# System Analysis Design

Chapter 7

Data Input and Output Method

Learning Goals

❑ The need for a data dictionary for an application

❑ How to develop a data dictionary for an application

❑ Design of forms and screens for data input and Output.

❑ Need and methods of coding data elements.

❑ design of input data validation methods.

❑ Design of Output reports

❑ design of screens

❑ Role of graphics in output design

Input and Output Methods
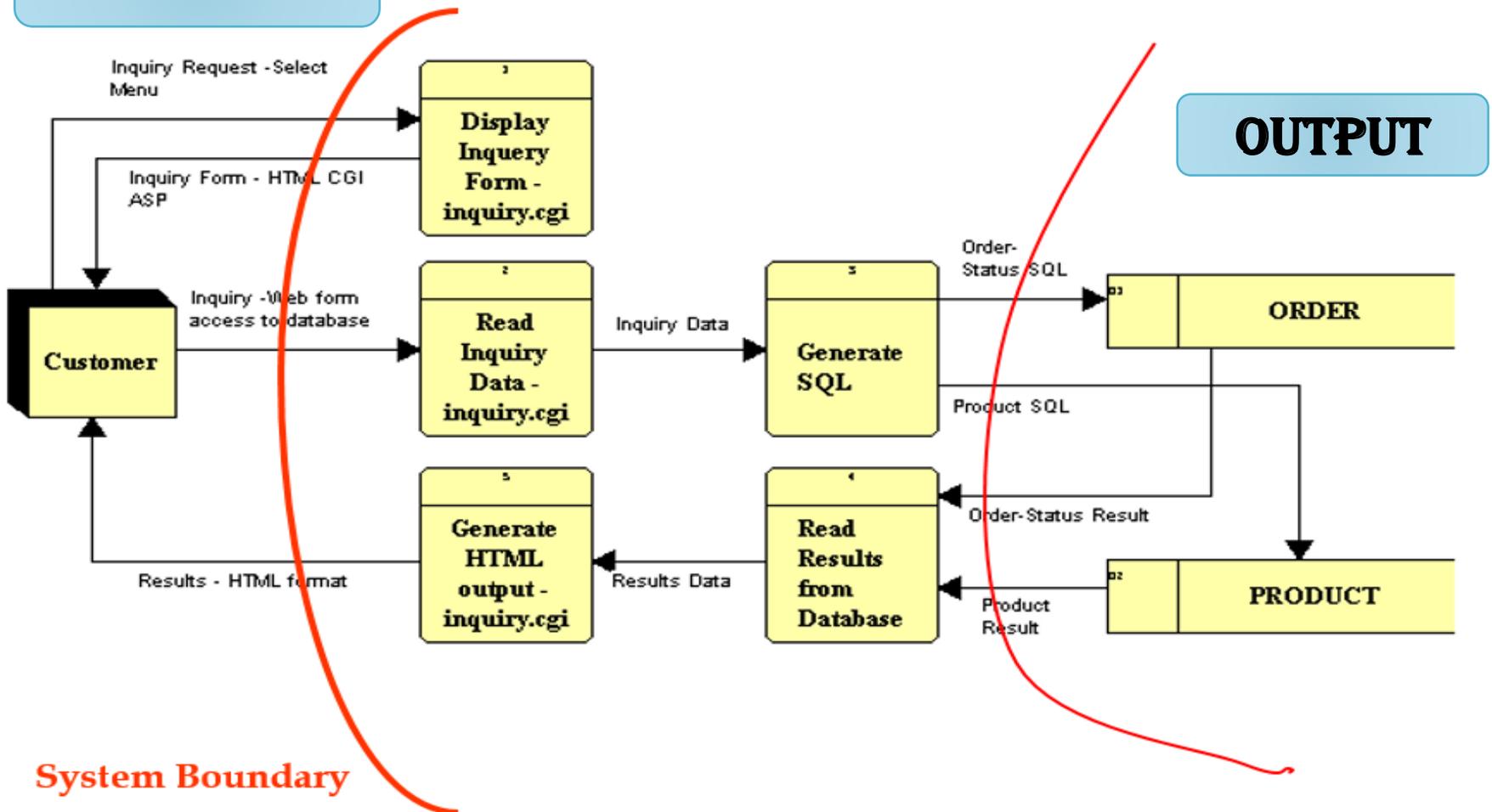
What is Data Dictionary

❑ Data dictionary is a catalogue of all data used in an application, their names, type and their origin.

