment 1, you don't need to do normalization more than 1NF level. This is because you will do another normalization task which requires you to do a normalization on 2NF/3NF level. For the answer, please list the new tables' structure, and their ER diagram. For this part, the ER diagram can be drawn both by hand or by a software application.



SalesStaffInformation			
EmployeeID	**SalesPerson**	**SalesOffice**	**OfficeNumber**
1003	Mary Smith	Chicago	312-555-1212
1004	John Hunt	New York	212-555-1212
1005	Martin Hap	Chicago	312-555-1212

Customer				
CustomerID	**EmployeeID**	**CustomerName**	**CustomerCity**	**PostalCode**
C1000	1003	Ford	Dearborn	48123
C1010	1003	GM	Detroit	48213
C1020	1004	Dell	Austin	78720
C1030	1004	HP	Palo Alto	94303
C1040	1004	Apple	Cupertino	95014
C1050	1005	Boeing	Chicago	60601

PART B: MODEL DATA PROCESSES

TASK1: Data Flow Diagram - Definitions

Brief History

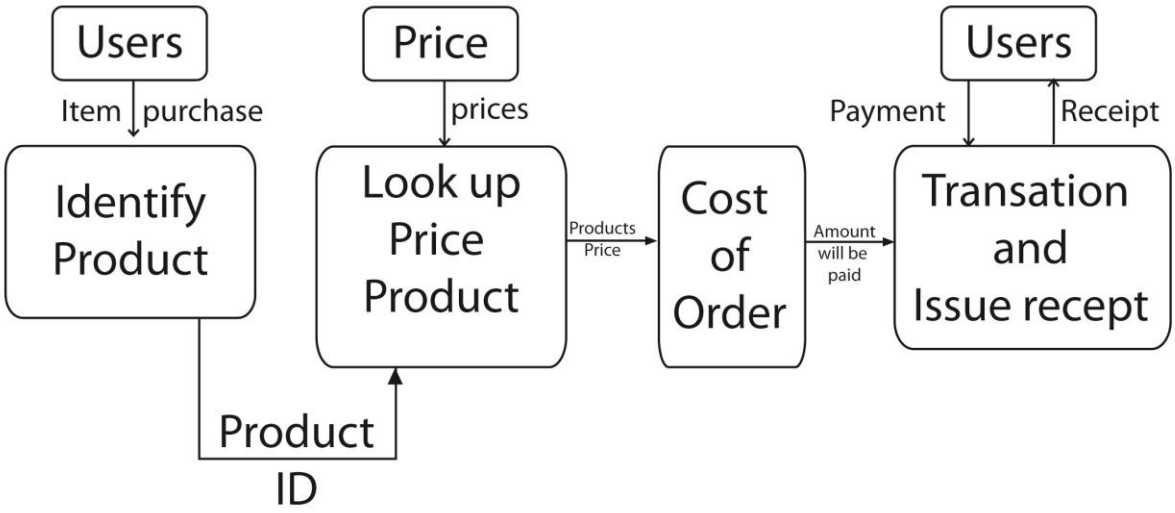
In late of the 1970s, Data flow diagrams were created by computing pioneers Mr Yourdon and Constantine in a Business market. And after, Mr DeMarco, Gane and Sarson create forms with various symbols and notations because there were necessities due to complexity of the project.

Data Flow diagram is a method of demonstrate a way with each instance, each element do in your project. It is a study guide that the programmer need understand to execute each part of your process of creation and implementation of the project.
The flowchart or Data Flow diagram is represented by rectangle, circle, arrows, diamond and others geometric figure. Each geometric figure has different definitions.
It is possible think about creation process of an essay.
A good essay has an Introduction, procedure and conclusion, in a system also has Introduction, development and conclusion, consequently in a data flow diagram is not different because in our system will be this parties.
There are two categories of Data Flow diagram: Logical Diagram and physical Diagram.

