DESIGN OF A COMPUTERIZED INVOICE PROGRAM
FOR ART CHEMICAL PRODUCTS, INCORPORATED

ANN KAISER
FEBRUARY 1978

HONORS ID 499
Dr. ROBERT BOWMAN
# OUTLINE

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DESIGN OF A COMPUTERIZED INVOICE PROGRAM
FOR ART CHEMICAL PRODUCTS, INCORPORATED

Introduction

The invoicing cycle at Art Chemical Products was studied in detail so that a computer program to prepare invoices and generate reports could be written. The steps involved in the process are described in this report.

The first step in designing any computer program is to determine the necessary outputs. The best way to determine the required information is to study the existing system. The invoicing cycle of Art Chemical Products, Inc. was studied to determine the information required and also any additional information which might be useful to the organization.

Short History of Art Chemical

Art Chemical Products, Inc. was incorporated in 1944 by Walter Ball, president and treasurer; Henry Cross, vice president and sales manager; and Wendell Clipp, secretary. Company stock was then and is presently held by the officers of the corporation. Currently there are three stockholders, George J. Bippus, retired; Wendell Clipp, retired; and Samuel M. Kaiser, who currently serves as manager and treasurer.

The company has been located at 1019 Salamonie Avenue, Huntington, Indiana, since 1948. The building was originally a foundry and has undergone three enlargements since it was first purchased by the company. Two warehouses and a production room were built.

The company was organized to manufacture a variety of specialty chemical products. Klean Klay Modeling Clay, a toy and school supply item, was the only successful item and
continues to be the major product of the corporation.

Sales are directed mainly to variety chain stores, to jobbers servicing that field, to the school supply market, and to certain types of industrial accounts. Klean Klay Floral Clay™ is sold to florist shops and variety stores. Most of the selling is done on a commission basis by manufacturer's representatives. True to Pareto's law, much of the company's business comes from eight major accounts, although they have 450 accounts with lesser volume. The daily average number of invoices is nine.

The company has been working toward future growth. Some exporting is done for additional sales. Some private label packaging of modeling clay is done and the company is seeking to do more of this in the future. In the near future it is hoped that they will be able to enter a different market—the department store and discount field—through private label packaging. The major products of the company are shown on pages 3 and 4.

The office staff consists of one full-time bookkeeper and a part-time clerical employee, who does general office work, in addition to the manager. In the production department there is one full-time working foreman, eleven full-time packers, one full-time carton packer and four part-time mixer-extruder operators.

The jobs of the four employees involved in the processing of invoices are as follows:
Manager: The manager manages the office, the plant, and the sales force. He maintains relationship with the accounts and does the sales correspondence, the general correspondence, and performs a general supervision of production. He is responsible for figuring orders as they are received, ordering raw materials and supplies, scheduling production, personnel work, pricing decisions, and new account solicitation. He prepares the year-end tax reports and does a small amount of auditing.
No. 1 Klean Klay — One color to box, 3½ oz. SIZE: 9½" x 3½" x 5/16". PACKED: 6 doz. to carton. 2 doz. each Yellow, Blue, Green, Natural. WEIGHT: 19 lbs. per case.

No. 8 Klean Klay — One color to box, 8 oz. SIZE: 5½" x 3½" x 11/16". PACKED: 4 doz. to carton. 1 doz. each Red, Blue, Yellow, Green. WEIGHT: 25 lbs. per case.

No. 18 Klean Klay — Three colors to box, Red, Blue, Yellow, 9½ oz. SIZE: 6½" x 3½" x ¾". PACKED: 4 doz. to carton. WEIGHT: 32 lbs. per case.

No. 19 Klean Klay — Four colors to box: Red, Blue, Green, Yellow, 1 pound. SIZE: 5½" x 3½" x 1". PACKED: 3 doz. to carton. WEIGHT: 37 lbs. per case.

No. 21 Klean Klay — Three colors: Red, Blue, Yellow, 8 oz. plus two flexible molds. SIZE: 8" x 5¼" x ¾". PACKED: 3 doz. to carton. WEIGHT: 23 lbs. per case.

No. 31 Klean Klay — Four colors: Red, Blue, Green, Yellow, 12 oz., plus four flexible molds. SIZE: 11" x 6¼" x 1". PACKED: 2 doz. to carton. WEIGHT: 24 lbs. per case.