❑ In other words it is data about data which is called metadata

❑ Data dictionary gives a single point reference of data repository of an organization

❑ It is thus an important documentation which would be useful to maintain a system

How is Data Dictionary Developed?
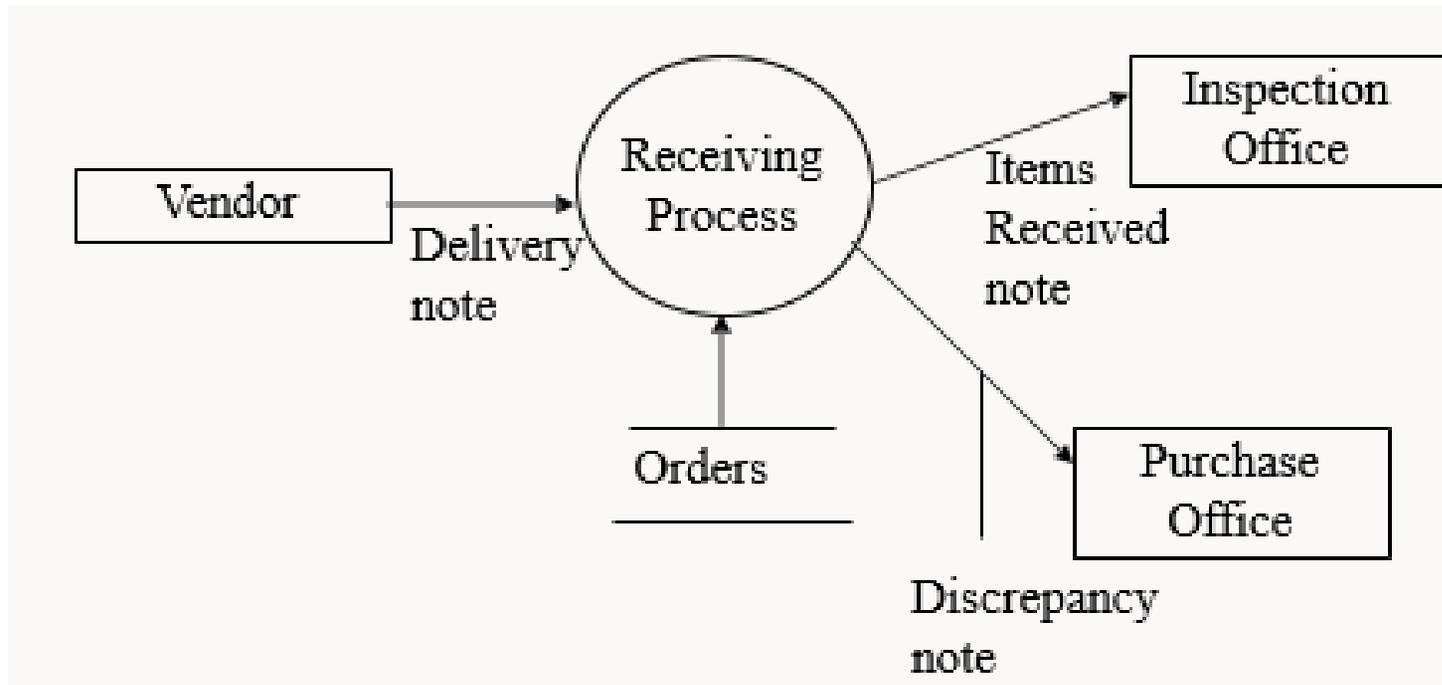
We will recall the word statement from requirement specification now.

Word Statement of Requirements

❑ Vendor sends items with a delivery note while fulfilling an order (along with the physical items) to a receiving office.

❑ Receiving office compares a delivery note against order placed.If there is a discrepancy a discrepancy note is sent to purchase office.

❑ Actual items received note is sent to the inspection office along with items received.

Data Elements in Data Flow

From word statement we derive data elements in each data flow.

1. Delivery note

❑ Order no,Vendor name,Vendor address,item name,delivery date,quantity supplied,units

Item name and Vendor name may not be unique to ensure uniqueness we assign unique codes for them.Name is however still kept to aid people.

Thus delivery note is:

Delivery note = Order no + Vendor code + Vendor name + Vendor address + item code + item name + delivery date + quantity supplied + units.

Data Elements in Data Flow

2.   Disagreement note :

Order no + Vendor code + Vendor name + Vendor address + item code + item name + delivery date + quantity supplied + units + excess/deficiency + no of days late/early.

