

## Tutorial 1 Introduction to Business Information Systems

### Objectives:

- How organisational goals can be achieved via BIS
  - The impact of BIS on organisations
  - How do organisations realise the benefits of BIS
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1. Identify and briefly define 5 attributes that describe the quality of information.

Characteristics	Definitions
Accessible	Information should be easily accessible by authorized users so they can obtain it in the right format and at the right time to meet their needs.
Accurate	Accurate information is error free. In some cases, inaccurate information is generated because inaccurate data is fed into the transformation process. This is commonly called garbage in, garbage out (GIGO).
Complete	Complete information contains all the important facts. For example, an investment report that does not include all important costs is not complete.
Economical	Information should also be relatively economical to produce. Decision makers must always balance the value of information with the cost of producing it.
Flexible	Flexible information can be used for a variety of purposes. For example, information on how much inventory is on hand for a particular part can be used by a sales representative in closing a sale, by a production manager to determine whether more inventory is needed, and by a financial executive to determine the total value the company has invested in inventory.

2. It is said that the amount of digital data is doubling every two years. Discuss some implications and issues associated with this rapid growth of data.

The increase in digital data means a huge increase in database storage needs, which will require more storage devices, more space to house the additional storage devices, and additional electricity to operate them.

3. Case Study (Group Discussion)

### Sketchers USA: Using Loyalty Programs and Customer Data to Grow

Sketchers USA, Inc., a billion dollar company, describes itself as “an award-winning global leader in the lifestyle footwear industry and designs, develops and markets lifestyle footwear that appeals to men, women and children of all ages...With more than 3,000 styles, Sketchers meets the needs of male and female consumers across every age and demographic.”

Any shoe company could say something similar. What separates one from another? Increasingly, it isn't the shoes. It's the information.

Information Systems are woven into every part of Sketcher's business. IT recent investment in Oracle applications, including cloud computing demonstrates the company's commitment to IS. Mark Bravo, Sketcher's senior vice president of finance says, "As we manage growth, we are establishing a business structure that lowers costs and creates more value and flexibility across the business. The cloud services help us to lighten our IT overhead and enable us to respond more quickly to market opportunities." Therefore it was natural that Sketchers would turn to IS to help with customer retention.

In a fast moving consumer product category like shoes, using information to understand, attract and retain customers is even more important than having the latest technology. Many companies use loyalty programs to help retain customers. For example, the coffee shop at the Campus Centre gives its customers a card that is punched every time they buy a coffee. When the card has 10 punches, the customer can order a cup of free coffee. Loyalty programs reduce the chances of regular customer switching suppliers even if another shop sells coffee for less during a promotion or offers a different advantage.

After Sketchers decided to offer a loyalty program, its challenge was this: How to design the program for greatest sales impact? The company had to balance ease of earning rewards, the value of the rewards, and other factors so it gave away as little as possible while retaining as many loyal customers as possible. At the coffee shop, a free cup of coffee after buying 5 might cost too much revenue; a free coffee after 15 might put the rewards too far out in the future to be attractive. 10 is a good middle ground.

The loyalty program that Sketchers designed, planned jointly by its marketing and IS departments, is called Sketchers Elite. Members earn free merchandise (\$10 credit for every \$150 spent), get free shipping, and enjoy special promotions. In addition, Gold members (who spend at least \$750 on Sketcher shoes in a calendar year) and Platinum members (\$1,000) get higher merchandise credits, sneak peeks at future products, and earn other greater benefits.

Sketchers couldn't operate Sketchers Elite without IS. The system supports this loyalty program records information about members, their purchases, and the rewards they're entitled to, so members can track their participation online. In addition, the system provides Sketcher's management with information about the purchase patterns of regular customers, such as shoe designs that appeal to them. The system also lets Sketchers send targeted promotional materials to its best customers.

Sketcher's CEO Robert Greenberg explains, "2012 was a remarkable year for Sketchers. In 2013, the company opened 30 to 35 new retail stores. We grew our existing product divisions, broadened our offering to customers with several new product lines, established an award winning performance division, and further grew our heritage business. We have taken a more focused approach to growing our product offering, added features and technologies that consumer desire, and supported these efforts with effective marketing."

## FIT2090 Business Information Systems and Processes

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### Discussion Questions

1. How did Sketchers achieve success by looking at what other companies outside its industry were doing with technology?

Sketchers used cloud services to help them lighten their IT overhead and to respond more quickly to market opportunities.
2. What kind of information does Sketchers Elite program use? Aside from its direct benefit in increasing customer loyalty, what other benefits might the program have? How could Sketchers use the information in its planning and sales activities?

The system that supports the Elite loyalty program records information about members, their purchases, and the rewards to which they are entitled.
3. From 2005 to 2012, Sketchers approximately doubled its revenue: from about \$1 billion to \$2 billion. In the next two years, revenue dropped 20% to \$1.6 billion in 2014. How do you think these changes in revenue growth affected its spending on information systems?

Student response will vary. Some may argue that the decline in revenue would encourage Sketchers to invest more in information systems, specifically cloud services, in order to reduce IT overhead and enable marketing opportunities.
4. Sketchers CEO Robert Greenberg explains one reason for his company's success in 2012: "We have taken a more focused approach to growing our product offering, added features and technologies that consumers desire, and supported these efforts with the effective marketing." Apart from the loyalty program, how else can Sketcher use information systems to support marketing?

Student responses will vary. For example, consider use of social media for marketing purposes.

## Tutorial 2 Enterprise Systems Suggested Solutions

### Objectives:

- Identify the basic activities and business objectives common to all transaction processing systems
  - Describe the transaction processing systems associated with the order processing, purchasing, and accounting business functions
  - Identify the basic functions performed and the benefits derived from the implementation of an enterprise resource planning system, customer resource management, and product lifecycle management system
  - Identify the challenges that multinational corporations face in planning, building, and operating their enterprise systems
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1. What is an enterprise system? Identify and briefly discuss the goals of different types of enterprise systems.

An enterprise system is central to individuals and organizations of all sizes and ensures that information can be shared across all business functions and all levels of management to support the running and managing of a business. Examples of enterprise systems include enterprise resource planning systems that support supply chain processes, such as order processing, inventory management, and purchasing, and customer relationship management systems that support sales, marketing, and customer service-related processes.

2. Identify and briefly discuss five challenges to the successful implementation of an enterprise system. Provide several tips to overcome these challenges.

Challenge	Description
Cost and disruption of upgrades	Most companies have other systems that must be integrated with the enterprise system, such as financial analysis programs, e-commerce operations, and other applications that communicate with suppliers, customers, distributors, and other business partners. This integration takes even more effort and time.
Cost and long implementation lead time	The average ERP implementation cost is \$5.5 million with an average project duration of just over 14 months.
Difficulty in managing change	Companies often must radically change how they operate to conform to the enterprise work processes. These changes can be so drastic to longtime employees that they depart rather than adapt to the change, leaving the firm short of experienced

	workers.
Management of software customization	The base enterprise system may need to be modified to meet mandatory business requirements. This modification can become extremely expensive and further delay implementation.
User frustration with the new system	Effective use of an enterprise system requires changes in work processes and in the details of how work gets done. Many users initially balk at these changes and require much training and encouragement.

The following list provides tips for avoiding many common causes for failed enterprise system implementations:

- Assign a full-time executive to manage the project.
  - Appoint an experienced, independent resource to provide project oversight and to verify and validate system performance.
  - Allow sufficient time for transition from the old way of doing things to the new system and new processes.
  - Plan to spend considerable time and money training people; many project managers recommend that 30–60 days per employee be budgeted for training of personnel.
  - Define metrics to assess project progress and to identify project-related risks.
  - Keep the scope of the project well defined and contained to essential business processes.
  - Be wary of modifying the enterprise system software to conform to your firm's business practices.
3. Assume that you are the owner of a small bicycle sales and repair shop serving hundreds of customers in your area. Identify the kinds of customer information you would like your firm's CRM to capture. How might this information be used to provide better service or increase revenue? Identify where or how you might capture this data?

