

Resource Scheduling Project

nURAD Technologies Inc.

By

Jim Barnard

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Management Summary:

Background:

Nurad Technologies, Inc. is a small defense company that builds many different types of products that go on other company's products. An example is a composite (type of fiberglass) shield that contains radar jamming equipment and fits into the wings of Lockheed Martin's F15 Fighter Jets.

Situation:

There are seven main departments with Nurad Technologies Inc. that are responsible for the actual production of Nurad's products. They are: Engineering, Purchasing, Tooling, Composites, Machining, Assembly, and Test. The product flows through production in that order as well.

Problem:

Management has no efficient way of determining when the product needs to be in each of those departments. Management also has to spend many man hours figuring out what volume will be going through each department during specified weeks.

Analysis:

Nurad uses PC's to do the majority of their computing. Information also already exists about the orders in Microsoft Excel. Therefore, Microsoft Access is a logical choice of a program to use for acting as a database to store the data and make calculations on the data.

In-depth Project Details:**Background:**

Located in downtown Baltimore, Maryland, Nurad Technologies, Inc. is a small defense company that builds many different types of products. These products are not stand alone product, but instead go on other company's products. An example of one of Nurad's products is a wing raydome. The wing raydome is a composite (type of fiberglass) shield that contains radar jamming equipment and fits into the wings of Lockheed Martin's F15 Fighter Jets. The composite can also be designed to hold other types of equipment such as the radar equipment that bombers use to track their smart bombs. Unfortunately, Nurad will not release very

many details of their products because the products are considered Top Secret by the United States Government. All employees are required to have Top Secret clearance. Some have a higher level of clearance than others.

Problem:

My father, Tony, is the President of Nurad Technologies Inc. and came to me for help when he heard that I needed a Senior Design project. He told me that Nurad has a urgent need for a resource scheduling system that will track customer orders and the flow through the company's seven major departments (Engineering, Purchasing, Tooling, Composites, Machining, Assembly, and Test) to completion. They are currently using Excel to try and keep track of there weekly department volume and the "bottlenecks" that occur in these different departments. They have no system to automatically analyze the data and therefore they are wasting a lot of time trying to make the analysis by hand. A problem arises because they are unable to see the weeks that the "bottlenecks" will build up and in turn the different weeks that the extra personnel will be

needed. Each department currently has a maximum capacity of production volume that it can handle. My father needs a program that will help predict future department volume in each week so that he can determine if employees need to work overtime, more employees need to be hired, or existing employees need to be replaced because they are inefficient.

Situation Analysis:

Every order has to go through steps before it can be completed. These steps occur in Nurad's seven departments. These steps can either be a measure of time or money. They can also be by order or by unit. For example, Engineering is measured by hours per order. This is because in Engineering, the product is being designed by the mechanical and electrical engineers. A product only has to be designed once; then it can be copied an unlimited amount. Purchasing is measured in dollars per order. Assembly on the other hand is measured in hours per unit because each unit has to be individually assembled. The week that the product was to be in each department was calculated by: $\text{WeekDue} - \text{"Department"}$ (Lead Time).

The amount of resources used for that order is calculated by: Quantity*"Department" (hrs/unit) or "Department" (hrs/order)*1. The weekly totals are then grouped by week, summed, and averaged by using another query.

MS Access Database Analysis:

The solution was to build a Microsoft Access database from scratch that allows Nurad's management to enter the required information about their orders and in return display the order's departmental volume and the "bottlenecks" in the departments for the specific weeks. This allows them to visualize in the present where in the future they will need extra personnel, money, or machinery in order to continue manufacturing and delivering their products on time. This will improve the companies competitiveness and productivity. The data used in the database is mostly hypothetical. It is used just to prove that the database and the calculations that it is asked to perform are working correctly. Refer to the Appendix to see a few sample reports of required data. The reports display all the needed information about when certain orders need to be

in each department and what the department's weekly volume is. The database is very user-friendly. It contains buttons that helps the end-user navigate to specific information. The buttons are controlled by macros (code).

Obstacles and Limitations:

There were only two problems with the project. First, MS Access was not, to my knowledge, able to show the scheduling of Nurad's orders on a conventional calendar. Second, some of the end users on the MS Access database at Nurad Technologies Inc. may need a brief training session in order to operate the database correctly. A user manual was included to help Nurad's employees get started with the database. I was unable to have MS Access show a red flag if the departments weekly volume exceeded what was the department weekly maximum because my father said that the weekly maximums are constantly changing.

Conclusion:

I believe this was a very educational and valuable experience for both Nurad Technologies Inc. and I. Now that the project is completed, Nurad is going to be able to predict "bottlenecks" much easier and try to prepare for them adequately. I have also gained experience by tackling a realistic business problem while learning more about the department resourcing problems of companies and MS Access.