Items received note = Delivery note **Data**

In data store

Order records = order no + vendor code + vendor name + vendor address + item code + item name + order date + qty ordered + units + delivery period.

Data Dictionary Format

Data dictionary gives in detail the characteristics of a data element. Typical characteristics are:

- ❑ **Data name** : Should be descriptive and self explanatory. This will help in documentation and maintenance
- ❑ **Data description :** What it represents
- ❑ **Origin :** Where the data originates e.g. input from forms, comes from receiving office, keyed in by user etc.
- ❑ **Destination :** Where data will flow and will be used (if any)
- ❑ **Data Type:** numeric, alphanumeric,letters(or text),binary(0 or 1; True or False),Integer, Decimal fixed point, real(floating point), currency unit, date

Typical Characteristics of Data Elements(cont..)

❑ Length : no of columns needed

❑ Limits on value : (if relevant)
e.g. upper and lower bounds of value (age>0,<100)

❑ Remarks : (if any)

Example of Data Dictionary Entry

- <u>Name</u> : Order number
- <u>Description</u> : Used to identify order given to vendor
  <u>Origin</u> : Part of delivery note from vendor <u>Destination</u>
  : Receiving process
- <u>Data type</u> : Numeric Integer
  <u>Length</u> : 8 digits
- <u>Limits on value</u> : >000,<=99999999
- Actual value not relevant.Used only as unique identifier
- <u>Remarks</u>: It is a key field.

Example of Data Dictionary Entry(contd..)

- ❑ <u>Name</u> : Delivery date
- ❑ <u>Description</u> : Date item is to be delivered
- ❑ <u>Origin</u> : Part of delivery note from vendor.Is also in orders
  data store which is input to receiving process
- ❑ <u>Destination</u> : Receiving
  process <u>Data type</u> : Numeric
  Integer
- ❑ <u>Length</u> : 8 digits
- ❑ <u>Limits on value</u> :   Date field in the form
  DDMMYYYY. Should satisfy constraints of a date
  in calendar
- ❑ <u>Remarks</u>: Blank fields not allowed.
  e.g.05082004 is ok but not 582004

Data Input Methods

- **ON-LINE** - User directly Enters data using screen prompts

- **OFF-LINE** -Forms filled by users-

  - for example- candidates for admission to a college fill forms

- Data from forms keyed in by a data entry operator

Batch Data Entry

Name

| | | | | | | | | | |
_ _ _ _ _ _ _ _ _ _

Address

| | | | | | | | | | |
_ _ _ _ _ _ _ _ _ _

| | | | | | | | | |
_ _ _ _ _ _ _ _ _ _

| | | | | | | | | | |

Tick as applicable

Individual
Hindu undivided family
Parent/Guardian of minor

Bad design : Tendency will be to fill name on top line. Not enough space for letters of address

Bad design : Choices are not codified. Data entry operator will be confused.

Batch Data Entry

Enter date

Day	month	Year

(Good design)

Enter time

Hr	Min	Sec

(Good design)

Enter date

(Bad design)

Enter time

(Bad design)

Batch Data Entry

Enter name and address using capital letters Use one box for each alphabet

Tick any of the following

Shri ☐ Smt ☐ Kum ☐
    1   2   3

Name ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

Only address (do not Repeat name)

										Pin						

I am applying as:

Tick one of the boxes below

Individual ☐   Hindu undivided family ☐   Parent or guardian Of minor ☐

Clear instructions . Enough space for entry manually.Data entry operator can be simple instructions for data entry

Models of Data Input

MENUS
 User presented several alternatives and asked to type his/her
    choice

Example
SELECT ALTERNATIVE

Type 1 For entering new student record
Type 2 For deleting student record
Type 3 For changing student record

Your choice

Models of Data Input

- Template analogous to form
- Has features to reject incorrect data input using built-in program
- User friendly visual presentation

