PROJECT BACKGROUND

Beverage management is under two distinct portion control systems. They are the manual pour and the automatic dispenser system.

The oldest is the manual pour system with stock record cards, break out documents, and sales recapitulation ledgers. It is the least expensive system in terms of equipment costs, but can be costly in terms of manhours expended. Product portion control is strictly dependent upon the accuracy of the bartender's skill. Accountability is dependent upon the accuracy of the bookkeeper.

The automatic dispenser system is expensive as well as complex from a mechanical aspect. This system is an electronically controlled pump-valve device with a secured remote bulk liquor storage area. The drinks are programmed for correct portions and are automatically tallied. The standard system price ranges from $13,000 to $30,000 depending upon the number of drinks available. In addition to the high cost, maintenance is critical. A faulty pump or electronic pourer will put an operation completely out of business. The accountability procedure involves reading meter values and making physical inventories. These values are extended on a ledger as in the manual system.

With the advent of microcomputers, two software programs have appeared on the market in the area of beverage control or accountability. They are Cellar Master from Jupiter Island Corporation, Emeryville, California and T.A.P.S (Taven Audit Procedure System) from Sparkling City Software, Corpus Christi, Texas.

ABSTRACT

The goal of this project is to provide a food service operator with a tool to monitor accountability in liquor sales and bar management. Accountabilty in this context involves production costs and financial responsibilites.

The project will involve the development of a software system that allows a food service manager to analyze liquor sales with a microcomputer. With this system the manager can determine if his operation is within established criteria. These criteria include paying the proper liquor tax liabilities, the determination of cash overages or shortages, and achieving an acceptable inventory consumption rate. In addition, the system will enable the manager to track product movement and receive a statistical analysis of sales.

The project will demonstrate the viability and usefulness of standard microcomputer in a food service environment, specifically in the area of liquor control.

PROJECT THEORY RATIONALE

POTENTIAL SALES VALUE

(target sale value)

Theoretically it is possible to determine what sales should result from the consumption of a bottle of liquor. If the standard hiball consists of one ounce of liquor, and the standard litre contains thirty two ounces, then a given bottle contains thirty two drinks. If the normal one ounce drink $1.00 then the potential sales value (target value) is $32.00. Consequently, each bottle of liquor is then hypothetically valued at $32.00. By extending this logic, it should be possible to determine the total revenue that will be generated for a given number of bottles of liquor consumed. However; seldom are there operations that sell just one shot hiballs, and this is only the beginning of our problem.

Cocktail and other mixed drinks involving varying quantities of liquors comprise some portion of every operation's total sales. Hence the potential sales value of a given bottle must be adjusted according to some formula that accounts for the variation in quanitites of liquor utilized as well as the varied selling price. This creates a more complex situation than previously and requires considerable more computation.

In broad terms, this procedure initially establishes a potential sales value for each bottle based on straight shots(units of issue) and then periodically adjusted by some formula which we will call the "mixed drink differential". This differential is a weighted average value assigned per bottle of liquor based upon historical sales.

The key to this system of control is adherence to standard receipes. Daily sales are analyzed to determine a demographic ratio of drinks sold. This value is then assigned to each bottle of the same size. Using our previous analogy, given the same litre of liquor with $1.00 one ounce drinks and now adding two straight one ounce drinks at $1.50, a new

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potential sales value (target sales value) can be derived. In this instance, analysis of sales indicates that 25% of all liquor sales were two ounce drinks and 75% were single shot drinks. Using the previous logic this translates to $24.00 for one ounce drinks and $6.00 for two ounce drinks for a total potential sales of $30.00.

Mixed drinks present a new factor, although a one ounce mixed drink use no more liquor than a one ounce hiball, the "expertise" required to make this drink allows for operations to command a higher price. For our purposes, the one ounce mixed drink will sell for $1.75. After analyzing sales it was determined that 50% of sales were one ounce hiballs, 25% two ounce hiballs, and 25% mixed drinks. This then would translate to sixteen one ounce hiballs @$1..00, four two ounce drinks @ $1.50, and eight one ounce mixed drinks @ $1.75, for a new potential sales value of $36.00.

The same one litre of liquor can be valued from $30.00 to $36.00. The correct value of course depends upon the type of drinks sold. Other factors also must be considered to make this value a more realistic goal. Evaporation, spillage, breakage, and overpours can complicate our hypothetical example. Normally this is handled as a shrinkage factor and is reduced from the initial allowance allocated for each unit of liquor in an operation's inventory. This figure is normally between 1-3 ounces per bottle.