No. 41 Klean Klay — Six colors: Red, Blue, Green, Yellow, Orange, Natural, 18 oz., plus six flexible molds. SIZE: 13½" x 7¼" x 1". PACKED: 1 doz. to carton. WEIGHT: 18 lbs. per case.

Although Klean Klay is non-toxic, protection is guaranteed retailers and wholesalers throughout the United States in the form of Products Public Liability Insurance.

ART CHEMICAL PRODUCTS, INC.
HUNTINGTON, INDIANA 46750
AN ADHESIVE FOR ANCHORING FLOWER ARRANGEMENTS
NON HARDENING • WATER PROOF • TARNISH PROOF • NON TOXIC • ALWAYS PLIABLE • USE OVER AND OVER

Klean Klay Floral Clay
WATER PROOF
WILL NOT TARNISH SILVER

ART CHEMICAL PRODUCTS INC - HUNTINGTON, INDIANA

FC, One pound green floral clay, wrapped. Box size 5½ x 3½ x 1⅛ in. PACKED 3 doz. boxes to corrugated carton. WEIGHT, 38 lbs.

FLORAL CLAY
FOR FLOWER ARRANGEMENTS

Klean Klay

FC-4, Colorful window box. Half pound green floral clay. Box size 5¼ x 3¼ x 1½¾ in. PACKED 3 doz. to corrugated carton. WEIGHT, 19 lbs.

LIABILITY INSURANCE
Although Klean Klay is harmless, protection is guaranteed retailers and wholesalers throughout the United States in the form of Products Public Liability Insurance

ART CHEMICAL PRODUCTS, INC. HUNTINGTON, INDIANA 46750
Bookeeper: The bookeeper serves as bookeeper and payroll clerk and prepares tax forms. She maintains perpetual inventory records of finished goods, work-in-process, and raw materials. She receives checks and debits accounts receivable and credits sales. At the end of the month she produces the balance sheet, profit and loss statement, and cost of goods sold statement.

Typist: The typist is a part-time employee who posts cost figures on labor to the labor cost sheet. She types orders and posts to the accounts receivable cards and account cards. She prepares special report forms, such as the reports sent to several accounts of the items, quantities, and prices of shipments sent to their warehouses. She performs other jobs as assigned, such as typing, and prepares and mails the past-due statements.

Foreman: The foreman assembles orders and schedules the proper trucks to pick up the orders for the day. When the trucks arrive he supervises the loading of freight and gives assistance when necessary. He picks up the signed bill of lading and verifies the inventory. He prepares the factory report of the items produced and validates payroll slips against production for the day. He forwards the bills of lading to the bookeeper.

Invoicing Cycle at Art Chemical

The office manager picks up the mail at the post office and sorts out the checks, orders, and correspondence. Upon receiving an order the manager checks the orders and verifies the amounts and applicable discounts. He circles items which the typist needs to notice, such as the purchase order number, the ordering company's department number, vendor number and warehouse number, special routing instructions, and the ordering company's computer numbers for the items purchased. He then indicates the routing to be used for the order. This information comes from the account card file, his own know-
ledge, or the A. T. A. Routing Guide, if necessary.

The orders are then given to the typist. The typist refires the amounts and discounts as a check measure and verifies any difference between her figures and the manager's figures. She then types the invoice set and returns the invoices and orders to the manager.

The manager again checks the amounts and discounts and separates the bill of lading set and the acknowledgment from the invoice. He decides which ones to mail and which ones not to mail on the basis of the size of the order and how quickly it is to be shipped.

The bill of lading sets are given to the foreman and the manager retains the rest of the invoice set and the purchase orders and uses them as a basis to prepare the production schedule. Any special items are put on the production schedule and the rest are filled out of stock.

The foreman assembles the orders, stamps the date on the bill of lading, and schedules the proper trucks to pick up the orders for the day. When the shipment is loaded the truck driver signs the bill of lading and the foreman gives him the white copy of the bill of lading set. The foreman retains the other two copies and uses them to verify the inventory. They are then given to the bookeeper.

The bookeeper sorts the invoices with the bills of lading. She then calculates the dozens shipped as a check on perpetual inventory so there is a record of the inventory on hand at all times. The parts of the invoice and bill of lading are separated and distributed to where they will go. A sample invoice set is shown on page 7 to illustrate the parts of the set.

The white invoices, blue duplicate invoices, and the salmon bill of lading copy are sent to the customers. The green copy of the bill of lading is retained in a file by customer with the original order attached.