Example

Roll no

Name

FIRST NAME/INTIALS   LAST NAME

Dept code

CE	CS	ME	EE	IT

CODES

Year

Hostel code

A	B	C	D

Pre-programmed to reject incorrect Roll no,Dept code,Year, Hostel code

Models of Data Input
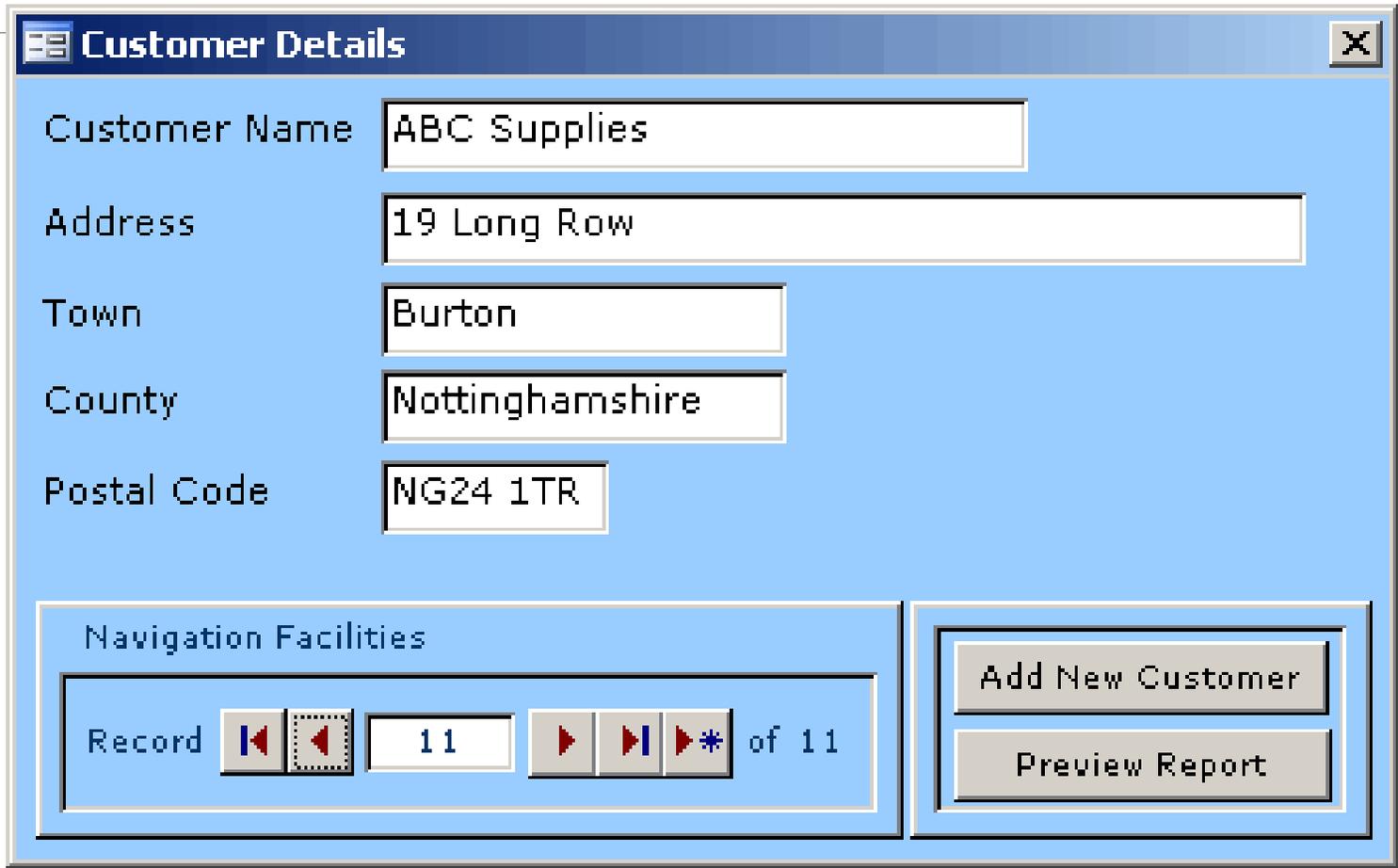
Customer Details

Customer Name | ABC Supplies

Address | 19 Long Row

Town | Burton

County | Nottinghamshire

Postal Code | NG24 1TR

Navigation Facilities

Record | 11 | of 11

Add New Customer

Preview Report

Models of Data Input

Models of Data Input

Models of Data Input

Records Fields Query Help

Taxon

Quantity   Stage

Site

Date   Status

Recorder   Determiner

Method

Reference

Comment

Ready

Save   Close

Output Devices

❑ **HARD COPY DEVICES** - PRINTERS

❑ **SOFT DEVICES** - VIDEO DISPLAY DEVICES

❑ **MULTIMEDIA**
- TEXT
- AUDIO - SPEECH SYNTHESISER
- GRAPHICS
- VIDEO
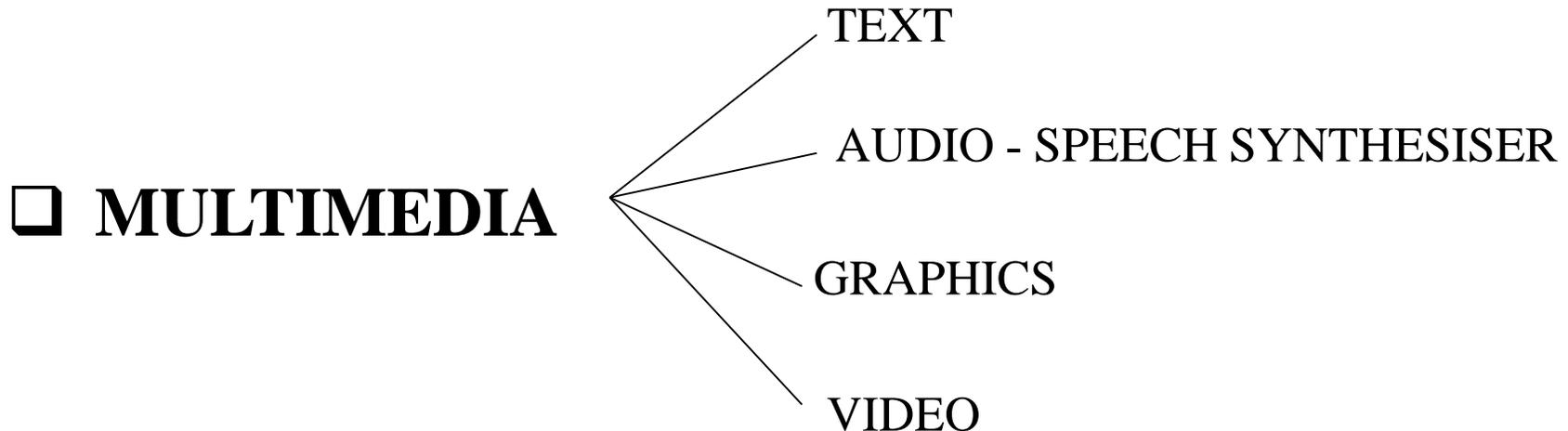
Speech Output Devices

- ❑ Audio such as beeps used for alerting users
- ❑ Device used is a speaker
  - ❑ Very small and inexpensive for beeps
  - ❑ Inexpensive for speech quality
- ❑ Useful when eyes are busy,for example, while driving,pilots etc.
- ❑ Pre-recorded speech is output in such cases
- ❑ Text-to-speech also useful for giving instructions where manuals cannot be read.

Objectives of Output Design

While designing output format and picking output devices the following should be taken into account

- ❑ The user group
- ❑ Proposed use
- ❑ Volume of output
- ❑ Periodicity of output
- ❑ Timely delivery when required

Nature of Output Reports

❑ **TOP MANAGEMENT**

- Summary highlighting important results

Graphical Output – Pie charts

- Bar charts

-Maps