Student response will vary. The CRM system could capture:

- Inventory
- Number of sales
- Registration data
- Warranty information
- Service history
- Who repaired the bike
- Parts ordered/replaced
- Owner information
- Customer inquiries

This information could help to anticipate the needs of customers, provide better service, reduce costs, and improve efficiency.

#### 4. Case Study: From Stand-Alone to Integrated Applications

YIOULA Group is the largest glass manufacturer in the Balkan, producing over 625,000 glass containers annually as well as over 30,000 tons of tableware. Starting in the 1990s in Greece, the company expanded by acquiring other glassmaking forms in Romania, Bulgaria and Ukraine. The company has 7 factories in 4 countries, about 2,100 employees, and net annual sales of about €180 million (about AUD\$280 million).

As a result of its growth through acquisition, YIOULA Group found itself with a confusing variety of information systems. The group was unable to compare production costs for the same item across factories, could not improve efficiencies by coordinating purchasing and financial management across its plants, and was not positioned for continued growth or expansion into new market areas. Clearly, its legacy stand-alone applications needed to be replaced.

YIOULA Group CIO Zacharias Maridakis had previous experience using integrated enterprise software when he worked at Mobil Oil's Greek subsidiary, Mobil Oil Hellas S.A., in the 1990s. Therefore he was well acquainted with the advantages of the software. Under his direction, YIOULA Group investigated various software packages. They selected JD Edwards EnterpriseOne, named for a company that had become part of Oracle Corporation in 2005. Part of the reason for this choice was that most other ERP packages, including the SAP software with which Maridakis had worked at Mobil, are designed primarily for much larger organisations. EnterpriseOne was always intended to medium-sized firms.

Because YIOULA Group had little experience with EnterpriseOne, it enlisted the help of Oracle partner Softecon to help configure the software to the company's needs, meet the legal requirements of each region in which it operates, and manage implementation in each area. Support for the Greek language (as well as English and 18 others) is a standard JD Edwards EnterpriseOne capability available from Oracle; Softecon added the other languages that YIOULA Group needed to the user interface. YIOULA Group also added a specialised cost comparison module from Softecon to the basic EnterpriseOne package. This module helps the group choose the lowest cost facility to manufacture a product.

The conversion to a single enterprise package gave YIOULA Group the expected benefits. Times from order to invoice, delivery time, and cash collection have all been accelerated. Financial data is now available two weeks after the end of a period versus one month previously. A consolidated view of inventory across all plants has enabled the group to manage inventory more efficiently and comprehensively and to use just-in-time purchasing methods.

Perhaps even more importantly, YIOULA Group is now positioned to grow. As Maridakis puts it, "Oracle's JD Edwards EnterpriseOne is a key enabler of our strategy to enhance market leadership in the Balkans, grow our business in the Ukraine, and continue to improve productivity, efficiency, and profitability as we expand into new markets."

### Discussion Questions

1. What problems had the YIOULA Group's stand-alone legacy software created for the company?

The group was unable to compare production costs for the same item across factories, could not improve efficiencies by coordinating purchasing and financial management across all its plants, and was not positioned for continued growth or expansion into new market areas.

2. What are the advantages of ERP systems over stand-alone software packages?

The primary benefits of implementing ERP include improved access to quality data for operational decision-making, elimination of inefficient or outdated systems, improvement of work processes, and technology standardization.

3. What immediate and long-term needs did EnterpriseOne fill for the YIOULA Group?

The conversion to a single enterprise package gave YIOULA Group the expected benefits. Times from order to invoice, delivery time, and cash collection have all been accelerated. Financial data is now available two weeks after the end of a period versus one month previously. A consolidated view of inventory across all plants has enabled the group to manage inventory more efficiently and comprehensively and to use just-in-time purchasing methods. Perhaps even more importantly, YIOULA Group is now positioned to grow.

4. The YIOULA Group adopted a general ERP system that was not industry specific. What are the advantages and disadvantages of general ERP systems and industry specific systems?

Because the ERP system was not industry specific, the YIOULA group was able to configure the software to the company's needs, meet the legal requirements of each region in which it operates, and manage implementation in each area.

**Tutorial 3**  
**Business Process Design and Data Flow Diagrams**

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**You will learn to:**

- Prepare context diagrams.
- Prepare data flow diagrams.
- Prepare table of entities and activities.

**Discussion Questions:**

1. Describe the who, what, where, and how of the following scenario. A customer gives his purchase to a sales clerk, who enters the sale in a cash register and puts the money in the register drawer. At the end of the day, the sales clerk gives the cash and the register tape to the cashier.

**ANS.** *Who:* The sales clerk performs the information processing activities.

- What:*
- (1) Give purchase to sales clerk.
  - (2) Enter sale in register (if it is an electronic register, data stores could be updated).
  - (3) Put money in drawer.
  - (4) Give cash and register tape to cashier.

*Where:* Store (at the check-out counter).

*How:* A manual process is performed by the sales clerk using a cash register.

2. Why are many correct logical DFD solutions possible? Why is only one correct physical DFD solution possible?

**ANS.** For each sensible grouping of logical activities, there is a correct logical DFD. And, because many sensible groupings are possible, multiple correct solutions exist. However, only one correct physical DFD is possible for each system because these diagrams are constructed directly from a description of the system. A physical DFD presents a one-to-one correspondence among entities, physical data stores, and data flows, as described in the narrative, leaving little or no room for interpretation.

### **Practical Exercise:**

The following narrative describes the order entry system for the OfficeSupply Company.

*OfficeSupply is a wholesale distributor of office supplies, such as disks, stationery, file cabinets, and relate items. Customers receive an updated catalogue annually and place orders over the phone.*

*When a customer calls in with an order, a clerk asks for the customer ID and name. The clerk keys in the customer number, and the computer retrieves the customer record from the customer database and displays it on the clerk's screen. The clerk compares the customer name to the data on the screen to ensure that the customer is legitimate. If everything checks out, the clerk enters the customer's order. After the order is entered, the computer compares the amount of the order to the available credit to ensure that the purchase does not exceed the credit amount limit.*

*This results in the creation of an entry in the sales event data store and an allocation of inventory. At the end of the day, the sales event data is processed against the customer data and the inventory data, and the sales order is recorded in the sales order master data store. At the same time a customer acknowledgement is printed in the mailroom and is mailed to the customer. Also, a picking ticket is printed in the warehouse and will be used to assemble the customer's order.*

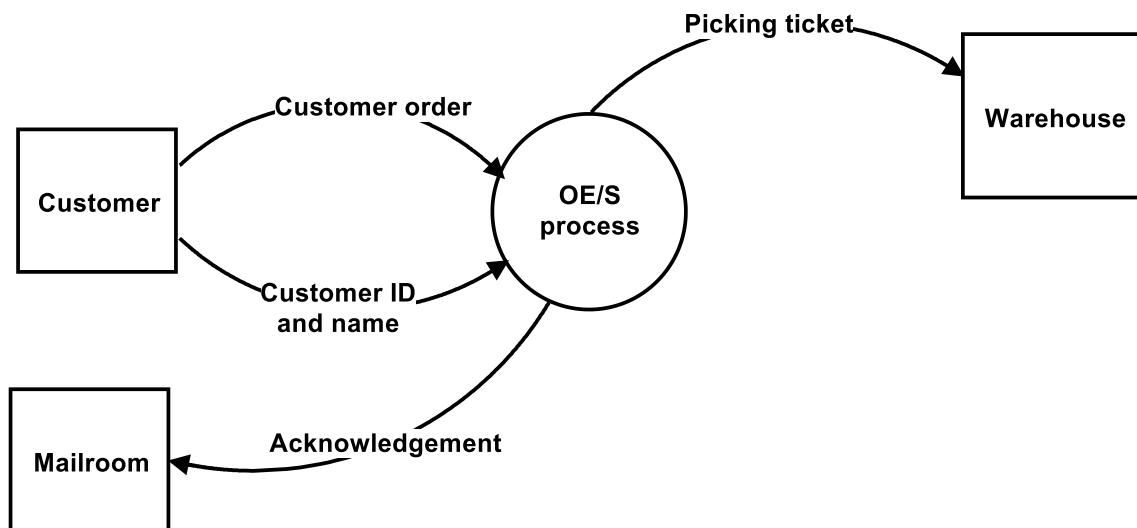
- a) Prepare a table of entities and activities based on the process described in the narrative above.
- b) Construct a context diagram based on the table you prepared in part (a).
- c) Prepare a physical DFD (Data Flow Diagram) based on the output from part (a) and (b).
- d) Prepare an annotated table of entities and activities based on the output from Part (a), (b) and (c). Indicate on this table the groupings, bubble numbers, and bubble titles to be used in preparing a level 0 logical DFD.
- e) Prepare a logical DFD (level 0 only) based on the table you prepared in part (d).

