Requirements Analysis:
Maple Tours Ltd

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Professor Mylopoulos
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Introduction

Maple Tours Ltd. is a small travel company, which sells vacation packages to Florida. In addition to its Toronto-based operation, Maple Tours has offices throughout the Keys. The company’s success relies heavily on the accurate exchange of data between its employees in Canada and the United States, customers, property owners, and airlines. The main activities are: preparation of next season’s brochure/program; mass mailings to prospective clients; accounting; holiday control; and holiday bookings. Currently, most of these activities are done manually by an office manager, eight booking clerks, a book-keeper, three directors and other staff. A small computer system is used only for routine mechanical tasks such as the printing of invoices, reminders to clients, and flight documentation. The goal of this requirements analysis for Maple Tours is to propose a larger computer system to handle the majority of administration and accounting functions, as well as to provide important management information and statistics. Moreover, Mr. Aston, a founder and co-owner of Maple Tours is considering adopting ecommerce technology via a company website to improve the business and its relations with clients. This requirements analysis of Maple Tours Ltd. will study the existing procedures and computerized information systems in detail, propose alternative business procedures, and provide a requirements specification for the proposed solution.
The Problem

Maple Tours Ltd. has experienced such a significant increase in business that the company is considering the addition of a computerized information system for handling the majority of administration and accounting functions, and for providing management information and statistics. Another goal is to create a web site to facilitate ecommerce expansions. Currently, the company's operations are mostly done manually and all information about the clients, the properties and bookings are maintained on paper or wallcharts. There is a small computer system that is used mainly for printing confirmed invoices, reminders, lists of customer information, and flight manifests. The Toronto office only has four obsolete computers, and there is no network for any of the computers in Toronto and Florida. All information for approximately 10,000 clients is stored in filing cabinets, where each client has a file containing all correspondence and documentation. The filing and purging of old clients are done by the booking clerks if time allows. Wall charts for the flights and 500 properties are used to maintain updates on vacation bookings. Only confirmed bookings are inputted into the computer so that printouts of invoices, client information and flight manifests can be made.

Since information about clients is stored in filing cabinets, it is not possible for the booking clerks to retrieve relevant information quickly when clients call in. Moreover, the organization of the filing cabinets may not always be updated or accurate since the booking clerks purge the files only when time permits. Human error is common when such a large number of clients has to be filed. One aim for Maple Tours is to have an on-line history of client information so that details of past conversations can be easily recalled for the clerks to treat the client as "old friends". The current system of maintaining customer information in filing cabinets does not allow the clerks to do this quickly.

The property and flight wallcharts are also problematic because the system is no longer suitable for handling approximately 2000-3000 bookings per season. Property and flight statuses are updated using colour cards and graph-like charts. This system relies heavily on the clarity of the charts, the understanding of the coding system, and the visual perception of the booking clerks. As with the filing cabinets, human error in marking the bookings and viewing the statuses is common. Thus, another goal for Maple Tours is to have an on-line system of the wall charts. Such an addition would require that the new computer systems be networked.

Information about the 500 properties that is listed in the company brochures is also not readily available for the booking clerks. Great stress is placed on the personal knowledge of clerks to answer property queries. An improvement would be to have a computerized database of property information that would aid the clerks in suggesting properties for vacationers.

Another main activity is to produce mail shots to past clients to advertise future advertisements. The company tries to relate mail shots to bookings. The current process involves the manual review of customers to differentiate between current year clients, previous clients, and clients who booked and cancelled in the current year. Ideally, the new computer system should be able to query the different clients easily and quickly. Since the clerks are also responsible for the tedious manual notation of brochure requests when time allows, it would be beneficial to have a database of client information that relates to the brochure mail-shots. Consequently, such a database would be advantageous for the analysis of future income by the accounting department. The addition of a website where prospective clients can view brochure information as well as make payments, is another form of advertisement that the system may consider.