Needed for strategic management

Types of Outputs

- **Internal outputs** stay inside the system to support the system's users and managers

- **External outputs** leave the system to trigger actions on the part of their recipients or confirm actions to their recipients
  - **Turnaround outputs** are those which are typically implemented as a report eventually re-enters the system as an input

Daffodil Polytechnic Institute

SoundStage Entertainment Club
Fax 317-494-0999

PURCHASE ORDER

The following number must appear on all related correspondence, shipping papers, and invoices:
P.O. NUMBER: 712812

To:
SoundStage Entertainment Club
2625 Darwin Drive
Indianapolis, IN 45213

Ship To:
SoundStage Entertainment Club
Shipping/Receiving Station
Building A
2630 Darwin Drive
Indianapolis, IN 45213

P.O. DATE	REQUISITIONER	SHIP VIA	F.O.B. POINT	TERMS
5-3-96	ldb	ups		N30

QTY	DESCRIPTION	UNIT PRICE	TOTAL
10000	Powder - VHS	19.99	199,900.00
5000	Now and Then - VHS	15.95	79,750.00
2500	Pulp Fiction Soundtrack - CD	7.99	19,975.00
450	U2 on Tour - T-shirt	3.49	1,570.50

Typical External Ouput

Subtotal	301,195.50
Tax	15,059.77
Total	316,255.27

1. Please send two copies of your invoice.

2. Enter this order in accordance with the prices, terms, delivery method, and specifications listed above.

3. Please notify us immediately if you are unable to ship as specified.

Madge Worthy   5-4-96
_____   _____
Authorized by   Date

Daffodil Polytechnic Institute

SoundStage Entertainment Club

2630 Darwin Drive - Bldg B
Indianapolis, IN 45213

Invoice No. 301231

INVOICE

Customer

Name	Carlina Smith
Address	3019 Duroc Drive
City	Little Rock State AR ZIP 42653
Phone	502-430-4545