- a) Prepare a table of entities and activities based on the process described in the narrative above.

Entities	Para	Activities
Customer	2	1. Call in and give customer ID and name.
Order entry (clerks)	2	2. Enter customer number.
Computer	2	3. Retrieve and display the customer data.
Order entry (clerks)	2	4. Compare name to display.
Customer	2	5. Give order.
Order entry (clerks)	2	6. Key in order.
Computer	2	7. Verify that the order does not exceed credit balance.
	3	8. Create an entry in the sales event data store and allocate inventory.
	3	9. Process the sales event data against the customer and inventory data and record in sales order master data store.
	3	10. Print customer acknowledgement.
	3	11. Print picking ticket.
Mailroom	3	<b>12. Mail acknowledgement to customer.</b>
Warehouse	3	<b>13. Assemble the customer's order.</b>

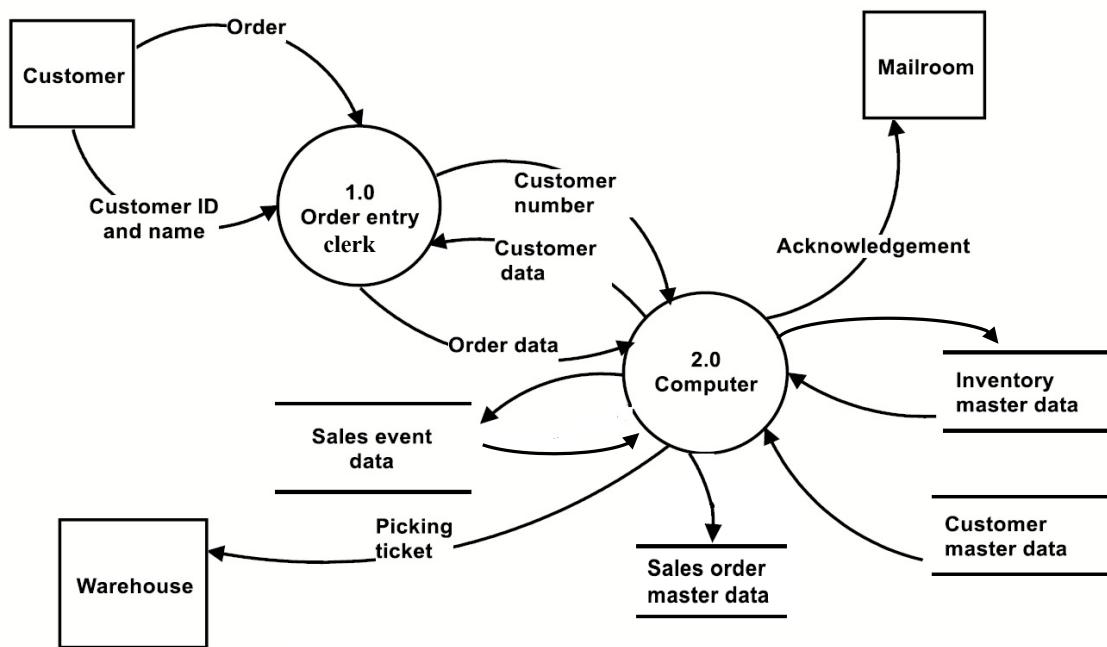
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- b) Construct a context diagram based on the table you prepared in part (a).



**Activity 12 and 13 are offline operational activities, which should not be included in the DFDs.**

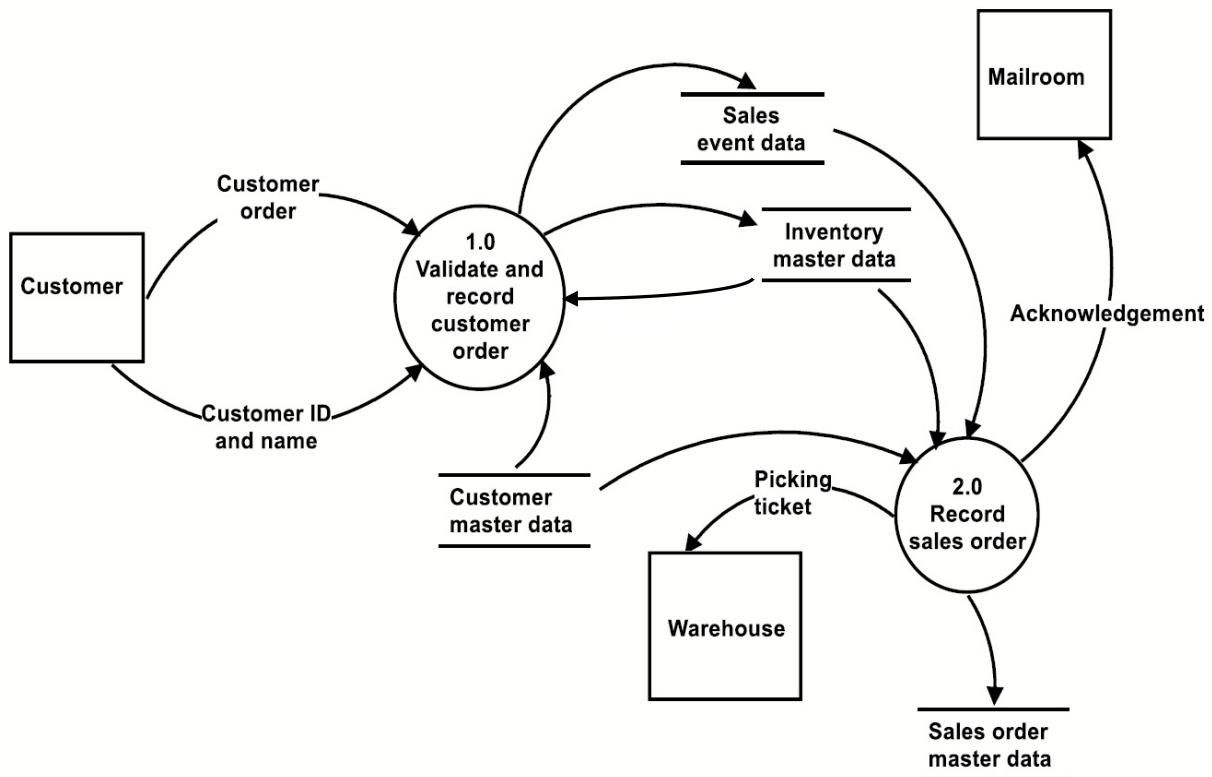
- c) Prepare a physical DFD (Data Flow Diagram) based on the output from part (a) and (b).



- d) Prepare an annotated table of entities and activities based on the output from Part (a), (b) and (c). Indicate on this table the groupings, bubble numbers, and bubble titles to be used in preparing a level 0 logical DFD.

Entities	Para	Activities	Process
Order entry (clerks)	2	2. Enter customer number.	
Computer	2	3. Retrieve and display the customer data.	
Order entry (clerks)	2	4. Compare name to display.	
	2	6. Key in the order.	<b>1.0 Validate and record customer order.</b>
Computer	2	7. Verify that the order does not exceed credit balance.	
	3	8. Create an entry in the sales event data store and allocate inventory.	
Computer	3	9. Process the sales event data against the customer and inventory data and record in sales order master data store.	<b>2.0 Record sales order.</b>
	3	10. Print customer acknowledgement.	
	3	11. Print picking ticket.	

