



UNIVERSITY OF NAIROBI

## DEPARTMENT OF PHYSICS

### SPH 108: INFORMATION SYSTEMS ANALYSIS & DESIGN

## TUTORIAL 1

---

**These assignments are group-based**

**Date due:**

---

1. Consider a simplified model of a supermarket whose inputs are purchased goods; outputs are sales by retail to customers and has three processing functions -purchasing, stocking and selling. These functions are subsystems that need to be managed (planned and controlled) and therefore, each of the processes has a control loop (organization). Additionally, an overall control subsystem oversees the control of each of the processes. Finally, the overall control subsystem is answerable to the board of directors/shareholders.

The information flow in this model is as follows

The management/board of directors provides an overall control statement which consists of objectives and standard of performance to the overall control subsystem. The overall system passes these control statements to each of the control subsystems for each function. The control subsystems then issue instructions for contracts to be negotiated and goods to be purchased; for stocks to be held, displayed and checked; and for goods to be advertised and promoted to encourage sales

Feedback is provided to the control subsystems from each of the operational units so that performance can be measured. This feedback enables adjustments to be made to the way the processes are conducted or to the volume/types of input to each of the processes . At the same time, the overall control system receives feedback in summarized form from the operational units and from control subsystems. As a result of this, the budgets and operational plans may be adjusted or feedback may be provided to the board of directors to cause a change to the company objectives/standards of performance.

#### *Assignment*

- (a) By assigning the information flow with numbers 1 to n, construct a simple control system model for a supermarket based on the information given above.
- (b) List the requirements for data processing within the supermarket.
- (c) \*What are the roles of the system analyst in this case.



UNIVERSITY OF NAIROBI

## DEPARTMENT OF PHYSICS

### SPH 108: INFORMATION SYSTEMS ANALYSIS & DESIGN

## TUTORIAL 2

---

**These assignments are group-based**

**Date due:**

---

Touchy lumber is a large wholesale and retail distributor of building supplies. It purchases products in truckloads and sells them to builders and homeowners in small orders, depending on the item. The firm is very successful. It has two stores-all located in Kisumu city with a population of 3 million

The organization structure of the firm is as follows:

- President and owner
- Three supervisors in charge of contractor, lumber, and hardware departments, respectively
- Three employees in the contractor's department, 14 in the lumber area, and 9 in hardware

The president's main concern is to control the huge inventory and many supplies that arrive by truck and train three times a week. The firm has no prior computer experience. No expansion of business activities is planned, although the firm advertises heavily in the local newspapers and on radio to maintain a high sales volume. Products such as roofing materials, lumber, bathroom fixtures, and paint continue to be the main lines of the firm.

You have been asked by the firm's president to examine the firm's structure, market share, and overall performance as a basis for discussing a possible computer system for inventory control. All you know about the company is what is described here. You are to prepare for the first meeting with the president.

### Assignment

- (a) What questions will you ask to do the following?
- (i) Develop an organization chart
  - (ii) Understand the organization structure and the type of system the firm is
  - (iii) Learn about the current inventory system
  - (iv) Asses the relationship between the organization and the community, customers, vendors, and others
- (b) Using the above case situation, how important are the following system concepts for system analysis?
- (i) Data base
  - (ii) Feedback
  - (iii) Interdependence
  - (iv) Open and closed systems
  - (v) Organization chart
  - (vi) System-subsystem interface



# DEPARTMENT OF PHYSICS

## SPH 108: INFORMATION SYSTEMS ANALYSIS & DESIGN

### TUTORIAL 6

UNIVERSITY OF NAIROBI

**These assignments are group-based**

**Date due:**

1. Assuming a monetary benefits of an information system are KShs 80,000 per year, a one time development cost of KShs. 100,000/=, an operation and maintenance cost of 20,000/= per year, a discount rate of 10% per annum, and a 5-year time horizon:

- (a) Fill in the following table
- (b) Determine the pay back period for the project
- (c) Determine the lifetime return of investment and the annual return of investment for the project. **[10 marks]**

	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Totals
Net Economic Benefit							
Discount rate (0.10 p.a.)							
Present value of Benefits							
Cummulative present value of Benefits							
One time Development cost							
Operation & maintenance							
Discount rate (0.10 p.a.)							
Present value of recurring costs							
Cummulative present value of Costs							
Cummulative present value of Benefits + Costs							

NB. Show all your workings/formulae used. Marks will be lost for giving information irrelevant to the question.