Date	7/21/97
Order No.	346910

Payment Amt

- -
Detach and return top portion with payment

Qty	Description	Unit Price	TOTAL
1	Star Wars - Empire Strikes Back VHS	$19.99	$19.99
1	Eric Clapton Unplugged CD	$13.99	$13.99
1	Alladin VHS	$17.95	$17.95

Payment Details

- ○ Cash
- ○ Check
- ○ Credit Card

Name _____
CC # _____
Expires _____

SubTotal	$51.93
Shipping & Handling	$7.00
Taxes	$2.95
TOTAL	$61.88

Office Use Only

Please return top portion invoice with payment. Make checks payable to: SoundStage Entertainment Club.

RETURN TOP PORTION WITH PAYMENT

Typical External Turnaround Ouput

Types of Outputs

❑ **Detailed Reports:**

- Present information with little or no filtering or restrictions.

- Some detailed reports are historical in nature.

- Detailed reports confirm and document the successful processing of transactions and serve as an audit trail for subsequent management inquiry.

❑ **Exception Reports:**

- Filter data before it is presented to the manager as information.

- Exception reports only report exceptions to some condition or standard.

Sample Detail Reports

SOUNDSTAGE ENTERTAINMENT CLUB
− Products Ordered on 6-31-1996 −

PO Number	Product Number	Product Type	Quantity In Stock	Quantity On Order
112312	102774	Merchandise	273	450
	202653	Title	75	325
	393752	Title	251	125
112313	109833	Merchandise	0	200
	111340	Title	46	150
	231045	Title	225	1,500
	253967	Title	332	850
112314	287904	Title	0	2,000
	699034	Merchandise	0	300
	836785	Merchandise	35	175
	984523	Title	213	250

Sample Detail Reports

Report Preview

Daily Report

Period: 2008-08-04 00:00 – 2008-08-05 00:00

Description	Object	Reduction	Unit	Count	Total	Reduced	Variance
Temperature							
Temperature in burner	t1	Maximum	°C	6	120,0	5,0	
Flow							
Flow water in	q1	Average	m³/h	7	1220,8	50,9	3,0
Flow into the purification	q2	Average	m³/h	7	977,1	40,7	15,7
Flow	q3	Average	m³/h	7	1078,6	44,9	26,2
Flow tank 2	q4	Average	m³/h	6	1587,7	66,2	29,7
Flow into the purification	q6	Average	m³/h	7	2117,0	88,2	3,9
Pumps							
Pump water	p1	Change		7	425	124	
Pump to section 2	p2	Change		7	425	124	
Water pump	p3	Change		7	0	0	
Valves							
Valve	v1	Change		7	833	243	
Sludge valve return right	v6	Change		7	209	61	
Valve	v11	Change		7	209	61	
Valve in outlet tank 4	v11	Maximum		7	24	1	
Valve in outlet tank 4	v11	Minimum		7	24	1	
Valve	v12	Change		7	0	0	
Valve	v14	Change		7	0	0	
Valve return vater (recircl.	v17	Change		7	0	0	
Valve en outlet tank 2	v23	Change		7	0	0	

Print   Print Preview...   Print To...   Close

Sample

Output Format

INVOICE

East Repair Inc.
485 Amsterdam Avenue
New York, NY 1023

BILL TO	**SHIP TO**	**INVOICE #**	00234
John Smith	John Smith	**INVOICE DATE**	03/25/2014
2 Court Square	684 Lexington Avenue	**P.O.#**	1742/2014
Long Island City	6th Floor	**DUE DATE**	04/09/2014
New York, NY 1120	New York, NY 1022		

QTY	DESCRIPTION	UNIT PRICE	AMOUNT
1	Front and rear brake cables & Throttle cable	56.00	56.00
1	New set of pedal arms	182.00	182.00
3	Labor 3hrs	25.00	75.00
	Subtotal		313.00
	Sales Tax 5.0%		15.65
	TOTAL		**$328.65**