Currently, the accounting department does not use a computer system to calculate payment and to make other financial analyses. Manual calculation is tedious and sometimes inaccurate. A financial system would enable the accounting department to quicker results with a higher level of accuracy. This computerized process would also allow the personnel in the accounting department to focus their time on other important tasks such as analysing future income.
The addition of a computerized system will reduce unnecessary human errors that currently occur in the main office activities, as well as increase the efficiency and speed of these processes.
ALTERNATIVES

1. Retain Original System

<table>
<thead>
<tr>
<th>Costs</th>
<th>Benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>♦ Time is required to record daily transactions</td>
<td>♦ Not much training required</td>
</tr>
<tr>
<td>♦ Extra time and extra staff required to handle all customers enquiries</td>
<td>♦ no need to purchase additional hardware and software</td>
</tr>
<tr>
<td>♦ Bookings can not be entered until the deposit is made</td>
<td></td>
</tr>
<tr>
<td>♦ The property wall charts and flight wall charts are difficult to expand, and inflexible</td>
<td></td>
</tr>
<tr>
<td>♦ Information about the properties is not easily accessible. Employees simply do their best to know as much as they can about the properties.</td>
<td></td>
</tr>
</tbody>
</table>

2. Database for Bookings and Client Information

This alternative involves having all company and client information stored in a database. The database would include a log of phone conversations and a spreadsheet to keep track of current clients, past clients and prospective clients. Clients would be able to access rental information via telephone, fax, or in person. Clients can make payments in person or through mail.

<table>
<thead>
<tr>
<th>Costs</th>
<th>Benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>♦ Computer system, required software and accessories need to be purchased</td>
<td>♦ All company and client information is stored on a database and easily retrieved for future reference (the wall charts no longer need to be used)</td>
</tr>
<tr>
<td>♦ Employees need to be trained</td>
<td></td>
</tr>
<tr>
<td>♦ Future upgrades and maintenance of system may be necessary</td>
<td></td>
</tr>
</tbody>
</table>

3. Database for Bookings and Client Information, Online documentation

This alternative involves managing all company information in a database. Not only can clients call in about rental information, they can also access all information online through the world wide web. However, to make reservations clients must contact an employee either through the phone or in person and can make payments through mail.

<table>
<thead>
<tr>
<th>Costs</th>
<th>Benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>♦ Computer system, required software and accessories need to be purchased</td>
<td>♦ All bookings and client information is stored and easily retrieved for future reference</td>
</tr>
<tr>
<td>♦ Employees need to be trained</td>
<td>♦ Clients are able to receive reliable information fast and conveniently</td>
</tr>
<tr>
<td>♦ Future upgrades and maintenance of system may be necessary</td>
<td></td>
</tr>
</tbody>
</table>

4. Database for Bookings and Client Information; Online documentation and online payment option
This alternative is similar to the previous one, including having all company information in a database and having clients be able to access information through telephone, fax, in person or by the online documentation. The added feature is for clients to be able to make payments online.

<table>
<thead>
<tr>
<th>Costs</th>
<th>Benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>♦ Computer system, required software and accessories need to be purchased</td>
<td>♦ All sales and client information is stored and easily retrieved for future reference</td>
</tr>
<tr>
<td>♦ Employees need to be trained</td>
<td>♦ Clients are able to receive reliable information fast and conveniently</td>
</tr>
<tr>
<td>♦ Future upgrades and maintenance of system may be necessary</td>
<td>♦ Clients are able to conveniently make payments without having to leave the comfort of their homes</td>
</tr>
<tr>
<td>♦ Setup and licensing fees from credit card companies in order to utilize the online option</td>
<td>♦ Waiting time is significantly reduced since the time required for the arrival of application and payment information is reduced</td>
</tr>
<tr>
<td>♦ High end security would be required.</td>
<td></td>
</tr>
</tbody>
</table>

5. Database for Sales and Client Information; All processes available for viewing online by clients

In this alternative all company information is stored in a database and clients are able to access all information through telephone, fax, in person or online documentation. Clients are able to make payments in person, through mail or online (only by credit card). Clients are able to independently access information on available bookings, access a list of all properties available for hire on a specified date and place an "option" on a holiday. Clients have 10 days to make the deposit. Once the deposit arrives the option is "taken up" and a contract is made and a copy of the contract is sent to the client.