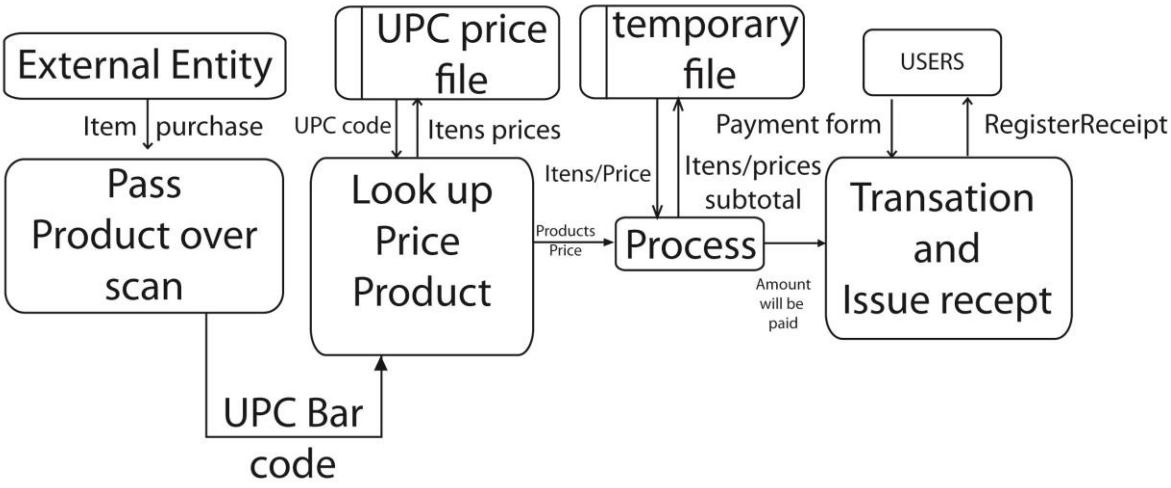
Logical Diagram: This Diagram has objective in business and business activities operation that diagram physic provides us.
It demonstrates the logic of a data is permanent stored.
Essential sequence, easily understand and Technical solution.

Physical Diagram: This party is important because it is about the system will be implemented, like a Tutorial and program modules. It demonstrates how valid an input data.
Files Transaction, Actual sequence and record status.

The diagram below represents a logical part of the system.



The example below is a Physical diagram part of the system.



When we are creating a new logical system is necessary to know what is functioning the software, hardware and how the entities are achieved. It is possible to see in a physical system and helps it find the best solution.

TASK 2: DFD Rules GUIDELINES - Components

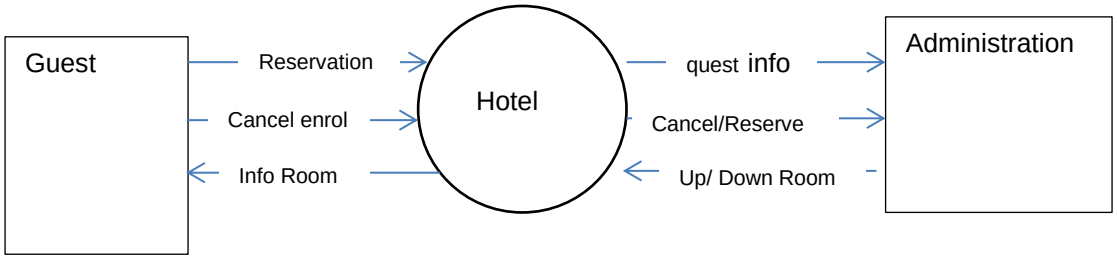
Data flowcharts can range from simple, even hand-drawn process overviews, to in-depth, multi-level DFDs that dig progressively deeper into how the data is handled. They can be used to analyse an existing system or model a new one. Please provide brief definitions of below DFD components.