- e) Prepare a logical DFD (level 0 only) based on the table you prepared in part (d).



**Tutorial 4**  
**Business Process Design and System Flowcharts**

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**You will learn to:**

- Prepare systems flowcharts.
  - Identify system flowcharts for typical information processing routines.
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**Points to note when creating Systems Flowchart:**

- Set up and label columns, one for each internal and one for each external entity.
- Use narratives, tables of entities and activities, and DFD physical and logical diagrams for source information for the flowchart.
- Show activities proceeding from top to bottom and left to right. Keep a flowchart as clear and simple as possible while representing activities fully. Keep the flowchart to a single page, using off-page connectors when necessary.
- Use appropriate flowcharting symbols to show all processing that occurs.
- Strike a balance between clarity and clutter by using annotation judiciously and by using on-page connectors whenever flow lines might create clutter.
- Avoid crossing lines wherever possible. If you must cross lines, use a “bridge”.
- Flowchart normal routines and leave exception routines for another page of the flowchart.
- Compare the finished flowchart to narratives, activities and entities tables, and physical and logical DFDs to make sure all activities are accounted for fully.

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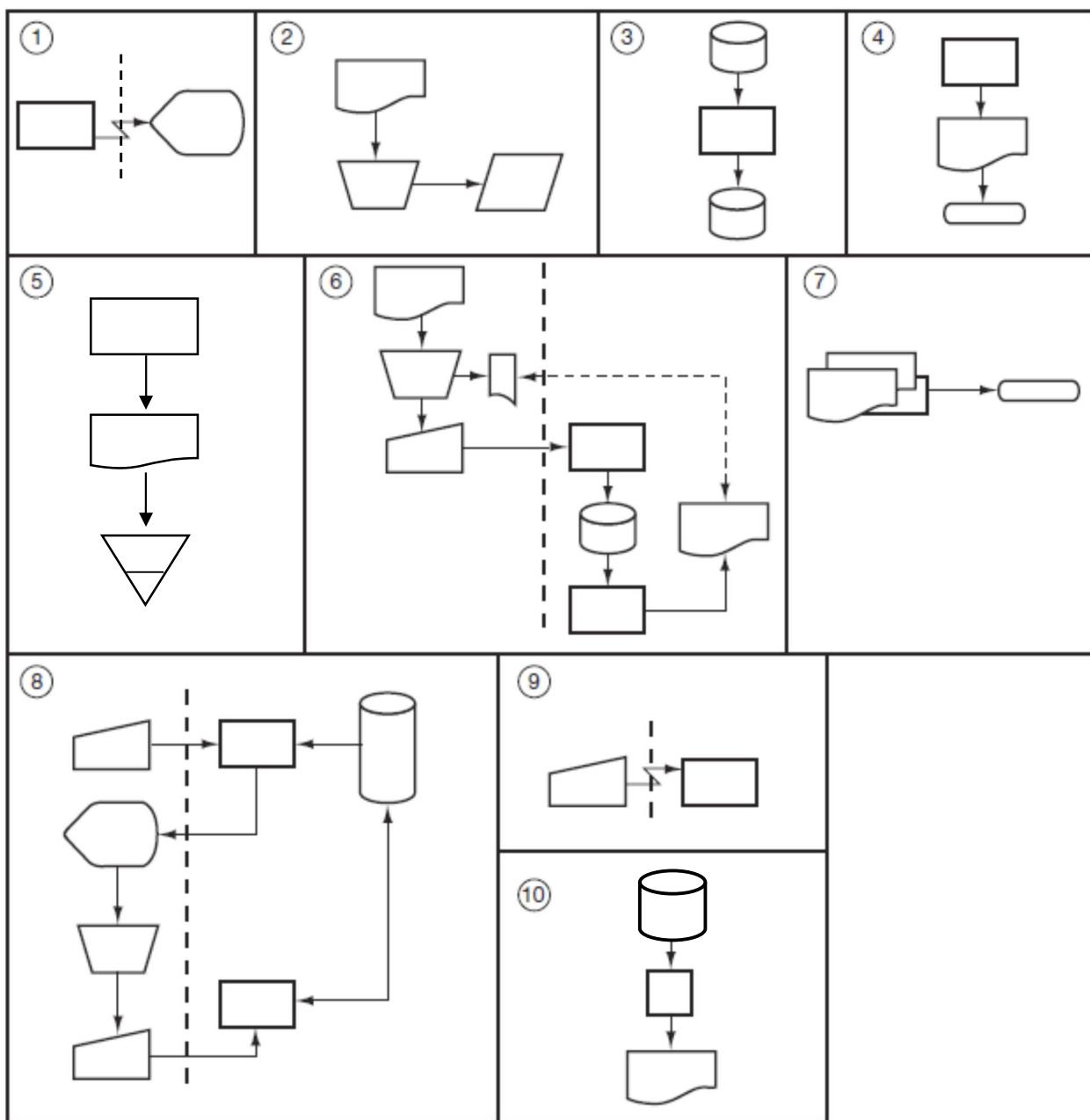
**Exercise 1:**

A description of fourteen typical information processing routines is given here:

- a. Data stored on a disk is sorted and placed on another disk.
- b. A report is printed from the contents of a disk.
- c. Documents are manually posted to a paper ledger.
- d. Magnetic tape input is used to update master data kept on a disk.
- e. A printed output document is filed.
- f. Multiple documents are sent to an external entity.
- g. Data on source documents are keyed to an offline disk.
- h. Programmed edits are performed on key input, the data entry clerk investigates exceptions and keys in corrections, and then data on the disk are updated.
- i. Input stored on two magnetic disks is merged.
- j. The computer prepares a report that is sent to an external entity.
- k. Output is provided to a display at a remote location.
- l. A batch total of input documents is compared to the total reflected on an error and summary report produced after the documents were recorded.
- m. Data are keyed from a remote location.
- n. Data on a magnetic tape are printed during an offline operation.

Match the flowcharting segments (in Page 2) with the above descriptions to which they correspond. (Four descriptions will be left blank.)

Flowchart segments:



ANSWER:

a. 3	h. 8
b. 10	i. no match
c. 2	j. 4
d. no match	k. 1
e. 5	l. 6
f. 7	m. 9
g. no match	n. no match