The pink salesman's copy is retained in a file until
INVOICE

ART CHEMICAL PRODUCTS, Inc.

HUNTINGTON, INDIANA 46750

SHIP VIA Roadway

Dept. 70

YOUR ORDER NO. 457428

DATE Nov. 21, 1977

No. 79217

D-U-N-S
545-2388

SOLD AND/OR SHIPPED TO

Rose's Stores Inc. #431
U. S. Highway 1 South
Henderson, NC 27536

SOLD TO
(IF DIFFERENT THAN ABOVE)

Rose's Stores Inc.
Drawer 947
Henderson, N. C. 27536

ROUTE

DELIVERING CARRIER

<table>
<thead>
<tr>
<th>NO. PKGS.</th>
<th>B/L DESCRIPTION</th>
<th>WEIGHT</th>
</tr>
</thead>
<tbody>
<tr>
<td>126</td>
<td>Modeling Clay</td>
<td>2689</td>
</tr>
</tbody>
</table>

TERMS 2% 10 DAYS E. O. M.
F. O. B. Huntington, Indiana

<table>
<thead>
<tr>
<th>QUANTITY</th>
<th>DESCRIPTION</th>
<th>PRICE</th>
<th>AMOUNT</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>300 dz</td>
<td>#1</td>
<td>.90</td>
<td>270.00</td>
<td>927.60</td>
</tr>
<tr>
<td>120 dz</td>
<td>#21 KLEAN KLAY</td>
<td>2.75</td>
<td>330.00</td>
<td></td>
</tr>
<tr>
<td>72 dz</td>
<td>#31</td>
<td>4.55</td>
<td>327.00</td>
<td></td>
</tr>
</tbody>
</table>

less 7%

freight all.

13.45

849.22

ORIGINAL
the end of the month. These copies are used to determine the salesmen's commissions and the copies pertaining to their accounts are sent with their commission check the next month.

The yellow copies are given to the typist. She posts to the accounts receivable cards and to the account cards. She then posts to the Indiana sales tax book which is maintained for gross income tax purposes. She also uses the yellow copies to post to the work sheets she maintains for reports on the activity of major accounts. The yellow copies are then maintained in a file by month where they are used for occasional reference. The usage and flow of forms in the present system is shown on page 9.

The files used in the present system to gather and store data are as follows:

**Auxiliary card file:** This file contains a card for every account. It is a record of the items purchased the quantities purchased, the date of shipment, the dollar amount of shipment, the date of payment, any credit follow-up, the routing used, and the salesman assigned to the account.

**Accounts receivable account cards:** They contain the name of the account and the balance due.

**Journal of sales:** Sales are posted by month.

**File of bills of lading:** The green copies of the bills of lading are filed by customer with the original purchase order attached.

**Salesmen's file:** The salesman's copy of the invoice is filed and these copies are used to compute commissions.

**Informal sales reports:** Informal worksheets of the sales to the eight major accounts are kept by the typist as she posts to the accounts receivable ledger. From these worksheets she prepares the special reports sent to three of the major accounts and also prepares a report of sales made to all of the eight major accounts.

**Monthly sales records:** Monthly sales are kept track of by dozens and dollars (standard cost) on the perpetual inventory cards.
The information required on the invoice includes a shipping address, a billing address (if the shipping address and billing address are different), the trucking company which will pick up the shipment, any special routing instructions, the date of shipment, the customer's purchase order number, and the salesman's number and type of account designation. Some customers also like to have their department number, a vendor number, warehouse number, and their own item numbers for the items ordered. (These duplicate item numbers are used in computerized ordering.)

The bill of lading section on the invoice tells the total weight of the shipment and the number of cases in the shipment.

The number of dozens ordered of each item, the basic price per dozen for each item are recorded and the extensions are computed and added to get the total dollar amount of the shipment.

Under the standard pricing arrangement all orders are given a $.50 C. W. T. (per hundred weight) freight allowance. Orders which are over $100 are given a 5 percent quantity discount and orders over $500 are given a 7 percent quantity discount. The freight allowance and discounts are deducted to reach the net order price. An additional discount of 2 percent is allowed for invoices paid within the discount period.