TERMS & CONDITIONS

Payment is due within 15 days

Citibank, N.A.
Account number: 2345678
Routing: 23412

Thank you

Sample Output Format

FLUID CONSTRUCTION

FLUID LIMITED
Fluid Centre, 120 Pinehurst Road, Farnborough,
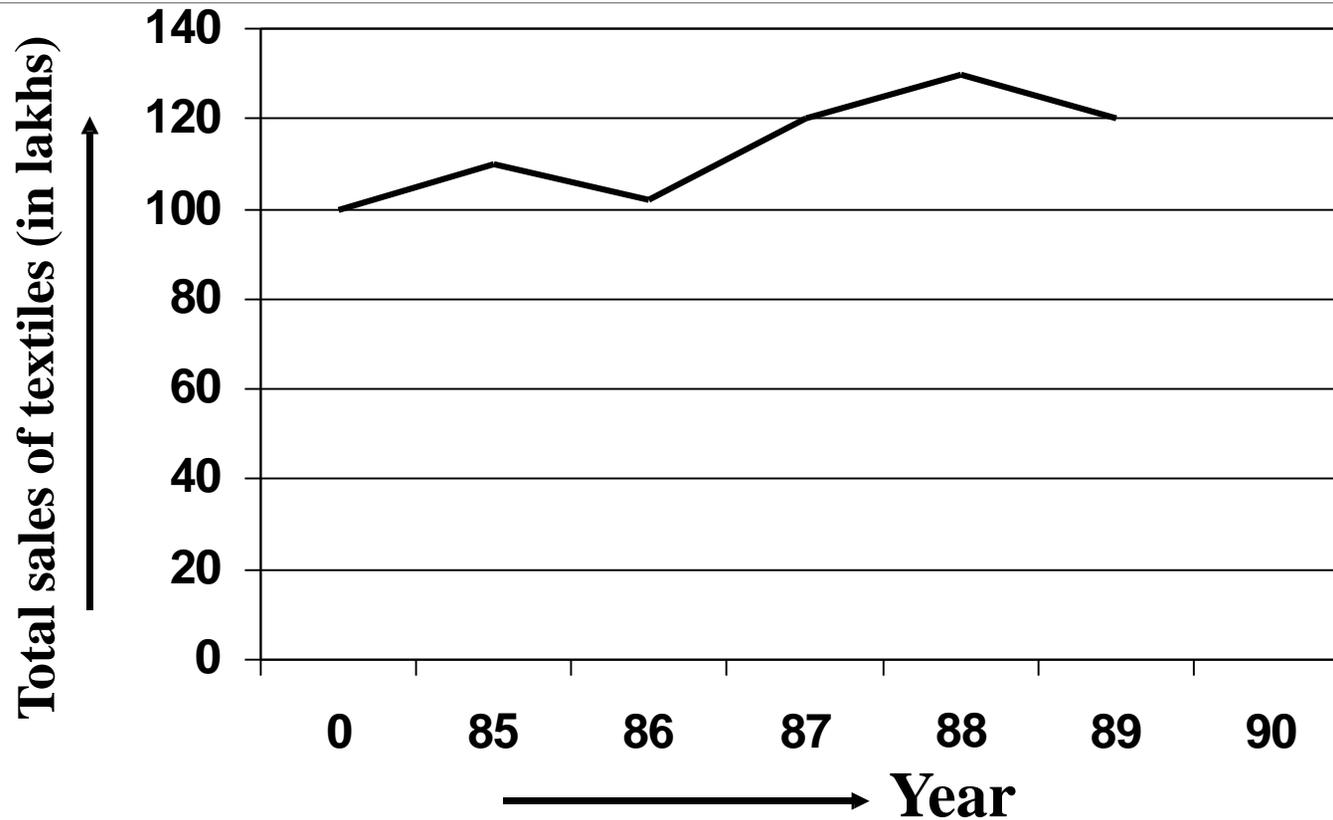KU12 7VG, United Kingdom

COMMERCIAL INVOICE

Consignee :
THE LIBYAN RUSSIAN UKRANIAN SPECIALIZED CENTER,
11-UEONIO STREET, TRIPOLI, LIBYA .