<table>
<thead>
<tr>
<th>Costs</th>
<th>Benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>♦ Computer system, required software and accessories need to be purchased</td>
<td>♦ All sales and customer information is stored and easily retrieved for future reference</td>
</tr>
<tr>
<td>♦ Employees need to be trained</td>
<td>♦ Clients are able to receive reliable information fast and conveniently</td>
</tr>
<tr>
<td>♦ Future upgrades and maintenance of system may be necessary</td>
<td>♦ Clients are able to conveniently make payments and book locations without having to leave the comfort of their homes</td>
</tr>
<tr>
<td>♦ Setup and licensing fees from credit card companies in order to utilize the online option</td>
<td>♦ Waiting time is significantly reduced since the time required for the arrival of application and payment information is reduced</td>
</tr>
<tr>
<td>CRITERIA</td>
<td>ALTERNATIVE 1 retain original system</td>
</tr>
<tr>
<td>----------</td>
<td>--------------------------------------</td>
</tr>
<tr>
<td><strong>Performance</strong></td>
<td>• all information stored on a small computer system (assuming spreadsheet) • lower level of security • take longer to search for queries</td>
</tr>
<tr>
<td><strong>Information</strong></td>
<td>• takes time to receive information • risk of brochures/invoices being lost/delayed in the mailing process; causing longer delays</td>
</tr>
<tr>
<td><strong>Economy</strong></td>
<td>• information retrieval time consuming • inexpensive in terms of software/hardware • no training required • new employees may be required to</td>
</tr>
<tr>
<td>Control</td>
<td>Efficiency</td>
</tr>
<tr>
<td>---------</td>
<td>------------</td>
</tr>
<tr>
<td>• information is not secure; no back up of sales information</td>
<td>• inefficient use of technology but could be improved</td>
</tr>
<tr>
<td>• information is more secure; passwords and encryption will be used for databases</td>
<td>• attempt to efficiently use technology but could be improved further</td>
</tr>
<tr>
<td>• information is very secure; passwords and encryption will be used for databases</td>
<td>• fairly efficient use of technology to reduce costs</td>
</tr>
<tr>
<td>• information is very secure; 128-bit encryption is available</td>
<td>• fairly efficient use of technology to reduce costs and speed up the completion of many tasks</td>
</tr>
<tr>
<td>• maximizes use of technology</td>
<td>• computer speeds up the completion of many tasks</td>
</tr>
</tbody>
</table>
**Recommended Solution**

From analyzing Maple Tours daily activities, including making client bookings to processing payments we feel that their current methods are inefficient. The wall charts used to keep track of property bookings and flight bookings is difficult to expand and the information is not transferable from one office to another. We are recommending (option #4 from analysis table) that Maple Tours store all client bookings and client information on a database system of which would be accessible through both the company’s network and through the world wide web. The online documentation shall provide customers the option to make credit card payments directly. By using a database system to replace the wall chart method, the time required for bookings is reduced, hence employees can serve more clients in the same amount of time. Also, by having all property information on the database system, employees can easily access all the information about specific properties, and no longer need to rely on memory when telling clients about different places. Information on a database system can be backed-up either on floppy disk, CD, or another hard drive thus preventing the loss of information. Although this method would be costly at the start, due to the purchases of the new system, it would be worth it for the company in the near future especially in the case of expansions. The database system would be a more efficient use of time and technology for the company. Option 5, which includes the ability to view all processes online, could be seen as a possibility for future improvements. It is not necessary to have such a option now, however, if the company improves and expands, it would be a good feature to include on the online document.
**Detailed Requirements: Table of Contents**

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   (memory, disk space, operating system, CPU, peripheral, network)
6. Functional Requirements for Company Network......................................................17
Introduction

Our recommendation to the company includes the use of a network system within the company and a company website, of which is accessible through the world wide web. The same server runs both the network system and company website, thus have access to the same information and changes to either one can be updated instantaneously. Information from the Florida office can easily be transferred to the Toronto office through this network. Information is stored on a server and can be access by all the client computers. The server system is well supported with a backup system thus there is only a 2% chance that the server would break down in a year. The company would be required to upload the data to be accessed through the web and can download the required information.
2. System Decomposition

The “Maple Tours Manager” (MTM) system is decomposed as follows:

- **Bookings Application Subsystem** provides the functions and databases to keep track of all customer, property, airline, and booking information.