Not all accounts, however, use the standard pricing arrangement. Six of the eight major accounts prefer slightly different methods of determining discounts. Although all of these accounts receive approximately the same total discount as a company ordering an amount large enough to receive the 7 percent discount, the salesmen have worked out arrangements which fit the desires of the purchasing companies. G. C. Murphy Company, McCrory Stores, and S. H. Kress & Company use a straight 9 percent discount deducted from the total order price as a warehouse allowance. Woolworth Company
has an "invisible" 2 percent discount from the basic price per dozen and a 7 percent quantity discount is deducted from the order price. The Woolworth Pacific Coast Distribution Center receives an additional 2 percent chain discount as a warehouse allowance.

The K-Mart Corporation receives a 7 percent discount on all orders, regardless of the size of the order because they have a number of warehouses which order separately. K-Mart also receives the $.50 C. W. T. freight allowance.

The Walgreen Company prefers to have their orders priced and ordered by cases rather than by dozen. For them net case prices are computed (the case price less 5 percent quantity discount and less the freight allowance on each case). The remaining 2 percent of their discount is deducted from the total order price (computed by net case prices) as an advertising allowance. Art Chemical has a policy of not giving advertising allowances, but in this case the 2 percent is actually part of the discount which the company is entitled to receive as a large volume purchaser. It is called an advertising allowance to please the buyer.

Data to prepare an invoice is obtained from the following sources:

Purchase order:
  shipping address
  billing address
  purchase order number
  department number
  vendor number
  warehouse number
  items and quantities ordered

Auxiliary account card file:
  carrier
  routing
  salesman's number and designation for type of account

Shipping date is stamped on the invoice when the order is shipped. Bill of lading description, item and order totals, discounts, and freight allowances are computed manually.
Art Chemical has a need to generate various reports from the invoices sent. These reports include special reports which are sent to K-Mart Corporation, Woolworth, and Walgreen of the quantities and dollar amounts of items shipped to their warehouses. Samples of these reports are shown on pages 13, 14, and 15.

Reports of the dollar amount of sales made in the accounts of the salesmen are needed to compute commissions. In addition to these reports, there are some other reports that are desirable. One such report would be to indicate the dozens and dollar amounts of each item shipped to each warehouse of the eight major accounts. Presently this report is prepared by company, but not broken down by warehouse. This report could be used to alert management to activity in the major accounts. If there is little activity in an area, then management can determine the causes. Sometimes local conditions preclude sales, but at other times a mishap may cause problems in ordering. Last year, for instance, one of the items was not being ordered by one of the major accounts due to a clerical error at that company. If this had been noticed earlier the correction would have been easier.

Another report which would be useful would be the total dozen and dollar amount of all items sold. This report would be used to maintain an adequate inventory of boxes and cartons and would tell if a trend occurred in the usage of certain items.

Presently the special reports for major accounts are prepared by the typist from records she keeps informally as she posts to the accounts receivable ledger.

The commission checks are prepared by a file of invoice copies kept by the bookeeper.

The report of sales to major accounts is prepared from records kept by the typist and pulled together into a report several times a year by the bookeeper.
July 12, 1976

Walgreen Drug Stores
200 Wilmot Road
Deerfield, Illinois 60015

Attn: Mr. R. E. Reed
Purchasing Department

Dear Mr. Reed:

As requested, we are furnishing the following report of purchases of Klean Klay Modeling Clay by Walgreen Drug Stores for April, May and June, 1976:

<table>
<thead>
<tr>
<th>Item</th>
<th>Code</th>
<th>Quantity</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>#19 Klean Klay</td>
<td>873552</td>
<td></td>
<td>$992.16</td>
</tr>
<tr>
<td>#31 Klean Klay</td>
<td>873558</td>
<td></td>
<td>966.76</td>
</tr>
</tbody>
</table>

Less 2% Ad Allowance

$1,958.92

Yours very truly,

Samuel M. Kaiser, Sales Manager
ART CHEMICAL PRODUCTS, INC.

cc: Hal Schollenberg
The needed output for the computerized invoices was determined by studying the existing invoices. It was decided to create three computer files to provide the proper inputs to the system—the customer file, the order file, and the inventory file. Company numbers and company warehouse numbers were assigned to each company to match the files during the computer run.

The customer file contains the company and warehouse index numbers; the shipping address, and if necessary a billing address; the trucking company which picks up their orders; routing instructions; the salesman's number; the company's vendor number; department number; and the items used by the company and their special computer numbers for the items ordered.