### Exercise 2:

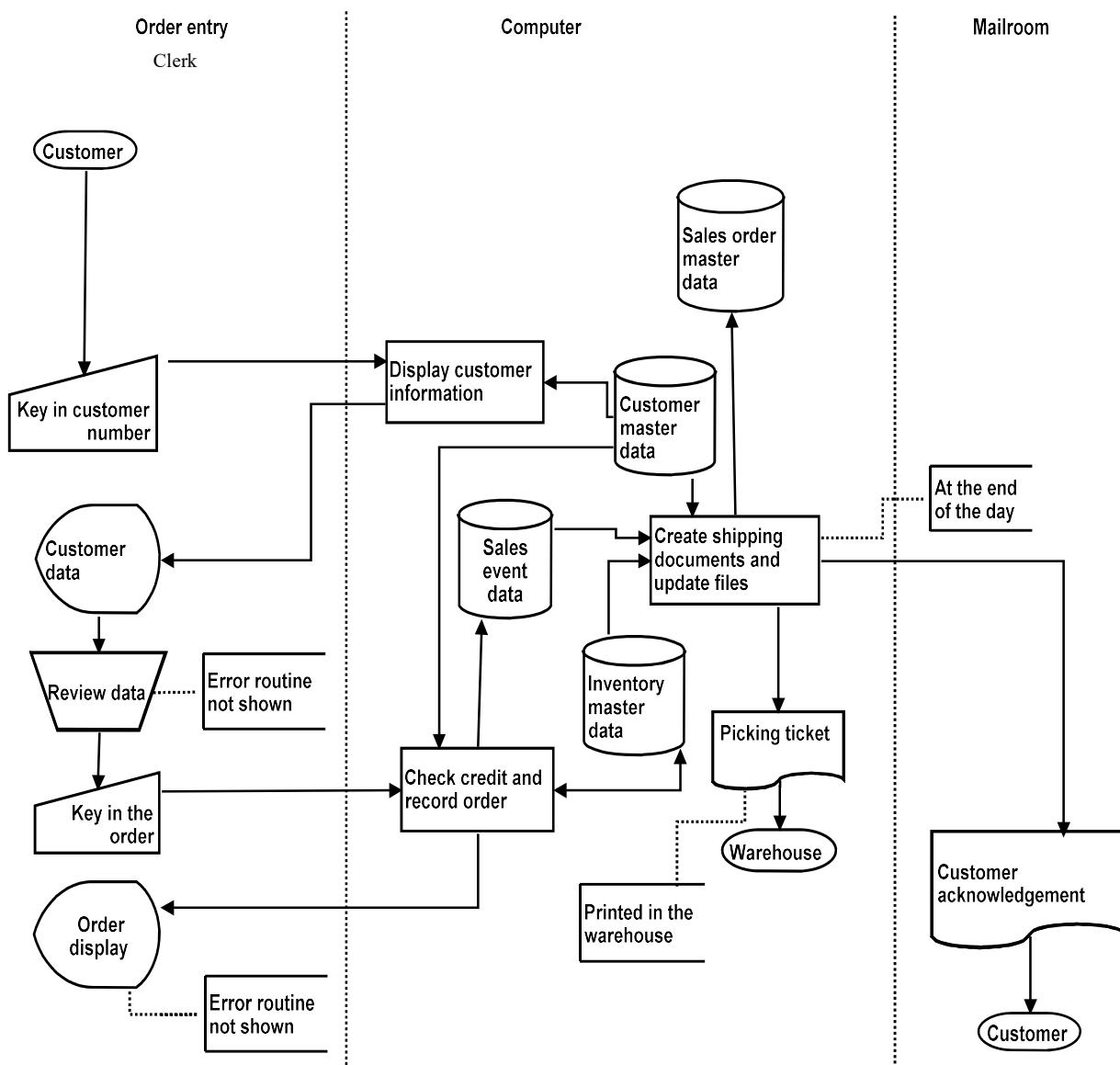
This exercise is a continuation from last week's problem on the order entry system for the OfficeSupply Company. A copy of the narrative is reproduced here:

*OfficeSupply is a wholesale distributor of office supplies, such as disks, stationery, file cabinets, and relate items. Customers receive an updated catalogue annually and place orders over the phone.*

*When a customer calls in with an order, a clerk asks for the customer ID and name. The clerk keys in the customer number, and the computer retrieves the customer record from the customer database and displays it on the clerk's screen. The clerk compares the customer name to the data on the screen to ensure that the customer is legitimate. If everything checks out, the clerk enters the customer's order. After the order is entered, the computer compares the amount of the order to the available credit to ensure that the purchase does not exceed the credit amount limit.*

*This results in the creation of an entry in the sales event data store and an allocation of inventory. At the end of the day, the sales event data is processed against the customer data and the inventory data, and the sales order is recorded in the sales order master data store. At the same time a customer acknowledgement is printed in the mailroom and is mailed to the customer. Also, a picking ticket is printed in the warehouse and will be used to assemble the customer's order.*

- a) Construct a systems flowchart based on the narrative and the output from Parts (a) through (e) of Tutorial 3 practical exercises.



## Tutorial 5

### Business Process Improvements and Organisational Change

#### Suggested Solutions

#### Objectives:

- What is the value chain?
  - What role does IS play in creating value in the value chain?
  - Understand the use of various tools for Business Process Design
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1. What is the difference between a value chain and a supply chain?

A value chain is a series (chain) of events that includes inbound logistics, warehouse and storage, production, finished product storage, outbound logistics, marketing and sales, and customer service. A supply chain is a network of suppliers, distributors, and retailers that participate in the production of a product.

2. What role does an IS play in today's organisations?

An information system can indirectly add value by summarizing the feedback from value-added processes for use by management and other organizational employees. The monitoring and control capabilities of an IS are excellent support features. A more contemporary view of the IS function holds that this system is an integral part of the value-adding processes and is key to providing input collection, product transformation, and output creation. In this way, an IS system can become a direct, strategic tool used to accomplish organizational goals and objectives.

3. What are some of the key differences between re-engineering and continuous improvement?

Reengineering is radical redesign of business processes, organizational structures, information systems, and values of the organization to achieve a breakthrough in business results. Continuous improvement is constantly seeking ways to improve business processes to add value to products and services.

4. Develop a general process chart for the requisition process below:

Step	Description	Time (minutes)
1	Requisition form initiated	10
2	Form mailed to procurement	720
3	Form sits in IN basket	75
4	Requisition form completed	18
5	Form sits in OUT basket	75
6	Form mailed for authorization	720
7	Form sits in IN basket	45
8	Form reviewed and authorized	12
9	Form sits in OUT basket	90
10	Form mailed to ordering	720

**Suggestion:**

*General Process Chart*

Activities	# of activities	Time (minutes)	%
Operation	2	$10+18 = 28$	1.1
Inspection	1	12	0.5
Transportation	3	$720+720+720 = 2160$	86.9
Delay	4	$75+75+45+90 = 285$	11.5
<b>Total</b>	<b>10</b>	<b>2485</b>	<b>100</b>

Operations = filling out the requisition form

Inspection = Authorization and review

Transport = in the mail

Delay = waiting in “out” and “in” boxes

5. A firm with 4 departments has the load matrix shown in Table 1 and the current layout is shown in Figure 1.

**Table 1. Load Matrix**

From/To	B	C	D
A	12	10	8
B		20	6

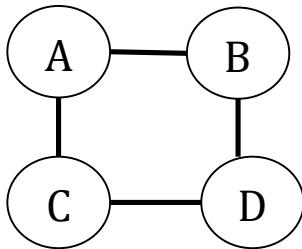


Figure 1. Current Layout

- What is the Load–Distance score for the current layout? (Assume rectilinear distance)
- Find a better layout. What is its total Load–Distance score?

**Suggestion:**

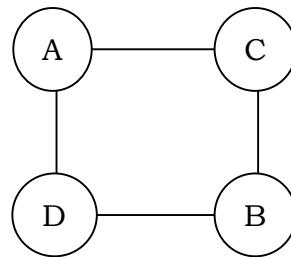
- What is the LD score for the current layout, assuming rectilinear distances?

Centers	Load	Current Design	
		Distance	LD score
(A,B)	12	1	12
(A,C)	10	1	10
(A,D)	8	2	16
(B,C)	20	2	40
(B,D)	6	1	6
		Total	84

- b) Find a better layout. What is the total LD score for the improved layout?

To improve the layout design further we can look at the LD scores in a) above and try to decrease the distance for the pairs with the highest scores.

- ⇒ A reasonable approach would be to change the places of stations B, C and D as shown in the following layout:



This new layout results in

- the distance between B and C with load 20 decreases to 1
- the distance between A and D with load 8 decreases to 1
- the distance between A and C with load 10 remains 1
- the distance between B and D with load 6 remains 1
- the distance between A and B with load 12 increases to 2

Centers	Load	Current Design	
		Distance	LD score
(A,B)	12	2	24
(A,C)	10	1	10
(A,D)	8	1	8
(B,C)	20	1	20
(B,D)	6	1	6
Total			68

The total savings in LD score is then  $(84 - 68) = 16$

### Case Study - Tesco uses Data and New Information Technologies to Stay Ahead

Tesco has come a long way since it began as a market stall selling surplus groceries in London's East End in 1919. It is now the largest food seller in the UK, and one of the largest general merchandise retailers in the world. It operates in 14 countries across Europe, Asia, and North America and has over 5,000 stores – about half outside the UK.

Despite its history of nearly a century, Tesco is up to date with today's information systems. One way it uses these systems is to better understand its customers. As former CEO Sir Larry Leahy puts it, "The hardest thing to know is where you stand relative to your customers, your suppliers, and your competitors. Collecting, analysing and acting on the insights revealed by customer behaviour, at the [cash register] and online, allowed Tesco to find the truth." He added, "Customers [are] the best guide. They have no axe to grind. You have to follow the customers."