- **Account Applications Subsystem** provides the functions and databases which handle the vacation payments, the processing of salaries and other expenses, the payment of villa and airline contracts, and the calculation of statistics for management information.

- **Advertising Applications Subsystem** provides the functions to extract and analyse the property, airline and customer information for the brochure production and mail-shots activity.

- **Network Manager Subsystem** provides for communication within the company network, as well as with the Internet.

- **System Control Subsystem** is responsible for startup/shutdown control of the MTM system and error handling.

- **Website Applications Subsystem** provides the functions and the databases, which handle the maintenance of the company website and online transactions.
3. External Interfaces

![Diagram of external interfaces]

1. Interface Requirements
The intranet network system should be user-friendly for seasonal employees to easily learn to use the system with minimal training. A “What you see is what you get” format would be practical in this situation.

2. Performance Requirements
a) reliability: The intranet network should be at least 98% reliable because crucial information needs to be accessed and transferred between the two offices daily. The company is totally dependent on the computer system. Thus, the system shall exhibit a Mean Time To Repair of not less than 2 hours. If the system continually breaks down, bookings and the transfer of information would be slowed down causing unfavorable customer service. Customers may become annoyed, leading to a drop in the company’s profits.

b) Quality of Software: The software acquired by the company shall have no more than 50 bugs per thousand lines of code as calculated by the Monte Carlo seeding technique in Appendix A.

c) Capacity: The company network system shall handle up to and including 50 simultaneous terminals (one computer per employee) with the ability to expand if necessary.

3. Operating Requirements
a) Restart requirements: In the event of software failure, the system shall perform an automatic restart. The automatic restart shall be completed within 5 minutes.

b) Response time: The system must have instantaneous response time for customer convenience. Customers will be annoyed if they had to wait for response to their inputs.

c) Security: The system must be protected from the loss of information. Some sort of back-up system should be used to store data. This system must be able to instantly update information to the server. The system shall have a dependable virus checker, which can be updated to include new viruses. A program such as “Norton Anti-Virus” should be considered. Since customers are able to make payments on their credit cards through the web, the system would require 128-bit encryption (highest form of security available today). Also, because both the company network and the website run from the same server, internal information needs to be protected.

d) Flexibility: The system must be flexible to addition of new statistics and/or information fields.

4. Lifecycle Requirements
The languages, operating systems and tools used should be universally available and standardized, such as FORTRAN, COBOL or C (for languages), or such as Unix, Windows (operating systems). The system shall be designed in such a manner as to allow for future addition of offices and expanding the network if need be if the company expanded to other areas in the world. Similarly,

5. Economic Requirements
The average cost for setting up the system can be no more than $250 000 (given that published profit is $500 000). The cost of maintaining the system shall be no more than $50 000.
Platform Requirements

1. **MEMORY**: The system shall have 128MB because a computer that will be running Windows, Netscape, MS Office, at the same time will require a certain amount of memory in order to operate properly and comfortably for the user.

2. **DISK SPACE**: The system shall have a disk space of 20 GB. This disk size may appear to be extremely large but most computer systems come with at least 12GB worth of hard drive space and also to accommodate for future conditions.

3. **OPERATING SYSTEM**: The system shall use WINDOWS NT. It is best to have software/operating system that provides security needed for networks, and Windows NT was designed for this. The Windows environment is easy to use and the employees at Maple Tours is already familiar with it. As a result, the need for training is reduced.

4. **CPU**: The system shall use a 400 mhz CPU. A computer that will be running Windows, Netscape, MS Office, usually at the same time will require a fairly fast processing speed, in addition to memory size, in order to operate properly and comfortably for the user.