The inventory file contains information on the various items: the item number, the number of dozens in the carton, the weight of one dozen in a carton, and the basic price per dozen.

The order file is prepared as input as orders are received. The company and warehouse index, the purchase order number, the shipping date, and the items and quantities ordered make up the input variables for this file. Because each company may order a different number of items string vectors were used in this file.

A flowchart of the invoicing program was prepared so the coding could be developed. A flowchart for the first module of the program is shown on page 17.

The computer reads in the files and the order is first matched with the customer file. If there is no match on file for that customer number an error diagnostic is shown.

The computer first prints the carrier, the purchase order number, the department number, the vendor number, the salesman's number and account designation, the shipping address, billing address, and the routing instructions.

Next the bill of lading description is computed to
Read Order File
Read Inventory File
Read Customer File

A = G
B = H

error

I$ V$ N$ M$ C K$ W$
A$ E$
B$ F$
C$ G$
D$ H$
J$

U = X
X = 0

J = X / D
K = I * E
L
M

L M
indicate the number of cases in the shipment and the total weight of the order. For this the inventory file is matched with the order file to determine the weights of each dozen, the number of dozens in a carton and to compute the total cases and weights for each item and then compute the total number of cases and pounds in the shipment. A loop and control statement are used to read in the item numbers and quantities ordered.

Next logic statements are used to determine if the order is of one of the eight major accounts. Nine different sections of the program, one for each of the major accounts and one for all other accounts are used so that the different pricing arrangements can be followed and so that accumulations on the major accounts can be made for reports.

Each branch begins with a loop and control statement to read in the items and quantities on each order. The item ordered is matched with the same item on the inventory file. The number of dozens ordered is multiplied by the basic price per dozen to determine the total price for the item ordered.

The computer next checks to see if the item ordered matches an item on the customer file for which there is a special computer number. If there is a match the description of the quantity ordered, the item number, special computer number, the basic price per dozen and the extension amount is printed. (If the item ordered does not match the items listed on the customer file an error statement is printed and the computer goes on to the next order.)

It repeats this cycle until all of the items on the order have been processed, printed, and added to the gross order price. The flowchart for this procedure is shown on page 19. It is basically the same for all branches except three.

Under the basic pricing arrangement the total gross
A1

B1

X = U

X = Q

G = 1

X = 0

N = I * F
Z3 = B
Z4 = X
J1
S1
K1
L1
X = 0

I O P$ F N
I Q R$ F N
O1 = O1 + N

Z5 = C
M(Z5)
order price is checked to determine if it is over $100 or over $500. If the order is under $100 a $.50 C. W. T. freight allowance is computed by multiplying the total weight of the shipment by .005 and subtracting that amount from the gross order price to get the net order price.

If the order is over $100 the freight allowance is determined as before. Then the gross order price is multiplied by .05 and this 5 percent quantity discount is deducted with the freight allowance.

If the order is over $500 the freight allowance and a 7 percent quantity discount are deducted.

The different company branches of this part of the program are generally exceptions to this procedure. On the Woolworth and Walgreen branches different pricing methods are employed.

On the Woolworth branch the prices are first computed in the regular manner so that accumulations can be made for the reports. The prices are then recomputed in accordance with the special pricing arrangement. Two percent is deducted from the standard price per dozen as an "in invisible discount". The discounted price is then multiplied by the quantity ordered to determine the extension amount. The invoice is printed with discounted price and extension rather than with the basic price. Woolworth also receives a 7 percent quantity discount, but no freight allowance. The flowchart for computing Woolworth's special prices is shown on page 21. One warehouse receives an additional 2 percent chain discount because it is located on the Pacific coast. The warehouse number is checked and if the order is for this warehouse the additional 2 percent is deducted and printed on the invoice.

In the Walgreen branch the item extensions and the gross order price are computed in the regular manner for accumulating the totals for the reports. The invoice is then refigured using net case prices. These are determined by dividing the dozen ordered with the number of
N = I * F
Z3 = B(A2)
Z4 = X(A1, B1)
J5
S5
K1
L1
T1
N1
T

I = P$ T * N
I = Q R$ T * N
O1 = 01 + N
O2 = 02 + N1
Z5 = C(A2)
M(Z5)

Compute 7% Discount

If Pacific Coast Warehouse

Compute Discount
dozens per case. The basic price per dozen is multiplied by the number of dozens in the case to reach the case price. From the case price the net case price is figured by multiplying the case price by 5 percent to reach the discount amount per case. The weight of one dozen in a carton is multiplied by .005 to determine the freight allowance per case. These amounts are subtracted from the case price to give the net case price. The number of cases ordered is multiplied by the net case price to determine the extensions and total order price. The 2 percent advertising allowance is then computed and deducted. The Walgreen flowchart is shown on page 23.