To track and analyse customer information, Tesco invested in a data warehousing system from Teradata along with reporting software from Business Objects. A data warehouse is a large collection of historical data to use for analysis and decision-making. At Tesco, "large" is no exaggeration: Its data warehouse contains over 100 TB (terabytes) of data. By comparison, a high-end personal computer might have a total storage of 1 TB.

Connecting with customers though isn't a one-way process of collecting data about them. Connecting also means reaching out to customers and allowing them to interact in new ways. Tesco is doing that, too. Using augmented reality technology from Kishino AR, Tesco lets customers see products online almost as if they were physically in a store. (You can see this in action in the Kishino AR video: ([https://www.youtube.com/watch?v=vHKuMlln5tQ&ab\\_channel=WirelessFederation](https://www.youtube.com/watch?v=vHKuMlln5tQ&ab_channel=WirelessFederation))

Tesco is also putting computers in its UK stores that allow customers to check out more products than a store can stock, and view heavy, bulky items from all angles. In Korea, Tesco has opened a complete virtual store: Customers can view over 500 items, scan their barcodes using a special smartphone app, and order products. The products can be delivered later that same day if they order by 1pm.

Recognizing that many of the customers it wants to connect with are members of social networking sites, Tesco has also developed a FB application in which the Club card holders (or most of its regular customers, 16 million in the United Kingdom alone) can vote on products they want added to its Big Price Drop promotion. Richard Brasher, (Former) CEO of Tesco UK explains, "We are committed to doing all we can to help our customers, and our new FB application will enable them to tell us directly where they most value reduced prices." Aside from the benefits of lower prices, voting on which prices should be lowered gives customers a feeling of being connected with the store and participating in decisions.

Tesco's applications require modern IS. More importantly, however, they require the ability to see the value of information and conceive of innovative ways to use it.

1. How does Tesco's Teradata database add value to the organisation?

Tesco's Teradata database allows them to track and analyse customer information. This information can be used to achieve a competitive advantage.

2. How do Tesco's use of augmented reality and its FB application give Tesco a potential competitive advantage?

Using augmented reality technology from Kishino AR, Tesco lets customers see products online almost as if they were physically in a store. Tesco is also putting computers in its UK stores that allow customers to check out more products than a store can stock, and view heavy, bulky items from all angles. In Korea, Tesco has opened a complete virtual store: Customers can view over 500 items, scan their barcodes using a special smartphone app, and order products. The products can be delivered later that same day if they order by 1 pm.

Tesco has also developed a Facebook application in which the Clubcard holders (or most of its regular customers, 16 million in the United Kingdom alone) can vote on products they want added to its Big Price Drop promotion.

3. Tesco collects and analyses historical data from customers, such as weekly and monthly spending habits. How might this information help a food seller such as Tesco operate more efficiently, save money, attract customers, and make sure food doesn't go to waste?

By analysing historical data, Tesco will be able to discover patterns and trends. They will be able to identify products with high turnover rates, determine when shoppers buy certain items, which shoppers buy certain items, etc.

4. How do you feel about a company, such as Tesco, collecting data about your spending habits?

Responses will vary. Some students may be uncomfortable with the idea that their spending habits are being tracked.

## Tutorial 6 Lean and Quality

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### Objectives:

- **Describe the Six Sigma Quality concept**
  - **Define the term “lean” and “quality”**
  - **Discuss ways of implementing Six sigma quality**
  - **Describe the quality tools and their role in applying lean concepts**
- 

### 1. What is Quality?

Quality is the ability of a product or service to meet or exceed the expectations of a customer. The intent of management to create quality goods or services is often operationalized through a commitment to a total quality management (TQM) approach to business. This means a collection of approaches, tools, and techniques are used throughout the firm to foster higher levels of quality. Key components in this approach are recognition of customer needs, employee empowerment, having a vision for quality, and developing a reward system.

### 2. What is Six Sigma?

- An improvement program aimed at reducing variability and achieving near elimination of defects from every product, process and transaction.
- Objective is to reduce cost and increase revenue: increasing process efficiency and process effectiveness.
- Centered around a disciplined and quantitatively oriented improvement methodology - DMAIC (Define, Measure, Analyze, Improve, Control).
- Six Sigma is a statistical term that means products and services will meet quality standards 99.9997% of the time. In a normal distribution curve used in statistics, six standard deviations (Six Sigma) is 99.9997% of the area under the curve.

### 3. Describe the key principles of Lean Operation.

#### Short version:

- Originated from TPS (Toyota Production System),
- Aims to improve/smoothening business process ‘flow’
- JIT (Just in time) philosophy
- Waste elimination – 7 wastes (TIMWOOD)

#### Long version:

There are five key principles associated with lean operation.

1. The first principle is to define value from the customer’s point of view, and not the traditional producer’s viewpoint.

2. The second is to evaluate the value stream and identify value-added and non-value-added activities for each family of products.
3. The third principle is to create an effective and uninterrupted flow of necessary activities for each product family.
4. After the flow has been created, the fourth principle is to have the product flow synchronized based on a pull system of authorized work.
5. Finally, as these four principles are put into practice, then the fifth principle is to perfect (or continuously improve) this practice.

The result will be a new way to organize business process (and its activities) to deliver more value to customers while eliminating waste.

4. The local telecommunication company provides service to the cities in Melbourne. The firm's current customers experience an average of 1147 dropped calls per week. The estimated loss time of 30s for each dropped call, which is roughly 9.56 hours per week. What is the company's current quality standard in terms of Six Sigma?

**Table 1. Six Sigma Metrics**

No. of Std Deviations above the mean	% of output that is defect free	Defects per million opportunities
2	69.15	308,537
2.5	84.13	158,686
3	93.32	66,807
3.5	97.73	22,750
4	99.38	6,210
4.5	99.865	1,350
5	99.977	233
5.5	99.9968	32
6	99.99966	3.4

Solution:

The company operates at 24/7, which equals 168 hours per week.

Computing the defect rate:

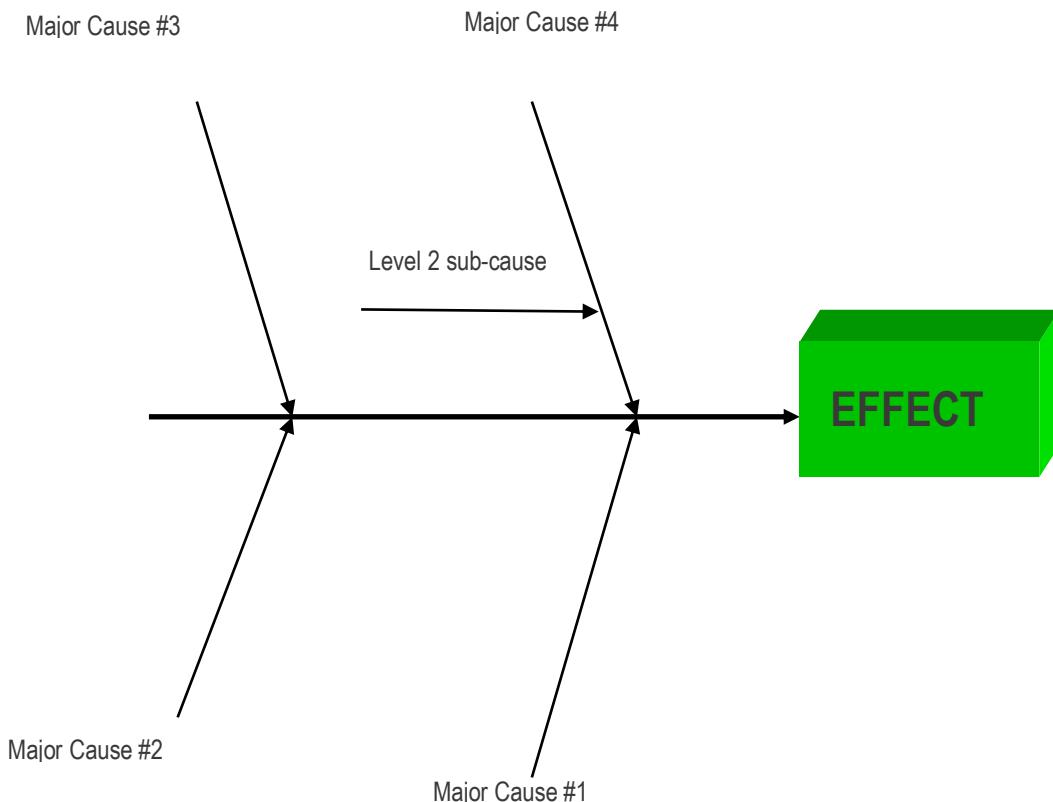
$$\frac{9.56}{168} = 0.0569 \text{ or } 5.69\% \text{ defect rate, or}$$