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DESIGN OF PROGRAM

(over view)

The project programs were developed using CBasic on the CP/M operating system. CBasic was chosen for its modular top-down capabilites which allowed for specific task-oriented modules to be independently developed and later linked together. CBasic is also recognized for its 14 decimal digits of accuracy, its string processing facilities, and its ability to support either random or sequential access to disk records. The language also enables the user to create multi-line user designed functions in addition to those supplied by the language.

Beverage Controller is a system of separately compiled modules which divides the overall process into three primary functions. These are (1) data input (2) data processing and (3) data output. The system is oriented towards front-end editing for data length, type, or predefined responses.

The system initializes system files, data files, and records various password or authorization codes during the first entry into the system. After this preliminary process, this portion is bypassed in subsequent entries. The system has a rudimentary security access routine which requires the use of a designated code for normal access. A date routine is encounter which will date stamp various system files and any hardcopy output. The first system menu is now displayed.

The **Master Menu** is the primary user interface into the system's various functions and activities. It allows access to six submenus, each with several options. The function are divided into the primary areas of activities previously mentioned. The Master Menu and its submenus check for proper selection of available options and alerts the user to discrepancies.

The first submenu is that of **General Information Maintenance**.

Its options's allow the initial inputing of data that will be used in later reports, such as establishing prices for drinks, initial allowances for specific units of liquor , and company name for report headings.

The second submenu is that of **Master File Maintenance.** This function adds records to the system's data base, allows for deletions of records, and changes to specific fields within records. The first two functions of addition and deletion are unrestricted to the user, the third, which allows alterations to records, is restricted by an authorization code to limit access.

Transaction File Maintenance allows the user to enter various transactions which affect the data base. These action typically increase or decrease values within records. These actions are accomplished by changes through receipts, inventory, or sales.

Print Work Sheets provides the user with formatted inventory work sheets and price lists. The inventory worksheet is provided to facilitate easier data input. The prices list is provided as a reference tool to be used by employees.

Option 5, **Analysis**, tabulates unit consumption, sales data, and calculates the system's target sales value. This is the system's data processing module. The target sales value generated is the benchmark figure by which cash sales is compared in determining overages or shortages.

Report Generation is the system's final main option. This is the system's primary data output routine. Three reports are generated from this option.

Detail Design of Program

The project utilzes two system files labeled "File.Dat" and "Access Dat". File Dat contains data file record counts for the master file (LCOF110.Dat) and the sales data file (LCOF150.Dat). The record counts are required for the various utility programs and routines, ie. sorts, search, and file backup to function properly. Access.Dat stores the various access codes, authorization codes, and system tolerance figures required in other programs.

Cursor2.Bas contains the code used by the project computers for screen addressing and user defined functions. Theoretically, to use the project program on another computer, the user would only need to change the cursor code specific to the target machine and recompile. This makes the program relatively easy to transport to another machine. In addition to screen addressing, graphic control codes are also included. They include those for entering and exiting the graphics mode, reverse and normal video. The user defined functions are primarily for data type checking, real numbers, integers, and alphanumeric characters. Code from this module is used by all of the system's programs.

The sort program used by the master file is the shell sort. The system sort is dimensioned to handle a maximum of 500 records. The sort is performed on a combination key created by the inputing program (master.bas), by combining the ASCII value from the first letter of the item type description (SC,BU,RM) with the item number. The inputing program also pads the number with zeros to allow proper sorting. Each of the record keys and current relative record number are loaded into the sort array. The sort is performed with the new record position written

relative to its new position within the array.

Files within the project are organized either into sequential access, stream file, or relative, fixed length access files. Nine sequential access files and five random access(two currently not accessed) files are created for use by the system.

In all situations where relative file records are altered, master file,sales file, etc, the records are automatically rewritten to another file, and a new scratch file is created (workfile.dat, wkmaster.dat). This is to prevent a catastrophic loss of data due to system crash or operator error. Upon completion of all alterations or modifications, the scratch file becomes the new master file, the original file becomes the backup, and the original backup is deleted. Sequential file backup differs from relative file backup in that no records are rewritten, but simpily renamed to be the backup file, and a new file is opened. These two procedures are adhered to in all file processing within the project.