In the ninth branch companies other than the eight major accounts have their orders computed. In this section it is necessary to determine if the ordering company has special item numbers for the items they use. It is also necessary to determine whether or not the item ordered is floral clay or modeling clay so the proper description can be printed on the invoice.

Logic statements are used to determine if the company has special item numbers listed on the order file. If it does these are printed on the description. It also checks to see if the items ordered are items 2 or 4. If they are one of these the description "Klean Klay Floral Clay" is printed in the description column rather than "Klean Klay Modeling Clay". If the company does not have special item numbers, the description is printed using the proper image statement. The companies discounts and freight allowances are computed using the basic pricing arrangement. The flowchart showing the ninth branch is on page 24.

The G. C. Murphy Company, S. H. Kress & Company, and McCrory Stores use the regular prices but have a straight 9 percent discount rather than the basic pricing arrangement. The Rose Merchandise Company and T. G. & Y. Stores use the basic pricing arrangement. They have separate branches in
FLOWCHART FOR BASIC PRICE ARRANGEMENT

\[ X = 0 \]
\[ X = U \]
\[ N = F \times I \]
\[ Z4 = X \]
\[ K1 \]
\[ S1 \]

Check for Special Item Numbers and Floral Clay

\[ O1 = O1 + N \]
\[ Z5 = C(A2) \]
\[ M(25) \]

Compute and Subtract Freight Allowances and Discounts
order to facilitate the accumulations for the report of sales to the major accounts.

On all orders the 2 percent discount for prompt payment is determined and printed on the invoice.

Samples of several invoices are shown on pages 26, 27, 28 and 29.

The use of a computerized invoicing cycle would require the use of a continuous form. On this form the billing and shipping addresses would be placed side by side for faster print out. Also, more information, such as the carrier, purchase order number, vendor number, department number, shipping date, and salesman's number would be printed in boxes on the same line.

On the present invoice the salesman's number is typed in the top right hand corner in order to file the copies used to prepare commission checks. Since the amount of sales in each salesman's account will be computed automatically, the salesman's number can be printed with the rest of the information.

Art Chemical has a need to generate various reports from the information on the invoices for both internal and external uses. Three of their major accounts require that reports of all items shipped to their warehouses be sent to their buyer at the end of the month, or in one case, every three months. Samples of these reports are on pages 13, 14, and 15.

There is also a need to compile a report of the dollar amount of sales credited to the accounts of the salesmen.

Reports of sales to each of the eight major accounts, broken down by warehouse and by dozens and dollars of each item shipped would also be desirable to show the activity in these accounts.

Reports of the dozens and dollar amount of items sold would be useful.
SAMPLE INVOICES

Associated truck 31290 3 8-C 2-16-78

G. C. Murphey Company
Distribution Center #2943
4150 Airport Expressway
Indianapolis, IN 46241

Associated truck

50 cases  Modeling Clay 48180 1673 Pounds

<table>
<thead>
<tr>
<th>Code</th>
<th>Quantity</th>
<th>Description</th>
<th>Unit Price</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>81DZ</td>
<td>19</td>
<td>KLEAN KLAY MODELING CLAY 1180</td>
<td>2.45</td>
<td>198.45</td>
</tr>
<tr>
<td>32DZ</td>
<td>31</td>
<td>KLEAN KLAY MODELING CLAY 1190</td>
<td>4.55</td>
<td>145.60</td>
</tr>
<tr>
<td>21DZ</td>
<td>19</td>
<td>KLEAN KLAY MODELING CLAY 1180</td>
<td>2.45</td>
<td>51.45</td>
</tr>
</tbody>
</table>

9% Warehouse Discount

$359.91

2% Discount allow, if paid in 15 days 7.20
Balance due if paid within discount period $352.71
SAMPLE INVOICES