$$1 - 0.569 = 0.94310 \text{ or } 94.31\% \text{ defect free quality level.}$$

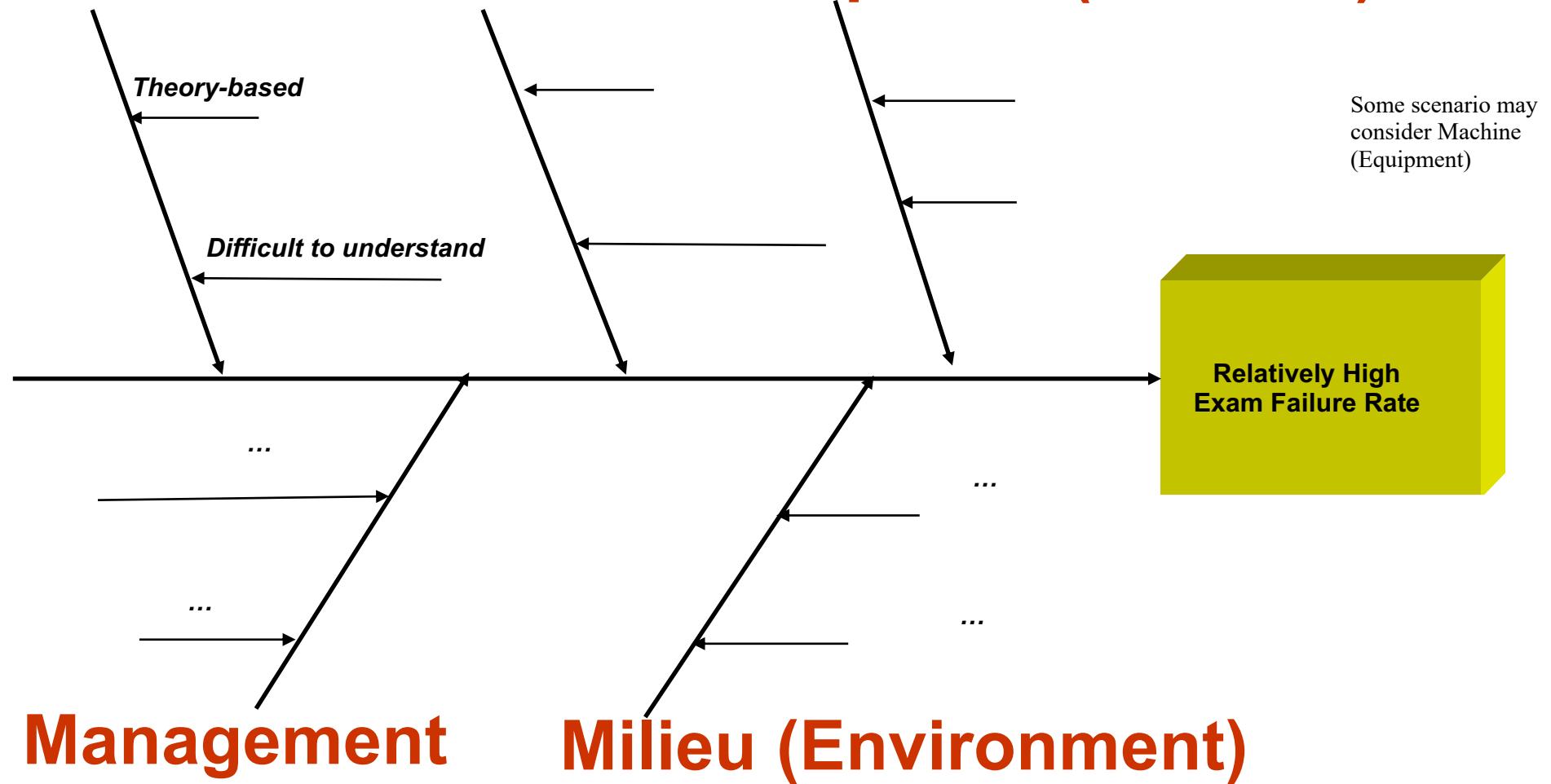
Using the chart in Table 1, it seems that the company is operating at the level between 3 and 3.5 Sigma.

5. You are the lecturer of Business Process Modelling. In recent years, the examination failure rate is around 15% -20% of the total enrolment. You would like to find out major factors that contribute to this failure rate.

Use Ishikawa diagram(s) to identify individual causes which may be due to human, process (or method), material, environment, management, etc.



## Material      Method      Manpower (Human\*)



## Tutorial 7 Part 2 Analysing Business Processes

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### Objectives:

- Apply the Theory of Constraints
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5. Use the theory of constraints and data in the following tables to determine how many units of each job type should be completed per week in order to maximize profits. Consider that the availability is 5,500 minutes for Resource 1 (R1), 3,000 minutes for R2 and 8,000 minutes for R3.

Job	Activity routing	Demand (units per week)	Profit Margin
A	1,4,7	80	\$10
B	2,3,5,6	100	\$15
C	1,3,5,6,7	120	\$20

Activity	Time (min)	Resource
1	20	R1
2	12	R2
3	7	R2
4	18	R1
5	9	R3
6	29	R3
7	8	R3

- Step 1: Identify system constraints

### Resource utilization calculations

Resource	Requirements (min/week)	Utilization
R1	$(20 + 18) \times 80 + 20 \times 120 = 5,440$ Job A      Job C	$5,440/5,500 = 98.9\%$
R2	$(12+7) \times 100 + 7 \times 120 = 2,740$ Job B      Job C	$2,740/3,000 = 91.3\%$
R3	$8 \times 80 + (9+29) \times 100 + (9+29+8) \times 120 = 9,960$ Job A      Job B      Job C	$9,960/8,000 = 124.5\%$

- R3 is the bottleneck, the constraint (Resource R3 required over 100% utilisation, so the process is constrained by Resource R3).

- Step 2: Determine how to exploit the system's constraint

- Rule applied: Contribution per minute of the bottleneck (Profit/Labour in Resource)

- Job A:  $\$10/8 = \$1.25$

- Job B:  $\$15/38 = \$0.39$

- Job C:  $\$20/46 = \$0.43$

»» Process A first, then C and finally B

- Step 3. Subordinate everything to the decisions in Step 2

Max of Job A =  $8,000/8 = 1,000$  jobs yet only need 80 units of A so process 80 units of Job A;

Max of Job C =  $(8,000 - (80 \times 8))/46 = 160$  jobs yet only need 120 units of C so process 120 units of Job C;

Max of Job B =  $(8,000 - (80 \times 8 + 120 \times 46))/38 = 48.4$  so process 48 units of Job B.

Total Profit of this processing plan =  $80 \times \$10 + 120 \times \$20 + 48 \times \$15 = \$3,920$

## Tutorial 8 Managing Business Processes Suggested Solutions

### **Objectives:**

- **Describe the concepts of material flow, information flow, customer flow and workflow**
  - **Discuss how these flows are managed in a company and a supply chain**
    - Apply line balancing principles
    - Perform load distance analysis
- 

1. Why are customer flows and workflows important to the firm?

Taken together, both are important for visualizing the workflow of delivering the customer delivery system and how the customer is involved in the system. The customer flow analysis seeks to identify the potential problems related to servicing the customer. The workflow analysis is used to determine which processes add value (or not) to the customer delivery system.