5. **PERIPHERAL**: Printer: The system shall use laser printers, to provide professional-looking documents both within the offices and for customers.

6. **NETWORK**: A switch is required to connect the computers together with the DSL or T1 connection. Cables are required to connect the computers to the switch.
6. Functional Requirements for the Company Network System

The functional requirements section of the requirements definition specifies the activities carried out by the system, the information maintained by the system, and the interfaces that the system supports. Each company computer will have the basic computer set-up of a monitor, keyboard, mouse, and printer for information input and output. The following is a description for each subsystem for the “Maple Tours Manager” (MTM) system.

1. Bookings Applications Subsystem

a) System Activities
The Bookings Applications subsystem provides the functions and databases to keep track of all customer, property, airline, and booking information. This subsystem will replace all of the manual activities currently done by the booking clerks. “Option” or provisional bookings can be recorded on the system, and confirmation details of the costs can be printed out automatically. If a deposit is received, the provisional booking is marked as “taken up”, and a contract and confirmation invoice are generated. When the final payment is made, the record is marked as paid in full, and a final receipt is automatically generated. Reminders are also printed up automatically if the payments have not been paid. Flight manifests with passenger details are also printed out two days before the flight departure to send to the airline. Lists of clients and their accommodation are also printed out or emailed to the Florida managers. There are also two online wall charts for properties and flights. These wall charts are continually updated on the system to record the property and flight statuses. If necessary, regular updates of the online booking charts can be printed out or emailed to the Florida managers, thus reducing the manual process of copying the information from the wall charts onto sheets of paper.

b) Information Maintained
There is a database of client information that can queried by name, vacation package or booking reference. An online history of client conversations is also stored in the Client database so that the booking clerks can recall past issues when clients call. Each client has a “notepad” screen in which the clerks can record past conversations. A database for “option” or provisional bookings is used to keep track of interested customers who have yet to pay their deposits. Once the deposits are received, these records can be marked as “taken up”, and the records are transferred to the Confirmed Bookings database. The Confirmed Bookings database consists of records of clients who have yet to pay in full. Once the full payments are received, these records are marked as paid in full and sent to the Paid Vacations database. Each of these three databases can be queried by name or booking reference. Information for the flights and properties can be extracted from the paid vacation database so that manifests and lists can be printed out. Finally, there are two online wall charts for the properties and flights that can be simultaneously referenced and updated by all the computers in the network.

c) Interfaces
The Bookings Applications subsystem consists of multiple screens that are linked together. These screens represent the Client database, the Provisional Bookings database, the Confirmed Bookings database, the Paid Vacations database, the Flights database, the Properties database, the Property wall chart, and the Flight wall chart. As described in b) and c), updates in payments allows the transfers of records to be passed from the Provisional Bookings to the Confirmed Bookings to the Paid Vacations. Each of these three databases can be queried by name or booking reference. Updates to these databases also changes the online Property and Flight wall charts so that the booking clerks can reference current vacation statuses when clients call to inquire. When a change has been made to a wall chart in one computer, wall charts in the other computers are automatically updated. All of the databases support printing functions so that invoices, reminders, lists, and manifests can be printed out. The lists of client information and flight manifests can also be sent via email to the Florida managers and airlines.

2. Account Applications Subsystem
a) System Activities
The Account Applications keeps track of vacation payments of customers, as well as outstanding fees for late payments. The subsystem also processes employee salaries and other company expenses. It also handles the company payments to the property owners and airlines. In addition, the subsystem manipulates the data from these processes to calculate statistics for management information, such as the analysis of future income based on the current bookings situation.

b) Information Maintained
The Account Applications subsystem has a database that stores the payments and fees owed for each client. Another database stores the salary information for each company employee, as well as other company expenses. The subsystem also keeps a record of the payments made to the property owners and airlines. Finally, the Account Applications maintains a history of past company income and results from previous financial analyses.

c) Interfaces
The Account Applications subsystem uses spreadsheets to maintain the necessary information. Spreadsheets allow for calculations to be made quickly and accurately.