Kains 17590 233 0233333 8-C 2-28-78

F. W. Woolworth Co.-Calif
% Chicago FWDG
3833 W. 38TH ST
Chicago, IL

F. W. Woolworth Co.
Pacific Dist CTR
570 Eccles Ave
S. San Francisco CA, 94080

Kains % Chicago FWDG., 3833 W. 38th St., Chicago, IL

68 Cases Modeling Clay 48180 2064 Pounds

81DZ # 19 KLEAN KLAY MODELING CLAY 2334760 2.40 194.40
82DZ # 31 KLEAN KLAY MODELING CLAY 2336020 4.45 364.90

7% Quantity Discount

2% Pacific Coast Warehouse Discount

2% Discount allow, if paid in 15 days 10.40
Balance due if paid within discount period $509.75

$509.75
### SAMPLE INVOICES

**Lime City**

| 94799 80 | 2-C 4-1-78 |

**Walgreen Company**  
5300 ST. Charles RD.  
Berkeley, IL 60163

**Walgreens**  
200 Wilmot Road  
Deerfield, IL 60015

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**Lime City**

| 43 Cases | MODELING CLAY 48180 | 1249 Pounds |

| 12CS  # 19 KLEAN KLAY MODELING CLAY 873552 | 6.80 | 81.57 |
| 31CS  # 31 KLEAN KLAY MODELING CLAY 873558 | 8.52 | 263.97 |

2% Advertising Allowance  
Total (net case prices)  
6.91  
$338.62

2% Discount allow, if paid in 15 days  
Balance due if paid within discount period  
6.77  
$331.85
SAMPLE INVOICES

Yellow Freight 11932  3-C 2-19-78

Duke & Aryes, INC.
8401 Chancellor Row
P. O. Box 47806
Dallas TX  75247

Yellow Freight

31 Cases  MODELING CLAY  48180  798 Pounds

<table>
<thead>
<tr>
<th>Description</th>
<th>Quantity</th>
<th>Unit Price</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>72DZ # 1 KLEAN KLAY</td>
<td>64</td>
<td>0.90</td>
<td>64.80</td>
</tr>
<tr>
<td>36DZ #19 KLEAN KLAY</td>
<td>88</td>
<td>2.45</td>
<td>88.20</td>
</tr>
<tr>
<td>21DZ # 4 KLEAN KLAY</td>
<td>39</td>
<td>1.90</td>
<td>192.90</td>
</tr>
</tbody>
</table>

5% Quantity Discount
$.50 CWT Freight allowance

2% Discount allow, if paid in 15 days  3.59
Balance due if paid within discount period  $175.67
Originally it was intended to prepare reports which would include year-to-date summaries and comparisons with the totals for the month and year-to-date of the previous year. However in order to set up the necessary files to store and accumulate this information the core space allotted under the Ball State University Computer Center's time sharing would be exceeded. It was decided to prepare the reports on a monthly basis.

The reports with the other totals could be prepared on a small business computer if the total core was devoted to the program at the time it was run. These types of reports could be generated on this program by adding some additional accumulation statements and files.

Three monthly reports have been compiled—the report of items and dollar amounts shipped to each company and its warehouses, the report by item of the quantities and dollar amounts sold, and the report of the dollar amount of sales for each salesman.

To prepare the company report accumulation statements were inserted into the program for each branch of the major accounts. The totals for the dozens and dollar amounts of each item are accumulated by using subscripted identifiers. Each company is assigned a specific identifier for the quantity and dollar amount of each item ordered. In the Murphy branch the identifiers for the quantity ordered is J1(Z3,Z4) and the identifier for the dollar amount is S1(Z3,Z4). The other companies use J2(Z3,Z4), S2(Z3,Z4); J3(Z3,Z4), S3(Z3,Z4); etc. The Z3 counter is set equal to B(A2), the identifier for the warehouse. The Z4 counter is set equal to X(A1,B1), the identifier for the item ordered. This permits the computer to accumulate the dozens and dollar amounts separately for each warehouse and for each item ordered from that warehouse.

K1(Z4) and L1(Z4) accumulate the quantities and dollar amounts sold on the basis of the item number only so they
can be used in the report of items sold.

After the total gross order prices are computed and all of the items on the order have been processed, the identifier M(Z5) is used to accumulate total dollar amounts for the salesman's report. The counter Z5 is set equal to the salesman's number on the customer file (C(A2)) so that dollar amounts are recorded under each salesman's number.

In order to print out these reports counters were assigned so that the totals would be printed in the same manner as they were first accumulated. A flowchart of the print out for the report for sales to one of the major accounts is shown on page 32.