2. Describe the concepts of material flow and why these are important to the firm.

Materials flow through a firm to produce a product or provide a service to the customer. In general, the materials flow includes the receipt of raw materials, scheduling the sequence of operations to produce the finished good, the storage of goods, and the delivery to the customer. Managing these flows effectively can lead to reduced costs while simultaneously maximizing customer satisfaction.

3. Describe the various types of flow analysis and the impact that flow has on the organization.

Process mapping, process flowcharting, and value stream mapping are basically the same terms used to describe the first step in understanding how processes work and integrate with other processes. These process maps are useful for gaining an understanding of how materials flow into, within, and out of a process. This is important for identifying where inventories are delayed or stored, as well as how long the inventories were delayed or stored.

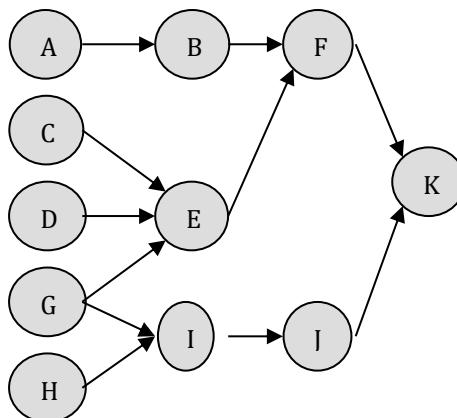
The process maps also help determine the path of the material movement and the sequence of activities that make up the process. This type of information is important for scheduling production and determining the capacity levels needed at each activity.

4. ABC Communications has redesigned one of its core business processes. Processing times are not expected to vary significantly so management wants to use line-balancing approach to assign activities to workstations. The process has 11 activities, and the market demand is to process 4 jobs per 400 minute working day. The table below shows the standard time and immediate predecessors for each activity in the process.

Activity	Time (minutes)	Immediate predecessor
A	70	-
B	15	A
C	8	-
D	32	-
E	47	C,D,G
F	25	B,E
G	61	-
H	52	-
I	29	G,H
J	42	I
K	50	F,J

- a) Construct a precedence diagram.
- b) Calculate the cycle time corresponding to a market demand of 4 jobs per day.
- c) What is the theoretical minimum number of workstations?
- d) Use the longest activity time rule as the primary rule to balance the line.
- e) What is the efficiency of the line? How does it compare with theoretical maximum efficiency?

a)



- b) Calculate the cycle time corresponding to a market demand of 4 jobs per day.

$$C = 400/4 = 100 \text{ minutes}$$

- c) What is the theoretical minimum number of workstation?

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$$TM = 431/100 = 4.31 \approx 5 \text{ workstations}$$

- d) Use the “longest activity time first” as the primary rule to balance the line.

Station	Activity	Idle time	Feasible activities	Activity with longest time
1	A	30	B and C	B
	B	15	C	C
	C	7	None	
2	G	39	D	D
	D	7	None	
3	H	48	E and I	E
	E	1	None	
4	I	71	F and J	J
	J	29	F	F
	F	4	None	
5	K	50		

- e) What is the efficiency of the obtained solution? How does it compare to the theoretical maximum efficiency?

Efficiency =  $431 / (5*100) = 86.2\%$ . This design achieves maximum efficiency, because it uses the theoretical minimum number of stations.

## Tutorial 9 Systems Development Suggested Solutions

### **Objectives:**

- Discuss some of the tools and techniques used in systems analysis
  - Discuss the merits and challenges associated with IT insourcing
  - Discuss the critical issues involved in IT applications development approaches
  - Discuss the buy and lease approach for IT applications
- 

1. What is the purpose of systems analysis? Identify the major steps of this phase.

After a project has completed the investigation phase and been approved for further study, the next step is to answer the question, "What must the information system do to solve the problem?" The overall emphasis of analysis is gathering data on the existing system, determining the requirements for the new system, considering alternatives within identified constraints, and investigating the feasibility of alternative solutions.

The steps in the systems analysis phase are:

- Identify and recruit team leader and team members
- Develop budget and schedule for systems analysis activities
- Study existing system
- Develop prioritized set of requirements
- Identify and evaluate alternative solutions
- Perform feasibility analysis
- Prepare draft of systems analysis report
- Review results of systems analysis with steering team

2. What is the Pareto principle and how does it apply to defining system requirements?

The Pareto principle (also known as the 80–20 rule) is a rule of thumb used in business that helps people focus on the vital 20 percent that generate 80 percent of the results. This principle means that implementing 20 percent of the system requirements can achieve 80 percent of the desired system benefits. An 80–20 option will have a low cost and quick completion schedule relative to other potential options. However, this option may not be an ideal solution and may not even be acceptable to the users, stakeholders, and the steering team who may be expecting more. Additional candidate solutions can be defined that implement all or most of the critical priority system requirements and team-selected subsets of the medium and low-priority requirements.

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3. Why is it important for business managers to have a basic understanding of the systems development process?

Student responses will vary. In today's businesses, managers and employees in all functional areas work together and use business information systems. As a result, they are expected to help and even lead systems development teams and should have, at least, a basic understanding of the systems development process.

4. Your company wants to develop or acquire a new customer relationship management system to help sales representatives identify potential new customers. Describe what factors you would consider in deciding whether to develop the application in-house or buy a software package to fulfill this need.

Factors to be considered include:

Factor	Develop (make)	Off-the-Shelf (Buy)
Cost	The cost to build the system can be difficult to estimate accurately and is frequently higher than off-the-shelf	The true cost to implement an off-the-shelf solution is also difficult to estimate accurately but is likely to be less than a custom software solution
Needs	Custom software is more likely to satisfy your needs	Might not get exactly what you need
Process improvement	Tend to automate existing business processes even if they are poor	Adoption of a package may simplify or streamline a poor existing business process
Quality	Quality can vary depending on the development team	Can assess the quality before buying
Speed	Can take years to develop	Can acquire it now
Staffing and support	Requires in-house skilled resources to build and support a custom-built solution	Requires paying the vendor for support
Competitive advantage	Can develop a competitive advantage with good software	Other organizations can have the same software and same advantage

5. You are the Chief Information Officer for a medium sized retail store and would like to develop a web site to allow your loyal customers to see and buy your products on the Internet. Describe how you would determine the requirements for the new system.

During the systems analysis phase, study the existing systems and work processes to identify strengths, weaknesses, and opportunities for improvement. You should attempt to answer the question: "What must the information system do to solve the problem?"

## Tutorial 10 Outsourcing and Governance Suggested Solutions

**Objectives:**

- Discuss the risks associated with IT outsourcing
  - Discuss the control and governance of IS
- 

1. Would you agree that most organisations tend to make IT outsourcing decisions based on an economic perspective? Present your views.
  2. Identify two factors that may encourage IT insourcing.
  3. Why do some organisations prefer selective IT outsourcing? Discuss.
  4. What is Governance? What is IT Governance?
1. Although the economic perspective is important, it may not always influence IT outsourcing decisions due to the following reasons:
- i. Often costs and benefits involved particularly in the long term are hard to predict accurately;
  - ii. Organisations are fundamentally political entities and many decisions including IT outsourcing is influenced by power and politics. One cannot assume that organisations always follow a rational decision rooted in economic perspective.
2. Various factors, e.g.
- i. Nature of IT application: Keep strategic (mission critical) applications in-house as more intimate knowledge of business is needed which can easily be found with internal staff
  - ii. Greater loyalty and Tacit organisational knowledge of internal IT staff
  - iii. When external IT vendors are either less reliable or have past histories of delivering unsatisfactory services
3. Selective outsourcing is recommended when the level of technology involved in a particular IT application is complex. It is less risky than turning over responsibility for the entire IT function to an IT vendor. It can become the basis for establishing a partnership with the vendor that develops over time. It is more popular among large companies. Etc.
4. (see Lecture 10b slides)