Appendix Table Of Contents

1. Microsoft Access Resource Scheduling User Manual
4. Weekly Department Orders
7. Department Weekly Volume Totals
10. PowerPoint Presentation slides

Resource Scheduling

User Manual

nURAD Technologies Inc.

By

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How To Begin:

1. Click on the MS Access icon from the MS Office tool bar or go to MS Access through the "Start" icon and Programs section when using Windows 95
2. Once MS Access is loaded on the screen, go to "file"
3. Go to "open" and select the file Nurad.mbd

Entering Data:

1. Click on the forms tab of the database
2. Open the form called Customer Order Form
3. This is the main form
4. All data entry and report gathering will initially come from this screen

Getting Reports:

1. To view/print reports, click on the button at the bottom of the page of the desired report
2. This will take you to another screen
3. Now click on the button of the function that you wish to do

Exiting Database:

1. There are buttons at the bottom of all the screens that will automatically close that screen

2. The "x" in the top right corner of the screen will also close that screen

Additional Help:

1. Use the MS Access help function located at the top of the screen
2. Or, call the database designer: Jim Barnard
(214) 696-2275; M-F 11am-7pm

Engineering Orders

<i>Order #</i>	<i>CustomerName</i>	<i>Product</i>	<i>Engineering Week</i>	<i>Engineering Total Hours</i>
7986-001	Boeing	Comp Vac 459	1	40
8878-001	Boeing	Ecover 459	3	10
8888-005	Lockheed	016-00565	2	40
8888-007	Lockheed	016-00565	3	15
8889-004	Wytec	hk47	2	21

Purchasing Orders

<i>Order #</i>	<i>CustomerName</i>	<i>Product</i>	<i>Purchasing Week</i>	<i>Purchasing Total \$</i>
7986-001	Boeing	Comp Vac 459	3	\$8,000.00
8878-001	Boeing	Ecover 459	7	\$890.00
8888-005	Lockheed	016-00565	3	\$450.00
8888-007	Lockheed	016-00565	5	\$98.00
8889-004	Wytec	hk47	8	\$230.00

Machining Orders

<i>Order #</i>	<i>CustomerName</i>	<i>Product</i>	<i>Machining Week</i>	<i>Machining Total Hours</i>
7986-001	Boeing	Comp Vac 459	8	248
8878-001	Boeing	Ecover 459	17	135
8888-005	Lockheed	016-00565	8	40
8888-007	Lockheed	016-00565	14	40
8889-004	Wytec	hk47	22	154

Engineering Total By Week

<i>Engineering Week</i>	<i>SumOfEngineering Total Hours</i>	<i>AvgOfEngineering Total Hours</i>
1	40	40
2	61	30.5
3	25	12.5

Purchasing Total By Week

<i>Purchasing Week</i>	<i>SumOfPurchasing Total \$</i>	<i>AvgOfPurchasing Total \$</i>
3	\$8,450.00	\$4,225.00
5	\$98.00	\$98.00
7	\$890.00	\$890.00
8	\$230.00	\$230.00

Assembly Total By Week

<i>Assembly Week</i>	<i>SumOfAssembly Total Hours</i>	<i>AvgOfAssembly Total Hours</i>
9	155	155
10	20	20
17	72	72
20	270	270
25	154	154



Company Requirements

- ◆ Company only has PC's
- ◆ Company has Microsoft Office 97
- ◆ Company is currently using MS Excel to do the Resource Scheduling
- ◆ Program must be compatible with MS Excel
- ◆ End users have very poor computer skills
- ◆ Program must be able to create departmental reports



Meeting the Needs

- ◆ Microsoft Access works on all PC's
- ◆ MS Access is part of Microsoft Office
- ◆ MS Access works very easily with MS Excel
- ◆ MS Access has the ability to act as a database and a calculating tool
- ◆ MS Access has the ability to be extremely user-friendly (Buttons, Forms, Reports, etc.)



Program Need Analysis

- ◆ Company needs to be able to know when a product order will need to be in each department so that the order can be delivered on time to the customer
- ◆ Company also needs to know how much volume each department will be doing during each week so that the correct amount of employees can be there



Key Benefits

- ◆ MS Access is able to be adjusted and enhanced so that it can grow with the needs of the company
- ◆ The database is easy for the end-user to operate
- ◆ Compatibility with other Microsoft products



Limitations

- ◆ Unable to make the database recognize dates and make calculations from those dates
- ◆ Company does not have any employees that are experienced MS Access programmers



Conclusion

- ◆ Completed a MS Access database that tracks all orders
- ◆ Successfully analyzes the department resources so that management can realize potential "bottle necks" before they occur
- ◆ User friendly!!!



Microsoft Access Demo

- ◆ Now for a quick demonstration of the Microsoft Access database program