- Data Flow — It is movement of data between external entities, processes and data stores. This data could be electronic, written or verbal. Input and output data flows are called on the type of data or its associated process or data store.
  - All the flow must have flow to/from a process;
  - Data flows cannot cross the information each other;
- Data store — A data store does not generate any operations, however this component is necessary because it is possible access the data posteriorly.
  Input flows to a data store include information or operations that change the stored data. Output flows would be data retrieved from the store.
- Process — Process is a transformation income data to outgoing data, all processes must have inputs and outputs on a DFD.
  This symbol is given a simple name based on its function, such as “Ship Order,” rather than being called “process” on a diagram. It is a reference number, location of where in the system the process occurs and a short title that describes its function.
  Processes are oriented from top to bottom and left to right on a data flow diagram.
- External Entity — External entity produces/ consumes data that flows between the entities. These representations are the inputs and outputs of the diagram. These instances stay within the limits of the diagram. They can be another system or indicate a subsystem.

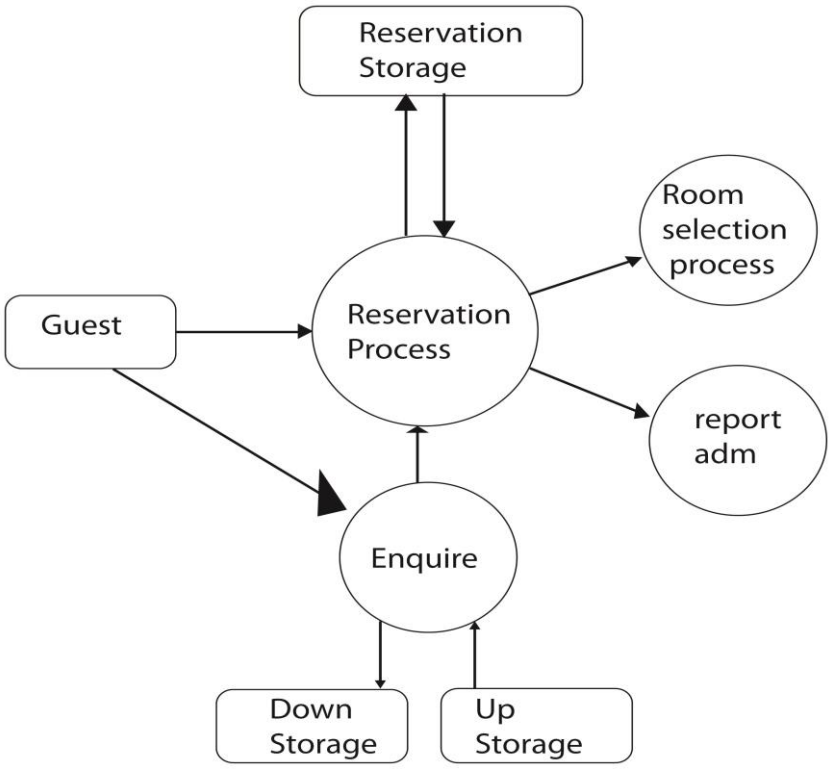
Levels of Data Flow Diagram

There are simple diagram and complex diagram. Simple Diagram is level 0 and the measure that the system has many functions or ways, the diagram turn a little bit complex, consequently the diagram is level one or two, according with your complexity.