Accumulations of the totals for quantities and dollar amounts are made for each item in each warehouse as they are printed out so that a total of the quantities of the entire company can be made. A total dollar sales for the entire company is also accumulated and printed. Samples of the reports are shown on pages 33 and 34.

CONCLUSION

The possibilities for generating reports from this program are almost endless. Reports could include all of the accumulations necessary for the special reports shown on pages 30, 31, and 32. Reports of sales by the week or even the day, listing of the accounts receivable of the day, reports of orders to be used in production scheduling, reports of sales for gross income tax purposes and many others are possible.

The ability of the computer to generate information for management decisions is one of its greatest advantages for business. With new small business computers small companies such as Art Chemical Products may be able to access information for management decisions very easily in the near future.
FLOWCHART FOR SALES TO MAJOR ACCOUNTS REPORT PRINTOUT

Print Heading

Print Company Name

Print Warehouse Address
A$
B$
C$
D$

Print Columns

J1 S1
K1
K2
H1

J1 = 0

G1 = 0

G1 G2

H1

Y7

Y6

Y5
# REPORT OF SALES TO MAJOR ACCOUNTS THIS MONTH

**G. C. MURPHEY COMPANY**

<table>
<thead>
<tr>
<th>Item</th>
<th>Dozen sold</th>
<th>Amount</th>
</tr>
</thead>
</table>
| G. C. Murphey Company  
Distribution Center #2943  
4150 Airport Expressway  
Indianapolis, IN 46241 | 19 | 102 | 249.90 |
| | 31 | 32 | 145.60 |
| G. C. Murphey Company  
Distribution Center #2953  
501 Lansdowne Road & RF&P Railroad  
Fredericksburg, VA 22401 | 19 | 24 | 58.80 |
| | 31 | 38 | 172.90 |
| Morgan-Lindsey Warehouse #2643  
4600 Central Avenue  
Monroe, LA 71202 | 19 | 81 | 198.45 |
| | 31 | 40 | 182.00 |
| G. C. Murphey Company  
Distribution Center #2903  
28th ST.  
McKeesport, PA 15132 | 19 | 24 | 58.80 |
| | 31 | 36 | 163.80 |

**Total sales to G. C. Murphey Company**

<table>
<thead>
<tr>
<th>Item</th>
<th>Dozen sold</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>19</td>
<td>126</td>
<td>308.70</td>
</tr>
<tr>
<td>31</td>
<td>70</td>
<td>318.50</td>
</tr>
</tbody>
</table>

**Total sales to G. C. Murphey Company**

<table>
<thead>
<tr>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>627.20</td>
</tr>
</tbody>
</table>
### REPORT OF SALES BY ITEM FOR THE MONTH

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Dozens shipped</th>
<th>Dollar amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>216</td>
<td>259.20</td>
</tr>
<tr>
<td>8</td>
<td>0</td>
<td>0.00</td>
</tr>
<tr>
<td>18</td>
<td>0</td>
<td>0.00</td>
</tr>
<tr>
<td>19</td>
<td>360</td>
<td>1425.90</td>
</tr>
<tr>
<td>21</td>
<td>24</td>
<td>66.00</td>
</tr>
<tr>
<td>31</td>
<td>428</td>
<td>1947.40</td>
</tr>
<tr>
<td>41</td>
<td>0</td>
<td>0.00</td>
</tr>
<tr>
<td>2</td>
<td>21</td>
<td>68.25</td>
</tr>
<tr>
<td>4</td>
<td>42</td>
<td>79.80</td>
</tr>
</tbody>
</table>

### REPORT OF SALES BY ITEM FOR THE MONTH

<table>
<thead>
<tr>
<th>Salesman No.</th>
<th>Amount of sales</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.00</td>
</tr>
<tr>
<td>2</td>
<td>285.60</td>
</tr>
<tr>
<td>3</td>
<td>628.50</td>
</tr>
<tr>
<td>4</td>
<td>259.40</td>
</tr>
<tr>
<td>5</td>
<td>44.00</td>
</tr>
<tr>
<td>6</td>
<td>65.25</td>
</tr>
<tr>
<td>7</td>
<td>75.25</td>
</tr>
<tr>
<td>8</td>
<td>0.00</td>
</tr>
<tr>
<td>9</td>
<td>426.00</td>
</tr>
</tbody>
</table>