2. Chinch Company Ltd. Intends to introduce a new system to replace the current system. From the feasibility study, the current system was found to have an initial investment of KShs 350,000 with an annual stream of savings of KShs 140,000, KShs 130,000 and KShs 175,000 in the 1<sup>ST</sup>, 2<sup>ND</sup> and 3<sup>RD</sup> years respectively. On the other hand, the proposed new system is expected to have an initial investment of KShs 390,000 with an annual stream of savings of KShs 120,000, KShs 210,000 and KShs 150,000 in the 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> years respectively. Using the payback method, determine the viability of the proposed new system. **[5 marks]**



UNIVERSITY OF NAIROBI

## DEPARTMENT OF PHYSICS

### SPH 108: INFORMATION SYSTEMS ANALYSIS & DESIGN

## TUTORIAL 8

---

These assignments are group-based

Date due: Before Semester Fall

---

1. Use Data Flow Diagrams to document the scenario described below

You are requested to computerize the help desk at the headquarters of an organization with several branches countrywide. In your initial study, you find that members of the public and any employees from other branches must first report at the reception desk. They present their needs, which are processed. Private needs are treated separately from official ones. Where a visitor needs to see someone at the headquarters, the person to be seen is called from the department. In case of other private needs, the visitor is directed to the department concerned.

To process an official enquiry, the employees of the organization from other branches must give their personal numbers. Their details are then retrieved from the personnel file and they are directed to the department concerned. Any other official enquiry is directed to the department concerned

**[5 marks]**

2. ***Ndovu fund*** sends monthly statements of account balances to all investors. However, investors with less than 50,000/= will not be sent monthly statements if their accounts have not had any activity during the past month. Document this case with
  - (i) a decision table and
  - (ii) a decision tree

**[5 marks]**

3. An insurance company invites applications from motorists regarding insurance cover. Applicants are required to submit the following details:
  - Name and address
  - Age
  - Number of accidents in the last ten years
  - Licence type -provisional or full

The rules regarding acceptance are as follows

- Motorists who are 31 years old or over, with no accidents in the last ten years, who hold a full Licence, are accepted for full cover
- Motorists who are 31 years old or over, with no accidents in the last ten years, who hold a provisional Licence, are accepted for third party cover
- All other are rejected

- (i) Draw a decision table which covers all the above rules
- (ii) Without using the else rule, reduce your table to eliminate redundancies therein **[ 5 marks]**

4. Kenya Airways initiated a frequent traveler program to encourage passengers to fly frequently and earn awards based on miles flown. The policy is as follows:

Passengers who fly more than 100,000 miles per year and, *in addition* pay cash for tickets or have been flying the airline regularly for more than 5 years receive a free round-trip ticket around the world. Passengers who fly less than 100,000 miles per year and have been flying the airline regularly for more than 5 years also get a free round-trip ticket around the world.

- (i) Draw a decision tree based on the policy
- (ii) Develop a decision table for passengers free ticket **[ 5 marks]**

6. (a) Create a context diagram for billing a dental office. External entities include the patients and insurance companies

- (b) Draw a logical “Diagram 0” DFD showing the general processes in (a) above. **[ 5 marks]**

7. Read the following narrative and answer the questions that follow

Master of Business Administration (MBA) students are taught by lecturers in lecture halls assigned to different units. A student can register for a maximum of 12 units and a project. Each project is supervised by a lecturer. The units are charged different tuition fees.

Draw an entity relationship diagram to represent this information. **[5 marks]**