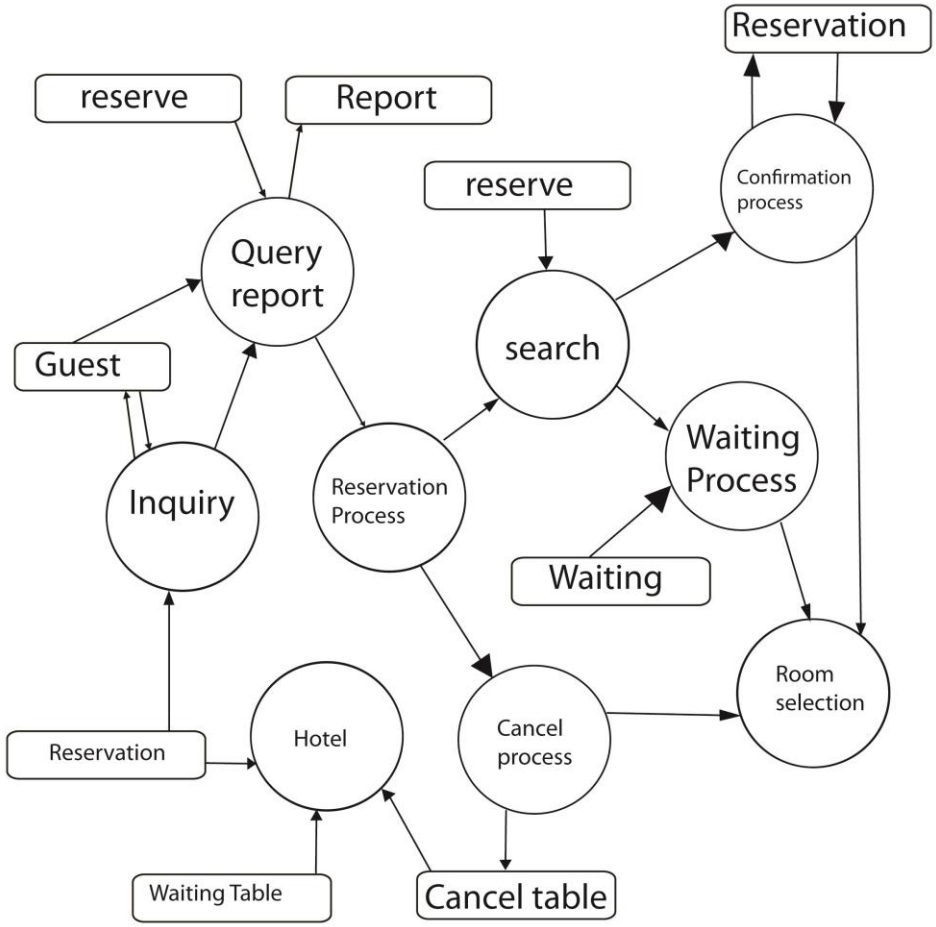
Example of diagram – Level 0: Reservation in a hotel/car.



In the level 1 is represented by relationship between entities can make different actions, it will be showed in diagram below. Note that relationship in level 0 is simple, only one way, one action that the entity can do.



Level 1



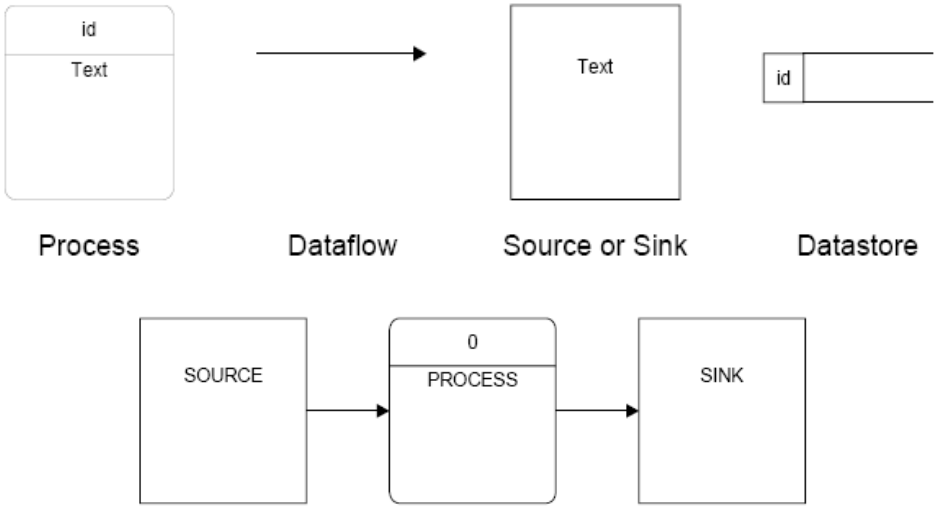
Level 2

We can observe that this diagram is little bit more complex than level 1 and level 0 because each instances have two or more relationships with other instances, the instances received data of different reasons, the example, it means all services (reserve table, hotel, room) that the hotel do with your client.