The search routine is the most frequently used utility program. It is essential in every system function which requires retreival of a specfic individual record from a relative file. The search is a binary search in contruction, consequently all records in the file are presorted in ascending order. In this project, the master records are sorted on a combination key as mentioned previously, however, the colating sequence is not the standard ASCII sequence but according to a conversion table within master.bas. It defines a special sequence which facilitates report writing in later modules. The search utilizes file.dat for the record count to establish the upper, lower, and midpoint search boundaries.

Data input into the various subprograms are generally checked for type and are preformatted in all random access files.

Potential Sales Value Calculation

The "potential sales value" or "target sales value" is the system's projected retail bench mark to which actual cash sales are compared in determining overages or shortages. This figure is calculated on the basis of allowances, pricing, and consumption that has been inputed to the system. The value is dynamic in nature and varies on a daily basis due to sales.

Formula

The formula is: A * C * R * P = RV1

A = number of drinks (allowances) designated per unit size of liquor

C = consumption of a specific unit size during the inventory period utilized

R = retail price for a specific type of drink (hiball,mixed,fancy)

P = percentage of total sales for that price category and type of liquor

RV1 = represents subvalue to be totaled with similar values.

Example:

Given total consumption of 4 litres & 4 quarts of liquor for the accounting period with cash sales of $410.95 and complimentary value of $20.50. Is this operation within the target criteria?

Process

Before any calculations, access is made to the master file to tabulate consumption for each unit size. Allowances are then obtained from "Allow Data". For this example, the allowance value is 30 for litres and 28 for

quarts. Prices are obtained from "Price.Dat" for each price category available. Sales percentage are also calculated using sales data from "130.Dat" recorded todate. This sales percentage provides the demographic sales pattern for this specific operation todate. In this example, 60% of sales were regular hiballs, 25% special hiballs, 7% Fancy I, 3% Fancy II, 5% complimentary. The the formula is then performed for each category of prices and for each unit size. The values are accumulated to provide the total "target value".

The calculations performed by the program are as follows:

A	*		*	R	*	P	=	RV
[illegible] @ 1 oz		$		2.00		60%		180.00
[illegible] @ 1 oz		$		1.00		25%		37.50
[illegible] @ 1.5		$		2.50		7%		17.50
[illegible] @ 3.oz		$		3.00		3%		4.50
complimentaries						5%		
						100%		

target value for 4 litres=239.50

[illegible] @ 1 oz	d	2.00	60%		134.40
[illegible] @ 1 oz	a	1.00	25%		28.00
[illegible] @ 1.5	i	2.50	7%		13.06
[illegible] @ 3oz	i	3.50	3%		5.91
complimentaries			5%		

target value for 4 qts=179.37

The calculated target value in this instance is $418.87 + $20.50 (complimentary value) or $439.37. Our actual cash and complimentary sales was $431.45. The difference is $7.92 for a difference of -2%

In this example, the hypothetical operation is within our defined criteria.

Beer and wine accountability target values are calculated in a similar fashion with minor modifications. In contrast to distilled liquor sales, beer and wine sales generally involve preportioned units with the exception being keg sales which are handled in a very similar manner.

Project Conclusions

The system will be undergoing field use at Chung Mei Restaurant to determine if the various modules are user friendly under continous use. Although data has been inputted to test the system's calculating ability, actual field use has not thus far been used due to the complexity and size of the system and the time limitation. Test data thus far has resulted in target values in the range of + or - 2.5% error of fixed ounces figures. This difference is due to the system's dependence on sales data averages rather than fixed ounce consumption. Since the project is a control program rather than an inventory program, this is still within the design goal of the project. The state allows an additional 5% error rate in determining tax obligations.

The project has met all of the design goals established in the abstract, however, additional modules will be added. These modules will provide the ability to retain sales data, for either a fiscal or calendar year, produce the appropriate reports, and have graphics capabilites. CBasic Compiler supports graphics and will enable the development of a module to produce both bar graphs and pie charts for video display. This capabiltiy will render data output more usable without the need for hard copy.

BIBLIOGRAPHY

Eubanks,Gordon;Osborne, Adam; McNiff,Martin, CBASIC User Guide, OSBORNE/McGraw-Hill, Berkeley, California, 1981

Maizel, Bruno, Food and Beverage Cost Control, Bobbs-Merrill Educational Publishing, Indianapolis, 1980

Microsystems, "CP/M Software Directory", Vol. 4 Number 12, page 59-96

North American Marketing Group, Liquor Operations, 1981.