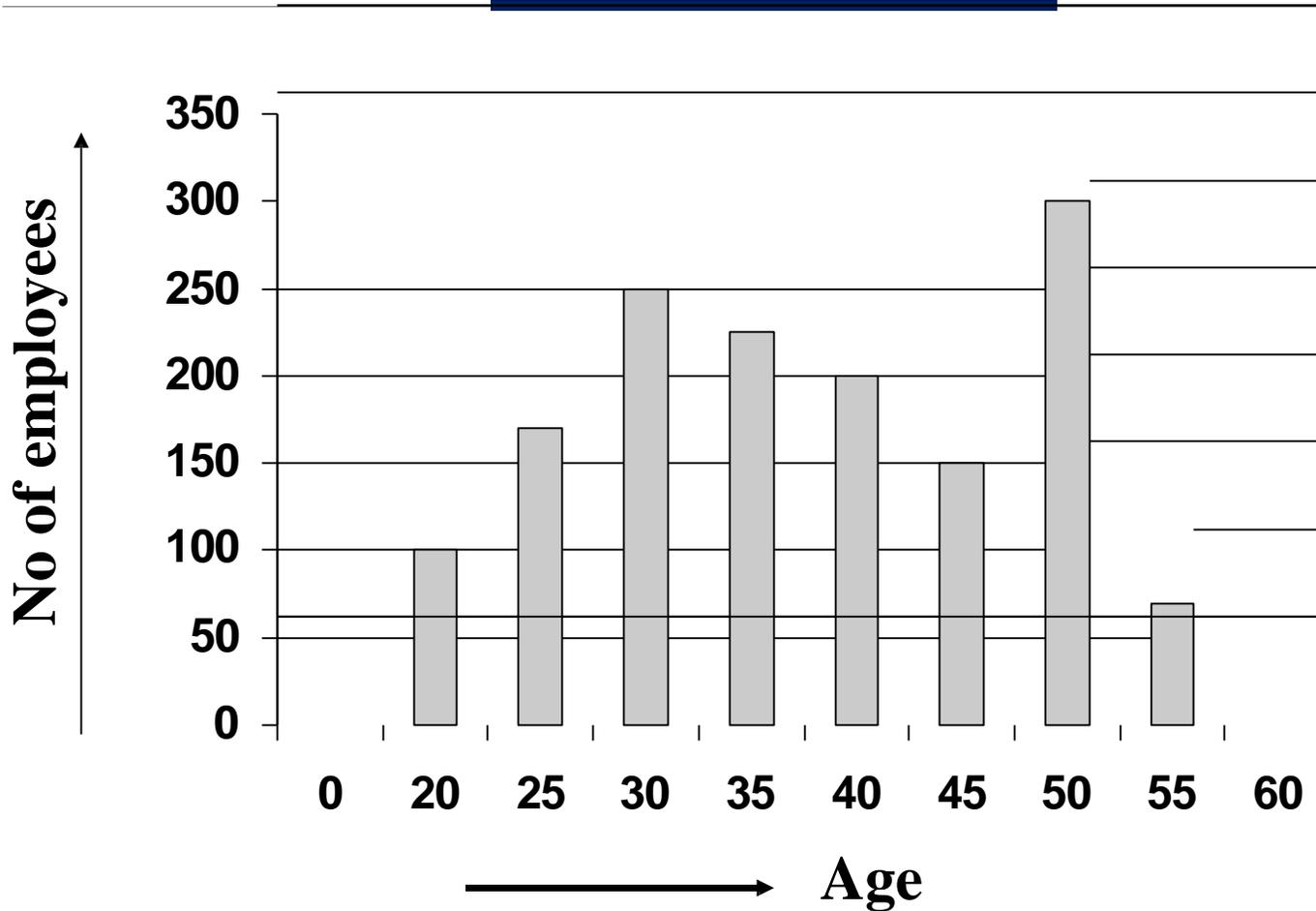INVOICE NO: CI-10012014
DATE   : 10.JULY.2014

DESCRIPTION	QUANTITY	TOTAL PRICE
DOORES AND WINDOWS ACCESORY	2.000,00 Pcs	100.000,00 USD
100 PCT. VALUE OF GOODS SHIPPED		100.000,00 USD
DEDUCTION OF ADVANCE PAYMENT		20.000,00 USD
NET AMOUNT		80.000,00 USD

Delivery Terms	CIF TRIPOLI PORT LIBYA
Shipment	2x40ft Dry Containers
Port of Shipment	Port of Felixstowe
Payment	**IRREVOCABLE CONFIRMED LETTER OF CREDIT**
L/C Number	**5322122004**
Account Holder:	*FLUID LIMITED Fluid Centre, 120 Pinehurst Road, Farnborough, KU12 7VG, UK*
Bank:	*HSBC*
IBAN EURO:	*GB15MIDL40051512345678*
Swift:	*MIDLGB22123*

Use of Graph

Bar Chart

Pie Chart

Dividends 15%

Equipment 10%

Tax 10%

R& D 5%

Misc 15%

Interest payment 15%

Raw material 20%

Salaries 20%