Case Study: FASHIONWAVE e-Commerce retail Company

FASHIONWAVE is an e-Commerce retail company. It sells products through the internet. The company needs to record customers, orders, and products. A customer put orders and each order belongs to only one customer. An order may have several transaction items and each transaction item matches a product, though one transaction may contain more than one item of that product. Product information includes description, price, and inventory level. FASHIONWAVE's web site allows customers to put products into their 'shopping bag.' When a customer finishes shopping, he will proceed to check out. A customer can update the shopping bag before checking out - changing the quantity or deleting an item. If the customer changes the quantity, the product is still in the shopping bag but if the customer deletes a product, it will be gone from the bag. Please draw DFD for this case. (hint: assume the shopping bag is open and there is no need to retrieve for customer.)

EXAMPLE OF DFD DIAGRAM

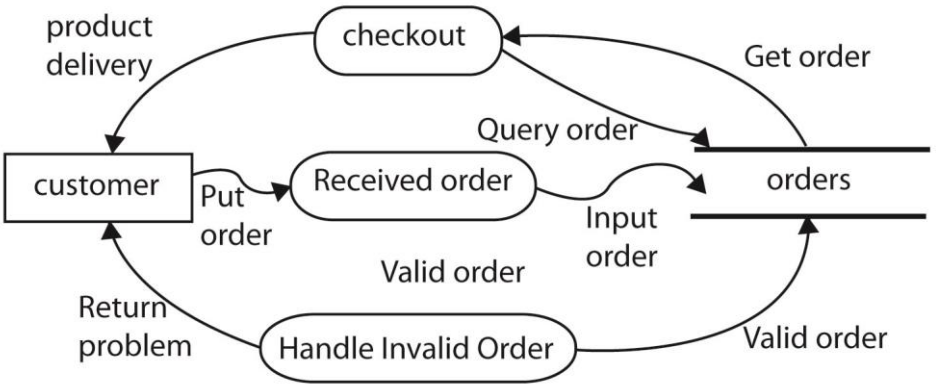


TASK 3: Developing DFD - Context Diagram

An overview of an organizational system that shows the system boundaries, external entities that interact with the system and the major information flows between the external entities and the system.

Example DFD in concept is below.

Level 0 - Based on FASHIONWAVE e-Commerce retail company case study.



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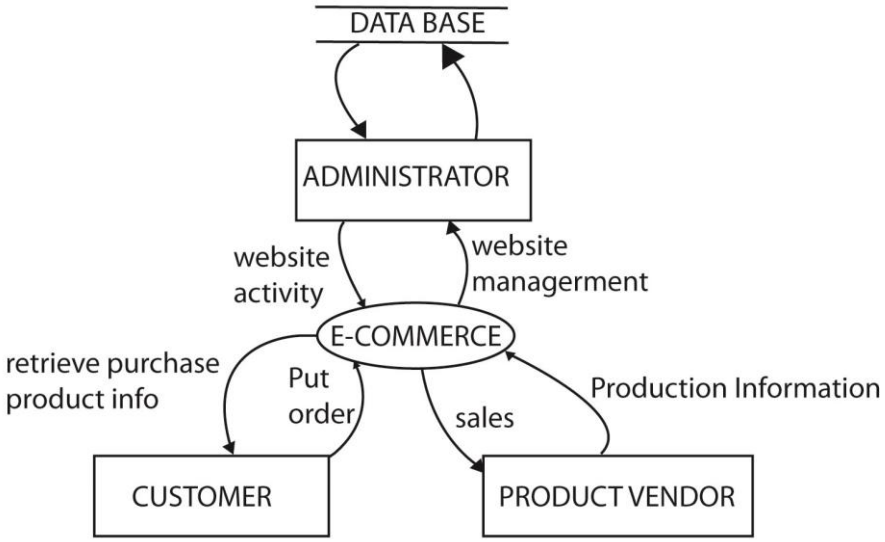
TASK 4: Developing LEVEL-0 DFD

The first level DFD shows the main processes within the system. Each of these processes can be broken into further processes until you reach pseudo code. A context diagram is a top level (also known as "Level 0") data flow diagram. It only contains one process node ("Process 0") that generalizes the function of the entire system in relationship to external entities.