3. Advertising Applications Subsystem

a) System Activities
The Advertising Applications extracts information about clients, airlines, properties, and vacation packages from the Bookings Application and Accounting Applications subsystems. This information supports brochure production, and the mail-shots activity.

b) Information Maintained
There is a database that keeps record of the properties and flights available for vacations during the season and. The subsystem also has a database to record brochure requests including the source of enquiry since this is central office activity. This information affects the mail-shots activity and the analyses of management information by the Account Department. Another database records client information to distinguish between current and past clients. The mail-shots activity uses this information in addition to the information about brochure requests to estimate the amount of business generated from each type of advertisement.

c) Interfaces
The property and flight database is maintained in a program that allows for queries by the booking clerks for vacation packages should callers ask for information. Queries can be done by vacations by date, price, property restrictions, and location. This process allows the clerks to search for property and vacation information on the database instead of relying on their personal knowledge. There is also an input screen that records brochure requests in a database. Client information is stored in a spreadsheet that separates current from past clients so that mail-shots can be directed. This spreadsheet automatically prints address labels when requested, as well as provide summary charts and graphs for management information. Finally, there is a program that allows for the creation of the company brochure.

4. Network Manager Subsystem

a) System Activities
The Network Manager simply provides communication between the company network via a server. It ensures that information updated on each computer is quickly and accurately transferred to the other computers so that all of the booking clerks will have access to updated information. This is especially crucial for the online wall charts since these provide continual property and airline updates. The company network also allows for internal emailing between computers in Toronto and Florida. In addition, the Network Manager uses the server to
maintain the company website. Information such as payments and client inquiries received through the Internet is sent to the company network.

b) Information Maintained
The Network Manager maintains information about the communication statuses of the company network and website.

c) Interfaces
Since the Network Manager is not accessed by booking clerks, its interface shows the communication statuses of the computers, as well as Internet information.

5. **System Control Subsystem**

a) System Activities
The System Control is responsible for the startup and shutdown control of the MTM system and error handling.

b) Information Maintained
System Control records the statuses of each computer to ensure that all operations are smooth. If an error is detected, actions will be performed in an attempt to correct it.

c) Interfaces
Like the Network Manager, System Control is not accessed by booking clerks so its interface simply shows the current computer statuses and error handling.

6. **Website Subsystem**

a) System Activities
The Website subsystem provides the functions and databases which handle the maintenance of the company website and online transactions. It transfers the online transaction information accurately through the Network Manager so that Bookings and Account Applications subsystems have updated information about vacation payments and inquiries.

b) Information Maintained
The Website subsystem keeps track of all website information such as the required html files. There are also records of all transactions online. Email is available for clients to ask the company about specific questions.

c) Interfaces
A program (e.g., Frontpage) is used to maintain the company website, as well as an Internet browser to view the site and retrieve email. A program for the transfer of online information will also be used by the Website, Bookings and Accounting subsystems.
Appendix A

Bebugging Technique based on the Monte Carlo Statistical Analysis Technique

Bebugging is when a number of seeded bugs are inserted into the software system just before testing. Then testing is done and bugs are uncovered.

Number of Bugs in system = \( \frac{\# \text{ of seeded bugs} \times \# \text{ of detected bugs}}{\# \text{ of detected seeded bugs}} \)
Appendix B

CONTEXT DATA FLOW DIAGRAM

Customer  

MAPLE TOURS PROCESSES

Property Owner

Flight Information

Property Information

Airline

Bookings

Invoices
 Appendix C

LEVEL 0 DATA FLOW DIAGRAM

- Property information
- Flight information
  - Holiday Control
    - Monitor operations
      - Report to Customer
        - Customer
          - bookings
          - payments
        - Employee
          - Generate paychecks
            - property owners
              - Send out Brochures
                - brochures
                - Create Brochures
                  - brochures
  - Airlines
    - airline payments
    - flight delays
  - Record bookings/payments
    - invoices and payments
    - employee report to customer
      - report to customer
  - Employee
    - paychecks
    - paychecks