A DFD that represents a system's major processes, data flows, and data stores at a higher level of detail.

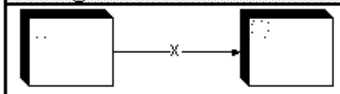
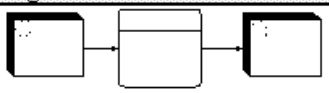
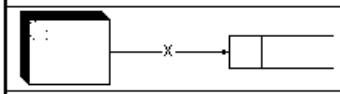
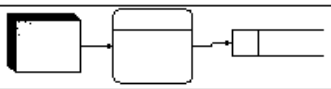
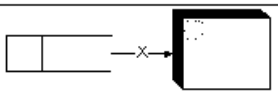
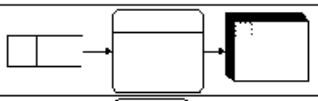
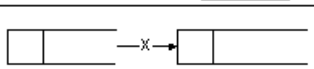
Based on FASHIONWAVE e-Commerce Retail Company.



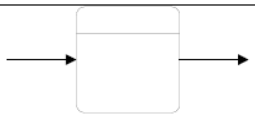
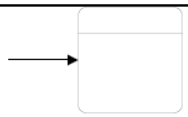
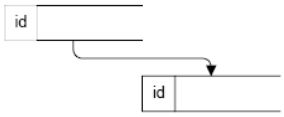
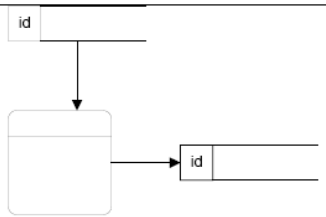
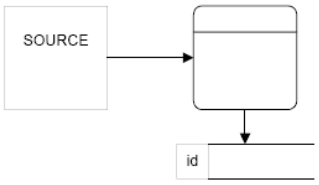
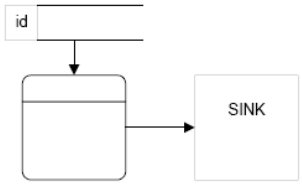
Appendix 1: Guidelines for Drawing DFDs

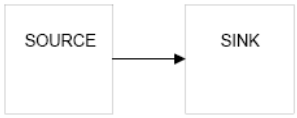
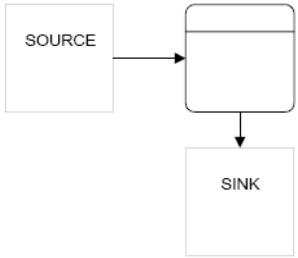
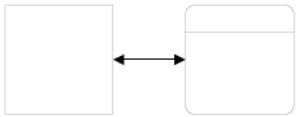
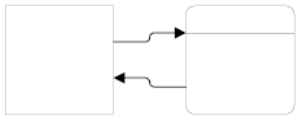
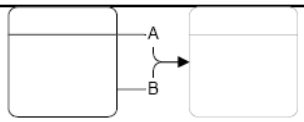
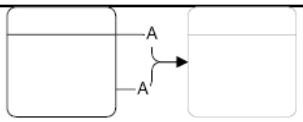
Example of right and wrong method of DFD

Table 2: Common data flow diagramming mistakes

Wrong	Right	Description
		A source or a sink cannot provide data to another source or sink without some processing occurring.
		Data cannot move directly from a source to a data store without being processed.
		Data cannot move directly from a data store to a sink without being processed.
		Data cannot move directly from one data store to another without being processed.

Source: Adapted from Figure 9.9, p. 360 in Whitten, J. L.; Bentley, L. D.; Barlow, V. M. (1994). Systems Analysis and Design Methods (Third Edition). Burr Ridge, IL: Irwin.

Rule	Incorrect	Correct
1a		
1b		
2a		
2b		
2c		

Rule	Incorrect	Correct
3a		
4a		
4b		
4c		
4d